Lay, Community and Worker 'Epidemiology' – An Integrating Strand in Participatory Research

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Introduction

Effective public health should be based on the World Health Organisation (WHO) principles of 'upstream' health interventions to prevent the development of avoidable diseases, rather than focus on 'downstream' medical interventions to treat preventable diseases. The achievement of such an approach should therefore rest on decision-making underpinned by the precautionary principle.

The precautionary principle depends as much on informed social, economic and political decision-making as it does on science and medicine. Indeed for the famous medical practitioner, Rudolph Virchow, medicine was 'applied politics'. Central to the approach is a need to assess the purpose and impact of any developments that might impinge on health in terms of environmental factors – be they personal, social or physical. In this context the first step in protecting public health should be the prevention of approval of dangerous substances or processes – be they in food, water, air, for domestic, leisure or workplace use. This should be achieved through rigorous toxicology or other scientific and technological testing.

In this context 'lay/worker/community' activity for the good of the public health has a part to play in the process of vetting substances, processes, materials, buildings, factories and other types of plant and installations. We have witnessed globally the over-confidence of scientists, regulators and politicians in the past when dealing with potential public health problems: their inability to deal with uncertainty, their failure to take data gaps seriously when carrying out risk assessments, their failure to go beyond very narrow risk assessments and skewed cost-benefit analyses which constantly favour capital over community and workers. Some communities live with the consequences of the failure of such approaches daily - whether in India and Pakistan, or Nigeria, China, the USA, the UK, Italy, Belarus, or Ukraine. Lay/worker/community action on public health issues can highlight these failures and bring important precautionary approaches to bear effectively on decision-making.

A case study – risk mapping on a grand scale

The Women's Environment Network (WEN) breast cancer survey with local community groups illustrates how communities themselves can explore possible health issues and look at ways to promote health supported by NGOs (WEN 1999). Appendix A contains some of the maps that the women developed. The UK has been top of the world league for several years on deaths from breast cancer in women. Local community groups have found in the east of England that they have some of the highest breast cancer mortality rates in the country, especially for women in younger age groups. The official response was to ignore these facts. The women themselves did not and organised a variety of means to investigate the problem and raise awareness of the disease – and the fact that perhaps at best only 40 % of all cases of the disease have established causes. They asked what role environmental factors could play in the disease and why so little data were available about environmental exposures and environmental risks related to breast cancer (Watterson 1995). The WEN breast cancer project has provided a community based means for such factors to be explored that may complement or possibly question some of the conventional tools used by epidemiologists.

These participatory studies now draw on Geographical Information Systems (GIS) approaches but their roots lie in the risk mapping activities of workers in a Fiat plant in Italy many years ago. The maps so prepared of course rely on worker/community knowledge of processes and procedures rather than managerial and 'expert' assessments that may sometimes reflect the theory rather than the real practice of processes and chemical usage. Appendix B shows risk maps prepared by Canadian factory workers.

WEN and other NGOs represent the prudent decision-makers, the precautionary principle advocates in the public health field, although this is only part of what can be a polarised picture on tackling environmental risks as Diagram 1 below reveals.

Diagram 1: Community environmental epidemiology and toxicology: models of environmental policy and practice

Technological optimists

1. "EXPERTIST"
   - White coat syndrome.
   - Laws irrelevant.
   - No freedom of information.
   - "Paternalist".

(small pox
(asthma
(asbestos
(endocrine disrupters
(aluminium sulphate water pollution
(lead in petrol
(CFCs in fridges

2. LEGAL
   - Science and law-led and operationalised by politicians "unholy alliance"?
   - No need to enforce laws as experts solve problems.
   - paradoxically often a non-enforced model.

3. PARTICIPATIVE MODEL - non expertist

(uses community
(environmental
(toxicology.

- Non jargonistic.
- Community as partners in (epidemiology and standard setting/vetting.
- Minimum legal standards.
- Right to information.
- "Maternalist".

[Source: Costanza 1992; Watterson 1994a]

Prudent decision-makers

These different philosophies underpin the different approaches to risk and to epidemiology. Prudent decision-makers who use lay epidemiology approaches are searching for public health data showing there are no major risks associated with hazards: the burden of proof lies with the manufacturer/government to show processes are 'safe'. The approach is informed but not dictated by science and scientific methods and recognises the limits of science. This is 'the prove it's safe' position.

Technological optimists rely on the 'scientific method' and on the null hypothesis. They look for evidence that a process or product is hazardous and with clear and calculated risks and assume no hazard and no risk often when data are lacking or limited. This is 'the prove it's dangerous' position The next section deals with how lay epidemiology has developed and how it engages with the technological optimists.

Origins of lay epidemiology

To determine the nature of 'lay epidemiology' it is first necessary to explore conventional epidemiology a little. Epidemiology has been defined as:-

> *'The study of the distribution and determinants of health and disease related conditions in populations. It is concerned with both epidemic (excess of normal expectancy) and endemic (always present) conditions...The basic premise of epidemiology is that disease is not randomly distributed across populations'.*
>
> (M Shenker in LaDou 1997)

Comprehensive epidemiology studies, if done on a large enough scale, over a long period of time and with designs that exclude bias may prove very effective ways of assessing disease causation in populations. This is, however, a very expensive process. It is also fundamentally limited because, although such studies may inform decisions – through exploring correlation between exposures and diseases, though not identifying individual disease causes - on other potential public health risks, they simply do not prevent diseases and disasters in the study being undertaken. Effectively they close stable doors after horses have bolted or shut the cage after the tiger has escaped. Toxicology and engineering are meant to be 'secure stables and cages' – we know that they are not.

Like most professional groups, epidemiologists do not like to discuss their failures in public. Some epidemiologists criticise commentators for using positive studies to dam materials and processes and point out that such studies are often not capable of proving something is not risky. However, such epidemiologists may be silent on the limitations of epidemiological studies that show no risks from a hazard exist. This is called 'negative epidemiology'.

Negative epidemiology

' "The prevailing view" is usually subjective in science' according to Hernberg. Hence the following basic problems sometimes occur in epidemiology to produce 'negative' results, but such results are effectively inconclusive and do not prove processes and materials are safe.

Table 1: Limits of 'negative' epidemiology

1. No studies carried out
2. Studies too small to have statistically significant results
3. Studies poorly designed and not sensitive
4. Problems with validity of control groups
5. Follow up periods insufficient for effects to materialise or materialise fully or follow up incomplete
6. Accuracy of exposure data needed
7. Wrong exposure categories are studied
8. Exposure is too low and/or too short
9. Measures of morbidity are crude
10. There are random errors
11. Wrong or irrelevant morbidity indicators are used

(Source: based on Sven Hernberg 1992)

The science of epidemiology, viewed as so critical to the development of 'academic', rigorous and high status public health medicine, has replaced clinical case studies as the most effective and credible science for sorting out disease clusters. The view of clinical cases is generally

that they are statistically limited sources of information. However, non-epidemiological data, linked to clinical cases or observations, have sometimes resulted in very effective actions. For instance the links between exposures to soot and cancer came from Percival Potts' clinical observations and case reports in the late 18th century. The links between exposure to vinyl chloride monomer and the rare liver cancer, angiosarcoma, came through primary care physicians near a US chemical plant connecting clinical cases. The 'Back to Sleep' campaign in the UK which cut 'sudden infant death' rates came from observational studies, not conclusive physiological studies that could explain mechanisms of mortality (DOH 1998:61).

In the 1920s and 1930s, Sir Thomas Legge who was an early user of 'sentinel' events to trigger investigations of health hazards, (Legge 1934:25-29) used observational data from workers to identify hitherto relatively unknown risk. For instance, he visited a docks site where the dockers themselves had linked work with a hard wood to ill-health cases in their members.

Trade union identification of workplace hazards

Workers have always used observations, knowledge of 'sentinel' events – sometimes single warnings or one worker presenting with an unusual or hitherto unnoticed disease – and varied data to make risk assessments of their workplaces and recognise occupational diseases, sometimes well ahead of medical and scientific investigators in those workplaces. The table below illustrates this clearly.

Table 2: Successful trade union recognition of occupational diseases

INVESTIGATOR	HAZARD	ACTION
Alfred Greenwood, Glass Bottle Makers Secretary 1891 using social insurance records	cataracts in glass workers	1900s: compensation but no action on the process.
Local woodworkers trade union secretary observing workforce 1900s	Narcotic effects of African boxwood through slowing heartbeat	Substitution with safer woods as best available local exhaust ventilation still created dust inhaled by workers
South Wales Dockers Union secretary observed pitch dust exposure of briquette workers	skin cancer known for centuries in tar workers	1927 finally recognised as an industrial disease for briquette workers
Sheffield Occupational Health Project 1990	chrome ulceration	The project team found more cases in one small Sheffield factory than were recorded for the nation in official records
Local unemployed centre in Sunderland 1994	mucous membrane disease in engineering worker	The centre revealed gross under-reporting of the disease

[Sources: Legge 1934, Watterson 1999]

Rapid appraisal

One approach that now encapsulates much of lay epidemiology is 'rapid appraisal'. 'Rapid appraisal is primarily a methodology which provides timely, relevant information to decision-makers on pressing issues they face in project and programme setting (Kumar 1994 cited by Ong 1996:3). Hence it can be a diagnostic tool or an agent for change or both. It does, however, not necessarily draw on communities in the appraisal as lay epidemiology always would. Communities, whether geographic or workplace-based, should be public health decision-makers as well as the politicians and scientists. The methods that rapid appraisals deploy are very familiar to those engaged in lay epidemiology and might include a number of elements.

Table 3: Elements of rapid appraisal

Mixtures: mapping matrices, focus groups, time lines and trend analysis and faster than 'conventional methods'

1. Field work emphasis
2. Reliance on learning directly from local people
3. Semi-structured, multi-disciplinary, flexible , innovative approaches
4. Focuses on 'insights, hypotheses, best bets rather than final truths or fixed recommendations'

[Source: Ong 1996:2]

The key steps in the process would include those outlined below.
Step 1 defines purpose, identify target groups and agencies.
Step 2 identifies leader/team to conduct rapid appraisal.
Step 3 organises workshops.
Step 4 entails fieldwork, observation, secondary data collection, interviews.
Step 5 includes data collection and analysis.
Step 6 prioritises needs.
Step 7 feeds back to community and discusses possible actions.
Step 8 develop a programme of change.
Step 9 evaluates the work and, if necessary, redefine priorities.
Step 10 explores a second rapid appraisal or a view of future based on the first appraisal (Ong 1996:9)

Participatory research

This draws on lay epidemiology and rapid appraisal techniques to involve communities actively in the appraisals rather than simply being the passive subject of the appraisal. This entails opening up the research process to ensure communities and workers can influence any changes proposed as a result of the research undertaken.

Table 4: The benefits of participatory research

- exposing unrecognised levels of disease
- studying subjective symptoms in an effective way, for instance ME ,Chronic Fatigue Syndrome (CFS), MCS, syndromes, ULDs, asthma, occupational stress
- low cost way of identifying a wide range of exposures to possible disease causes and outcomes through interactive approaches able to deal with rapidly changing situations
- increasing capacity of communities and workers to involve themselves in public health
- recognising and using knowledge and experience of communities in identifying particular health risks
- new approaches to conceptualising knowledge
- enhancing the potential for action outcomes from research findings and raising awareness of policy-makers linked to an identification of key local concerns

(Source: adapted from Loewenson 1996)

Table 5 : Weaknesses of participatory research

- aim to identify community perspectives may mean no precise quantification of a particular problem occurs
- may provide inaccurate perspectives although there is major difference between lay perspectives and lay epidemiology eg malaria examples and CHD work.

Lay epidemiology

This should be a major strand of participatory research although it is often neglected as it sometimes appears too difficult to mount and potentially open to challenge by regulators and scientists. The uses of the technique are many and various and do not simply relate to the investigation of a health hazard and the scientific proof of correlations and causes of diseases. They also contain important community, individual, political and social elements (Watterson 1994b, Popay and Williams 1994 and 1996).

Table 6: Benefits of lay epidemiology

- Inform communities about public health problems and solutions
- Involve communities in public health policy and monitoring of solutions
- Sustain communities and individuals dealing with a common problem requiring community solutions
- Empower communities and individuals in an organisational and possibly social setting
- Change attitudes, approaches, sources of data, possible solutions to public health problems
- Educate professionals through lay groups about new or different public health perspectives and vice versa
- Campaign for positive change

Definition of lay epidemiology

'...the process by which lay persons gather statistics and other information and also direct and marshal the knowledge and resources of experts in order to understand the epidemiology of diseases.'

(Brown 1989)

Table 7: Principles of lay epidemiology - tools, mechanisms, techniques

These may include methods that:-

- appear 'easy' but are not in terms of data gathering
- sometimes observational – different types of data differently used
- generate similar data to that used by epidemiologists and toxicologists but perhaps more comprehensive, more up to date, more relevant, more current, better informed .
- are qualitative – records and histories that may be used in conventional epidemiology but given different weighting here. Problems exist already about recall, about job categorisation and about location and length of exposure and exposure levels in conventional epidemiology. Records of incidents, accounts of exposures, details of suspected adverse effects may all be more richly documented in lay epidemiology than some other sorts of epidemiological study.

The types of questionnaire that may be used in lay epidemiology studies are illustrated by the Vinatex study (see Appendix C) where the ex-workers organised, planned and partially implemented a study of workers exposed to PVC to try to track a range of health effects possibly linked to workplace exposures to vinyl chloride monomer (VCM), a gas used to make PVC. The workers themselves, in conjunction with an NGO, produced questionnaires, conducted interviews and gathered data. The questionnaires were modelled on those used by government departments and international agencies to protect the study from accusations of using 'subjective' data gathering methods. The results were analysed by a university in conjunction with the ex-workers group. The study has raised major questions about under-estimates of the ill effects of VCM exposure.

Data collection in lay, community and worker studies may also come in other forms, some of which would be readily recognised and accepted by conventional epidemiologists. These

Forms of conventional and lay epidemiology

Lay epidemiology may come in several and sometimes hybrid forms and is sometimes totally excluded from conventional epidemiology studies. For instance:-

1. Epidemiologists design, carry out, analyse and present the study.
2. Epidemiologists design, study and train and use lay staff to carry out survey.
3. Epidemiologists invite lay people to contribute to design of study protocol. Lay staff carry out questionnaire surveys and interviews.
4. Epidemiologists analyse and present data.
5. Epidemiologists invite lay people to contribute to study design. Lay people carry out surveys. Epidemiologists, with lay people, analyse and present results.
6. Lay people identify problem and invite epidemiologists to investigate the problem. Back to (1).
7. Lay people identify problems, involve epidemiologists. Joint protocol is drawn up. Back to (3) and (4).
8. Lay people identify problem, involve epidemiologists. Joint protocol. Lay people and epidemiologists jointly investigate problem and analyse results. Joint presentation of results.

The best approach is contained in number 7 above but this may also the most difficult to achieve because of resistance, apathy or ignorance from health professionals. Compromises along the way may need to be negotiated.

Ways forward

The benefits of lay, worker and community-led health studies are enormous. How can they be introduced more widely and supported more clearly? The following approaches may help the process. Strengthen the means available for social, economic or geographical communities to participate and indeed initiate lay/community epidemiology and toxicology projects both on suspect hazards and on industrial and other processes:

- by ensuring that 'no cost' freedom of information about disease and prevention are available at community level.
- by ensuring easy access to such information.
- by creating information systems that disseminate information rather than restrict information because communities do not know what information is available or are only given information if they ask very specific questions.
- by re-educating health workers in community epidemiology principles and techniques.
- by incorporating the need to involve communities in the monitoring, review and audit of pollutants into the new training of health and technical staff in public and private sectors.
- by all regional health authorities, trusts, local authorities, commercial bodies adopting the WHO Charter on Environment and Health with a commitment to implement its principles and practice (Appendix E). Public Health Medicine Departments in health authorities around the country should have a key role in this process as should community health councils.
- by central and local government and other funding agencies ensuring that lay/community epidemiology is built in as a requirement for any research grants or programmes which involve working on communities or health hazards affecting particular groups.

- by the adoption of cleaner production and toxics reduction methods, again based on community/worker input and audit on environmental hazards and the precautionary principle.

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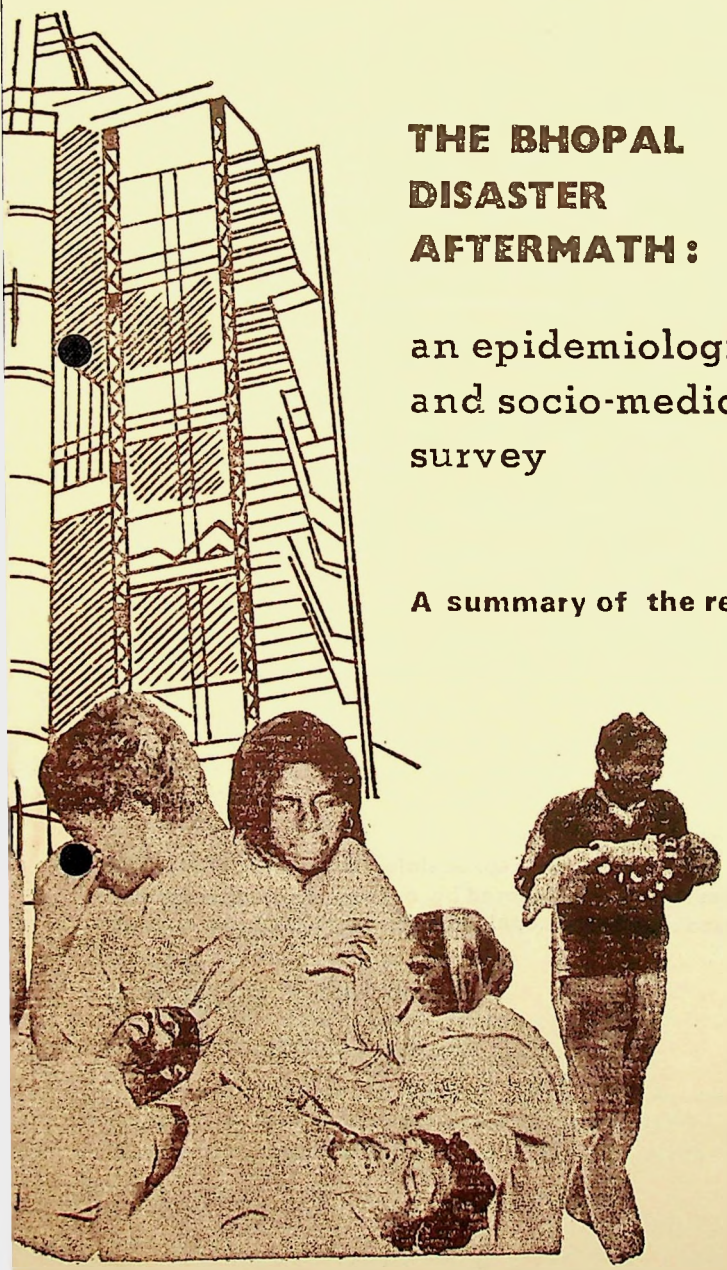

THE BHOPAL DISASTER AFTERMATH:

an epidemiological and socio-medical survey

A summary of the report

medico friend circle

PREFACE

The Bhopal disaster has been an unprecedented occupational and environmental accident. Equally unprecedented have been the imperatives for relief, rehabilitation and research in the aftermath of the disaster.

The local situation has been extremely complicated and dynamic. While health service providers and researchers have had to face many medical challenges; government and voluntary agencies involved in relief and rehabilitation have had to face many logistical and organizational challenges.

For the medico friend circle too, in its intervention in research and continuing education strategies in support primarily of voluntary agencies, it has been both a challenge and a thought provoking learning experience. The experience of planning, organising, analysing and communicating our research findings based on a modest study has brought us further in touch with the apathy, vested interests and status quo factors which obstruct action in favour of the disadvantaged in society.

Having seen the intensity of health problems of the disaster victims and the inadequacies in the strategies employed to ameliorate them we cannot but help raise critical comments on all components of the social medical system who are there to handle such problems.

Our objective, however, is more than critical analysis. Through this epidemiological study we have tried to make our own small contribution to a better understanding of the health problems that prevail in the aftermath of the disaster. We have also made suggestions for a more comprehensive relief and rehabilitation strategy.

A word of caution here-most of our observations are of the situation as it existed at the end of March 1985. Six months have passed in the process of analysis, consensus

seeking and understanding our findings. During these six months, many further developments—both positive and negative—have taken place in Bhopal at the governmental and the non governmental initiative.

We hope that this report will atleast help to highlight to our readers among other matters that—

(i) what people say and feel is as important evidence as what we can discover through our over-mystified medical technological approach;

(ii) in the absence of a community oriented epidemiological perspective, decision making about relief efforts following a disaster can be adhoc and often irrelevant; and

(iii) for research to be relevant to the lives of the people, the findings and inferences drawn must be communicated to the health service providers and the patients themselves through an effective communication strategy.

Finally we hope that through this report, we shall stimulate debate, dialogue and a commitment to a deeper understanding of the problem leading to more relevant and meaningful interventions.

Bangalore
2 Oct. 1985

Ravi Narayan
Convenor

THE BHOPAL DISASTER: ITS AFTERMATH

Introduction

The disaster that took place on the dark, wintry night of 2/3 December 1984 in Bhopal is the worst man made environmental accident in recorded history. The shocking, official estimates of 1754 human deaths, an equal number of dead cattle and the physical and mental disablement of over two lakhs people, by a mixture of toxic gases including Methyl Isocyanate (MIC), do not adequately express the tragedy that has occurred.

The relief efforts, initiated immediately, were handicapped and hampered by the lack of authentic information on the nature of the gases released, by the unwillingness of the Union Carbide to release information and by lack of relevant information among the State and Central authorities.

The doctors at the Hamidia Hospital, Bhopal, where hundreds of the victims rushed, were faced with an acute emergency which they never anticipated, of whose exact nature they had no inkling, and for the treatment of which they had no ready sources of information.

Since the nature of the toxic gases released into the atmosphere had not been made public either by the Union Carbide or by the Centre (which sent high level technical experts to Bhopal), this had to be a conjecture based on reason and visible evidence.

Soon, two theories emerged to account for the varied symptomatology and stunning mortality of the victims. The development and testing of these theories, had they been done properly, would undoubtedly have added immensely to scientific knowledge. What is more important is that it would have relieved the sufferings of thousands of people. The local realities have, however, revealed the power stru-

ggles in the medical community and how it ignores in the process, the victims; the lack of human concern leading to withholding of probable proper treatment; the indifference of our medical and scientific community to communicate with our largely illiterate but not unintelligent masses.

The Two Theories

The protagonists of the first theory, the *'Pulmonary theory'* believe that isocyanates of which MIC is one, damages only those tissues with which they come into direct contact and cannot be carried by the blood to internal tissues and organs. Thus MIC can damage only the lungs, eyes and skin and this according to them explains the predominant involvement of the eyes and lungs in the Bhopal victims. They also believe that symptoms, if any, related to other systems must be due to hypoxia caused as a result of lung damage. This theory is strongly supported by a dominant section in the Gandhi Medical College and the medical community in Bhopal. They believe that early deaths were due to carbon monoxide poisoning - one of the constituents of the released gases. They refuse to accept any alternative theory.

This theory cannot fully explain the varied symptoms of the victims: nor the fact of multi-systemic involvement without lung involvement seen in many patients. While another isocyanate, toulene diisocyanate (TDI) has been shown to cause brain damage, the protagonists of the present theory are silent as to why MIC cannot do so, too. Public Health specialists in the U. S. say that this exposure can lead to permanent lung involvement and blindness. This is in contrast to the Union Carbide which maintains that MIC can have no lasting damaging effects.

The main protagonist of the second theory, the *'Enlarged Cyanogen Pool theory'*, is the Indian Council of Medical Research (ICMR). In fairness to this body, it must be stated at the very outset that it does not reject the first theory

but believes that both have important roles to play in explaining the varied symptomatology.

This theory stemmed from the observation that the tissues and blood of the dead victims were bright red in colour. This occurs both in cyanide and carbon monoxide poisoning. Haematological (blood) studies by ICMR ruled out the possibilities of carbon - monoxide poisoning.

Cyanide on the other hand might have been inhaled directly as hydrogen cyanide or might have been released in the body after the breakdown of the MIC molecule.

Normally, there is a small cyanogen pool in the body formed by the generation of small amounts of cyanide or cyanogenic substance during normal metabolic processes. These cyanide or cyanogenic radicals are converted into relatively harmless thiocyanates by a liver enzyme called rhodanase and excreted in the urine. Certain foods like cabbage etc., and smoking are known to increase the cyanogen pool as evidenced by an increased excretion of thiocyanates in the urine. Cyanide/cyanogen interferes with oxygen utilization in the body.

The protagonists of the enlarged cyanogen pool theory have established that MIC in the body gets attached to the haemoglobin by a process of carbamylation. They believe that by a mechanism as yet unknown the cyanogen pool within the body is increased. In these circumstances, its conversion to thiocyanate by rhodanase, can be accelerated by administration of sodium thiosulphate (NTS). This is the rationale in using NTS as an antidote for cyanide poisoning. The resultant thiocyanates are excreted in urine, and this can be used to test the proposed theory itself.

The ICMR conducted a double blind clinical trial using sodium thiosulphate and glucose as a placebo on gas affected patients in January. Majority of patients who received NTS showed significant improvement and 10 out of the 19

patients showed an eight fold increase in urinary thiocyanate levels. Those who received glucose did not show significant changes. Unfortunately, and due to reasons best known to itself, the ICMR has not made the details of the findings of this crucial trial, public. The opponents of the theory too have conducted a trial-not double blind, which they say does not confirm the hypothesis. They too have withheld their findings from public scrutiny.

The Study by mfc

The mfc had decided at its annual meet held at the end of January 1985, to respond to a series of appeals from various non-governmental organizations(NGOs)and citizen's forums to undertake an epidemiological investigation, so as to support the victims and the NGOs in their struggle for proper relief and a more meaningful rehabilitation process. Some members of mfc visited Bhopal in mid-February to assess the situation and the actual epidemiological survey was conducted between 18-25 March 1985 by 11 members of mfc and 3 friends from the Baroda Medical College.

It must be admitted that the mfc had neither the human power nor the material resources to launch a full scale investigation. Our initial, fact finding survey revealed :

(i) official secrecy regarding all information on the disaster;

(ii) absence of open scientific debates;

(iii) lack of encouragement to NGOs.

The mfc therefore decided to:

(i) make an epidemiological assessment of the current health status and health problems of the people;

(ii) to examine the findings in the light of the two controversial theories;

(iii) to evolve a critique of the medical reasearch and relief programme;

(iv) to make recommendations for a more meaningful relief and rehabilitation policy.

The ICMR summaries of research undertaken and press releases available to us were inadequate and sketchy. We decided that we would go primarily by the broad range of symptomatology with which the patients in the community were presenting. We supplemented this by a thorough physical examination and undertook haemoglobin estimations and lung function tests. A criticism against this approach of reliance mainly on symptoms could be that it lacks objectivity. However, we believe that a thorough study of symptoms is a perfectly valid method of study as has been accepted in a whole range of medical conditions like chronic bronchitis, ischaemic heart disease, arthritis etc.

The study population

The study was a community based, case/control study. Two slums were selected for the study: (i) *J P Nagar* situated in the close vicinity of the Union Carbide factory and the worst affected by the gas leak. (ii) *Anna Nagar* 10 km away with the least exposure, which served as the control. There was no area which was similar to JP Nagar in socio-economic and environmental characteristics and yet escaped exposure and, therefore, Anna Nagar with the least exposure was the best control that could be chosen.

Rapport was established with the people by explaining to them our objectives and making it very explicit that we were not there to offer any financial compensation, medical treatment etc. The slum dwellers were given a hand out in Hindi explaining the role of mfc and a commitment was made that the salient findings of our study and our recommendations would be made available to them.

Sample Selection

The families for study were selected by random sampling, an accepted statistical method used in community

based studies. Only subjects above 10 years of age were selected. Those less than ten years were excluded in view of their probable inability to report symptoms correctly. All details were entered in a pre-designed proforma. In addition, lung function tests were done by standard procedures using a portable spirometer by a doctor fully familiar with measuring these under field conditions.

Observations

The two slum populations were similar in age and sex composition, in the number of smokers and of people with long standing respiratory problems like asthma, tuberculosis etc. The JP Nagar residents who were the more affected, were slightly better off economically but this is of no significance in so far as morbidity rates in JP Nagar are concerned. *(For details of actual figures, see our Report.)*

An unexpected finding was that people as far away as Anna Nagar (our control population) were minimally exposed and we observed a larger number of serious symptoms in this group than one would expect. This fact narrows down the differences in rates of symptoms observed between the two populations. The health impact of the toxic gases on the exposed population is therefore much greater than what our study reveals.

The subjects described *a broad range of symptoms arising from most of the different systems in the body.* Each symptom was described in such graphic detail that it was obviously based on the patient's own experience and could not be malingering or wild imaginations as some are apt to allege. Since these symptoms could arise due to different causes and since the residents of Anna Nagar, the controls, were also exposed to the gas, albeit to a small extent, the latter also reported those symptoms. However, *JP Nagar residents had a much higher (statistically highly significant) incidence of these symptoms compared to Anna Nagar.*

The commonest symptom was breathlessness on accustomed exertion. The following symptoms were highly significantly different (higher) in J P Nagar as compared to Anna Nagar: cough with expectoration, chest pain, blurred vision, photophobia, headache, fatigue, loss of memory for recent events, weakness in exremities, muscle ache, abdominal pain, nausea, and anxiety/depression (see table). The following six symptoms were also significantly different: dry cough, breathlessness at rest, watering of eyes, skin problems, bleeding tendency, and impotence. On grouping the symptoms according to the systems, most of them are related to the pulmonary system (respiratory), the gastrointestinal system (digestive), the eye and the central nervous system. It is important to note that this survey was conducted more than three months after the disaster, and the victims still continued to suffer so many multisystemic symptoms. Moreover *every individual in the J P Nagar sample reported atleast one serious symptom* but many in the Anna Nagar sample did not report any such. *Probably the most crucial finding of significance was that 35% of the patients had gastro-intestinal, central nervous system and eye symptoms in the absence of any lung findings.* This cannot be explained by the theory that the multisystemic symptoms are due to hypoxia (decrease of oxygen in blood stream) secondary to lung damage. It points to the possibility of a circulating toxin in the blood, affecting all the systems.

Our findings also refute the speculation that much of the present morbidity is due to a high prevalence of chronic diseases like tuberculosis, asthma, bronchitis etc., *and high rates of smoking* among the affected basti population.

Women in the reproductive age group reported menstrual irregularities such as shortened menstrual cycles, altered pattern of discharge, pain during menstruation and excessive white discharge. These symptoms were compared not only between the two populations, but also with respect to the

Salient Findings of the Study

Comparison of symptoms/investigations in J P Nagar and Anna Nagar

(expressed in percentage) (No. of cases are shown in brackets)

Sl No	Symptom	J P Nagar		Anna Nagar		P Value
1.	Breathless on usual exertion	87.16	(129)	35.50	(49)	<< 0.001
2.	Chest pain/tightness	50. 0	(74)	26.08	(36)	<< 0.001
3.	Weakness in extremities	65.54	(97)	36.95	(51)	<< 0.001
4.	Fatigue	81.08	(120)	39.85	(55)	<< 0.001
5.	Anorexia	66.21	(98)	28.26	(39)	<< 0.001
6.	Nausea	58.10	(86)	16.66	(23)	<< 0.001
7.	Abdominal pain	53.37	(79)	25.39	(35)	<< 0.001
8.	Flatulence	68.91	(102)	25.36	(35)	<< 0.001
9.	Blurred vision/photophobia	77.02	(114)	38.40	(53)	<< 0.001
10.	Abnormal distant vision	42. 0	(65/141)	21.88	(21/96)	< 0.001
11.	Loss of memory for recent events	45.27	(67)	11.59	(16)	<< 0.001
12.	Tingling & Numbness	54.72	(81)	20.28	(28)	<< 0.001
13.	Headache	66.89	(99)	42.02	(58)	<< 0.001
14.	Muscleache	72.97	(108)	36.23	(50)	<< 0.001
15.	Anxiety/depression	43.92	(65)	10.14	(14)	<< 0.001
16.	Impotence	8.10	(12)	0.72	(01)	< 0. 05
17.	Haemoglobin (male) (mean gm%)	14.68	(1.79)*	12.70	(1.35)*	< 0. 01
18.	Haemoglobin (female) (mean gm%)	12. 7	(1.46)*	10.79	(1.34)*	< 0.001

* Standard deviations of means

pattern in the same group before the gas disaster and the difference was found to be stastistically significant.

Nearly half of the nursing mothers in J P Nagar reported a decrease or complete failure of lactation.

8% of the men reported impotence.

The number of pregnant women in the sample is too small to come to any conclusion about the effect of the exposure on the outcome of pregnancy. We are conducting a detailed study of pregnancy outcome in September 1985.

Many residents had symptoms of anxiety, and some had frank depression. Many had loss of memory for recent events.

Mean pulse rates and respiratory rates were not significantly different in both sexes in JP Nagar and Anna Nagar. Mean haemoglobin concentrations in both males and females were significantly higher in JP Nagar than in Anna Nagar, suggesting that compensatory mechanisms in the body had begun to respond to the hypoxia.

The mean values of lung function tests were statistically significantly lower in JP Nagar as compared to Anna Nagar particularly in the age group 15-44 and 45-60 in both sexes. The pattern was primarily restrictive.

An important finding of grave significance is that 65% of the working persons in JP Nagar experienced a drop in income ranging from 20% to100% as opposed to only 9% in Anna Nagar. This reflects the way in which the physical/mental disability of the people caused by the disaster has affected their working and earning capacities.

The causative factor

The presence of such varied symptoms suggests the involvement of more organs and body systems than the lungs alone. These cannot be explained by the pulmonary

theory alone even though pulmonary lesions can cause peripheral hypoxia and hence muscular fatigue and so on. On the other hand, the enlarged cyanogen pool theory can better explain the varied and apparently unconnected symptomatology. It must be emphasised that both theories are probably playing a role in the causation of symptoms. However, the ICMR has not tested the cyanogen pool hypothesis rigourously. It has studied only the seriously ill, hospitalized patients and concentrated mainly on the lung symptoms. They do not say whether the non-pulmonary symptoms (symptoms not related to lungs) were also relieved by sodium thiosulfate and curiously has not made its findings public. One therefore, may also question whether the cyanogen pool theory is fully valid.

It must be stressed here that the mfc is not rejecting the cyanogen pool theory. It is only to point out that the country's main medical research pody has failed to be rigorously scientific in testing its own hypothesis.

Sodium thiosulphate therapy

We have already explained how sodium thiosulphate (NTS) will help remove cyanide radicals from the body. If the enlarged cyanogen pool theory has been established, even as one of two causative factors the victims should receive NTS treatment. Some of the local doctors and beaurocrats availed themselves of this, after the cyanide theory was proposed, yet the affected people in the bastis were not given the drug.

The ICMR at a meeting held on on 4 Feb 85, issued guidelines for NTS treatment. The medical group of Bhopal which was opposing the treatment, was also present at the meetings, according to the minutes. Yet they opposed the treatment later with the argument that they are not convinced of its efficacy. The question is not of a doctor's conviction. A doctor's choice of treatment cannot be arbitrary. The

question is whether there is scientific evidence in favour of NTS therapy and whether there is equally strong, if not stronger, evidence against the use of NTS in this situation.

NTS with its specific action is a better therapeutic agent than the non-specific remedies that are being used for the lung symptoms. A dominant section of the doctors of Bhopal are thus guilty of delaying treatment and by not revealing the findings of its clinical trial, the ICMR too has to accept part of the blame for the continuing suffering of the victims.

After a few weeks of controversy the NTS therapy has now been accepted but mass detoxification is still being strongly opposed.

The trial with NTS is not the only study launched by the ICMR. It has sponsored many other studies on the Bhopal victims, but they lack an integrated approach. Thus lungs, eyes etc., are being examined independent of each other, by different investigators and the ICMR is unwittingly lending support to the first theory, namely, that MIC gas damages only tissues with which it comes into dirrect contact.

What exactly happened to the gas victims?

So many months after the disastrous gas leak, one still does not know what exactly has happened to those who inhaled the gases and are still surviving. This is not because all attempts to unravel the mystery have failed but because an integrated approach has not been taken to do so. Months after the disaster, thousands of the survivors are still suffering from debilitating symptoms which prevent them from going back to work.

The medical community and the officialdom have been adhoc in their efforts to render adequate succour to these hapless victims. A powerful medical lobby in Bhopal have opposed sodium thiosulfate, a treatment, with good potential

to the patients. They have no convincing argument for their stand. The IMA, (Indian Medical Association) the organisation which has authority over the medical profession, has remained totally mute. The doctors as well as the ICMR have concentrated entirely on those who were hospitalised and have not evolved a holistic, community approach to understanding the problem. The ICMR sponsored local studies with exception of the NTS trials have lacked the rigour and the epidemiological orientation that are necessary in arriving at a meaningful understanding of the problem.

A point of utmost significance is that the victims of the Bhopal gas disaster mostly belong to the lowest strata of society and are not in a position to fight for their rights, be it medical aid or monetary compensation. It is, therefore, not very surprising that the government and its organisations have shown marginal interest in the after effects. It also reveals a lack of interest among our scientific community in investigating an environmental disaster of an unprecedented nature. On the other hand, one can observe the striking contrast with which all attempts were made to retrieve the Black Box of Kanishka, whose mid-air explosion resulted in the death of only 326 persons but needless to remind of the upper socio-economic class.

Recommendations

Research

1. The research and follow up studies should shift focus from hospital/dispensary based studies of seriously ill patients to family/community based ambulatory patients.
2. Well designed clinical trials should be further initiated using sodium thiosulphate as a therapeutic and epidemiological tool to further establish the significant could role it could play in mass therapy.

Care, Surveillance and Rehabilitation

3. Psychosocial assessment and consequent counselling and rehabilitation are urgently required.
4. Mass treatment with sodium thiosulphate based on ICMR guidelines should be initiated maintaining good medical records.
5 A surveillance programme should be undertaken to assess risks to pregnant mothers, unborn babies and new born babies. There should also be close monitoring of the gynaecological problems of women.
6. It is necessary to have a long term surveillance of lung function in view of the postulated damage to lungs and resultant lung fibrosis. Similarly, eyes should be examined regularly.
7 A comprehensive listing of all gas disaster victims is a long overdue task necessary for mass treatment, compensation and rehabilitation. This must be done immediately.

Communication

8. There is urgent need to evolve a continuing education strategy for all health personnel including doctors working in both government and non-governmental centres. These could be through newsletters, hand-outs and informal group meetings.
   The areas identified are:
   (i) sodium thiosulphate therapy;
   (ii) identification and management of psycho-social stress;
   (iii) risks to mothers and unborn foetus and need for surveillance;
   (iv) family planning advice till completion of detoxification;
   (v) role of respiratory physiotherapy;
   (vi) management of lactation failure;
   (vii) caution against overdrugging;

(viii) need for open minded surveillance of high risk groups;

(ix) importance of medical records.

9. There is also urgent need for dynamic creative non-formal health education of the affected community through group meetings, posters and pamphlets with information and messages built around their life style, culture and existing socio-economic situation.

The areas identified are :

(i) sodium thiosulphate therapy;

(ii) ongoing research programmes and informed consent;

(iii) risk to unborn and new born babies;

(iv) family planning advice;

(v) respiratory physiotherapy;

(vi) management of lactation failure including low cost weaning foods;

(vii) importance of records and regular check ups;

10. Occupational rehabilitation and compensation: In the ultimate analysis care of illness, health education, psychosocial counselling would be inadequate measures if they were not backed by adequate monetary compensation and urgent occupational rehabilitation of the disaster victims. This would have to be imaginatively done keeping their previous occupations and the residual disabilities in mind.

Coordination

11. The government machinery alone cannot handle such a massive task. The government must adopt a policy of enlisting the help of all non-governmental agencies and groups wishing to work in Bhopal. This enlistment must be active and supportive.

and finally

12. It is imperative that the victims as well as the entire country must be provided with all the details of how the accident occurred, of the nature of the chemicals released and of the reasons why the detoxification by sodium thiosulphate has been so badly mismanaged.

medico friend circle

The medico friend circle (mfc) is a circle of friends with medical /non-medical backgrounds who share the common conviction that the present system of health services and medical education is lopsided in the interest of the privileged few and must be changed to serve the interests of the large majority, the poor. mfc fosters a 'thought current': upholding human values, people and community orientation of health care and medical education, demystification of medical science and a commitment to the guidance of medical interventions by peoples' needs and not commercial interests.

mfc offers a forum for dialogue/debate, sharing of experience and experiments with the aim of realising the goals outlined above, and for taking up issues of common concern for action.

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(A detailed report of the study including background, objectives, materials and methods, observations and results, discussion, recommendations, important appendices including proformas and references and reading list is also available on request from the **mfc organizational office** *326 V Main I Block Koramangala Bangalore 560034*

Price Rs. 8. 00)

mm&P

mines,minerals & PEOPLE

Our Land, Our Minerals, Our Rights

♦ Mining in India

The problem of mining is manifold. The destruction of the preexisting habitat for the mining industry undermines the possibility of any other use of the other resources of the area. The Mining Industry is wide spread and severe adverse impacts are visible from small scale rat hole mining and stone quarrying to large open cast and deep underground mines.

The social and political implications of mining assumes far reaching implications when this principle mineral wealth lies in the most forested regions and those homelands traditionally inhabited by Dalit and Indigenous Peoples.

In the wake of the current globalization and liberalization programs, dictated to us by the International Monetary Fund and the World Bank, in the form of Structural Adjustment Programs, large new tracts of land are proposed to be acquired for mining with MNC's.

Mineral extraction today is dictated by the market forces and cartels controlling the price according to the profitability rather than for the benefit of society or a community.

Thus a good number of minerals go to the war industry, or to enhance the powers of the powerful through strategic control. Besides this natural resources of the poorer countries are being over used with rampant environmental destruction, while the same resources of the rich countries are being safely preserved for their future generations.

♦ mines,minerals& PEOPLE:

An Emerging Alliance

mm&P(mines, minerals& PEOPLE) is a growing alliance of individuals, institutions and communities who are concerned and affected by mining.The isolated struggles of different groups have led us to form into broad a national alliance for combating the destructive nature of mining.

mm&P members at present are

- more than 100 grass-roots groups,
- About 20 diverse support organizations,
- Across 16 States.

With the purpose of...

- Supporting local struggles,
- Legal and media advocacy,
- Information, documentation, research and fact finding,
- Developing campaign strategies,
- Skill share, Jatras, Exchanges,
- National and International networking,
- Technical and Scientific Expertise.

Challenges ahead....

- To bring a uniform and balanced mineral policy
- Protection of rights of indigenous communities,
- Fight for people's control over mineral resources,
- Stress for minimum mining,
- Explore better sustainable alternatives to mining,
- Resist environment destruction,
- Monitor global and Indian mining industries.

Of Choices.....

- Mining should be the last resort for the use of land. Before resorting to mining, comparable usability of resources from existing sources, i.e. recycling and storage dumps should be made,
- There is much greater wealth for human kind above these minerals.

- One species of medicinal plant which turns out a medicine can be worth ten times the total produce of minerals,
- Community knowledge of various aspects of human life-from medicinal plants to community organisation is worth ten times the value of a plant species.

...and Alternatives

- We should gear towards a national policy of what has to be mined and what should not be mined, from the interest of the people rather than the Markets and the Industry.
- We therefore feel the progressive nations should go beyond economics of the market place and understand global stewardship,
- they should contribute to minimising mining,
- and seek ways where we can replace non renewable with more renewables.

Of Values and Decisions.....

- The minerals will be for ever- if we do not mine them,
- The wealth above will never be ours-if we mine them..

...and therefore, in togetherness we appeal.....

Emphasise Minimum Mining

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Com H - 64.

Community Health / Environment Health Survey Skillshare (CHESS)
13 - 17th August 2001, Bangalore

OPERATION CHART FOR PLANNING AND ORGANISING A HEALTH SURVEY

PART 1: Planning the survey

1. Recognise and define community needs and problems.

2. Decide what information is required to deal with these needs and problems.

3. Enquire whether this information is already available; study and use any available information.

4. Decide whether a survey can succeed in getting the information required.

5. The First Planning Decisions
   - i) List the main questions the survey is to answer.
   - ii) Outline the methods (sampling plan) by which the information can be obtained.
   - iii) Decide on the time required for the field work

6. Decide on the sampling plan
   - i) How are the people to be selected for inclusion in the survey ?
   - ii) How many are to be included ?
   - iii) What arrangements are needed to get the interviewers to the respondents ?

7. Estimate the survey costs
   - i) What will the survey cost in terms of staff, time, transport and others ?
   - ii) Is the survey as outlined in (5) and (6) too big or too complicated or too costly ?
   - iii) Does the survey plan need changing ?

8. Make the final decisions on the survey including:
   - i) the essential information to be collected
   - ii) the scale of the survey

9. Design and write out:
   - i) Questions and questionnaire
   - ii) Sampling plan

10. Prepare the Interviewer instructions

PART 2: Organising the survey

11. Prepare the community for the survey
    i) Let people in authority know what is planned and get their agreement and co-operation. Explain the purpose of the study to them.
    ii) Prepare the community or institution for the coming survey.

12. Test the survey methods
    i) Test the questions and questionnaire.
    ii) If possible do a small pilot study.

13. Train the interviewers

14. Start the field work
    i) Arrange to meet the interviewers regularly and often for discussion.
    ii) Check completed questionnaires with the interviewers.

15. Abstract the Information
    Arrange for abstracting information from the questionnaires. Is local help available for this work ?

16. Write and distribute the survey report.

Source: Planning And Organising A Health Survey (Book 1) by W. Lutz
International Epidemiological Association

COMH 64.

Discussed

31/7.

The Community Health / Environment Health Survey Skillshare (CHESS)*

A. BACKGROUND.

Environmental regulations in India, even if properly implemented, will result in the steady poisoning of the environment. It goes without saying that a polluted environment will manifest itself in the form of health disorders amongst human and other living populations exposed to the polluted environment.

Irony:
Disaster – Agriculture
Pharmacy – Chemical Ind.
Pollution –

Based on numerous cases around the country, common sense evaluation clearly confirms that industrial pollution has damaged community health. However, the specific nature of the damage or its extent remains unknown. As a result, community health has hardly influenced pollution policy. The indications that this is the case is evident:

1. Pollution legislation aims at controlling pollution rather than preventing it.

2. Pollution legislation merely prescribes norms that legalise pollution.

LD50 Lethal Dose 50
MAC Minimum Allowable Concentration

3. What is legal is not healthy. Pollution norms are prescribed based on an assumption of assimilative capacity of nature rather than on facts that point to the cumulative nature of the most deadly kinds of pollutants.

4. Polluters remain unpunished for their pollution and effects on community health.

Importance of Community Health Surveys

Citizens and community groups need to be able to identify environmentally-caused health disorders, and the sources of environmental disturbance(s) that cause such disorders. This is important for several reasons:

1. Ensuring that the "Polluter Pays": The Polluter Pays principle is important not merely as a deterrent for further or future pollution, but also in the context of recovering the ecological debt owed to the communities of living beings and their future generations. Ecological debt goes beyond the fiscal and requires a deep-rooted sense of apology by the polluter for the damage caused by its actions.

2. Mobilising the Community: Often health disorders within a community are seen at a family level, with people blaming the compromised health of their family members on fate or accident. Many of the subtler effects - learning disorders, immune system depression, reproductive or gynecological anomalies - are noticeable as trends only when seen at a community level. Mapping the health of a community brings home the fact that the fate of the community as

Group at equal large no. of Procedure deliveries

* A CHC initiative, 13-17th August 2001

a whole is linked to its environment.

3. Preventing Future Harm: Armed with the knowledge that certain kinds of industries and pollution can cause community wide health effects, communities can play a more active and informed role in deciding the course of their communities' development. Combined with an operational understanding of the Precautionary Principle, such knowledge can help in preventing the setting up of polluting industries.

Delhi Court ruling – Shifting of industry into earmarked areas

4. Countering Government/Industry: Community health surveys need not be conclusive in establishing cause-effect relationship between environmental disturbance and health disorders. They need to sufficiently appeal to the common sense of the community members and the public to be able to challenge the baseless assertions by Government/industry that a community's ailments have nothing to do with the pollution they are subject to. Health surveys can help reverse the burden of proof, with communities demanding industries and governments to establish beyond doubt that their polluting activities/industries are not related to the community's health problems, or will not cause health disorders.

Contradicting.

5. Health Care Needs: Health surveys also allows for better understanding of the health care needs of communities living in environmentally disturbed areas. Such an understanding is crucial to designing the health care interventions necessary for the community members.

B. AIM:

and Campaigns

Equipping Communities to Deal with Health Surveys:

C. OBJECTIVES:

To create a multidisciplinary resource base of medical practitioners, community activists and toxicologists capable of conducting community health surveys in communities subject to industrial pollution;

To promote interaction between community activists and community health experts to facilitate a discussion aimed at understanding the limitations and strengths of community health surveys;

To understand the role of community health surveys in campaigns against industrial pollution. and environmental

D. THE SKILLSHARE (ORIGINAL PLAN)

The skillshare would discuss the following elements:

1. Toxicology

2. Pollution & Community Health

3. Design and Implementation of Health Surveys - Resource Implications

(costs, personnel, time etc)

4. Understanding the strengths and limitations of community health surveys

5. Using Community Health Surveys for campaigning.

6. Resources and resource sharing opportunities.

7. Case Studies

Participants

Community activists, medical practitioners from affected communities, occupational health doctors/activists, community health doctors/activists, toxicologists, lawyers.

E. RESULTS OF PRE SKILL SHARE SURVEY (As of 15/7/01)

Preliminary results of a pre skill share survey of potential participants has identified a wide range of concerns and expectations. While all of them cannot be covered in one skill share - it is good to reflect upon them as a group. Responses from others are expected. Skill emailed

List of participating groups/organization/campaign

C1-Thanal Conservation Action and Information network

C2-Occupational Health and Safety Center, Mumbai

C3-Paryavaran Suraksha Samiti, Narmada PSS

C4-Citizens for Alternatives to Nuclear Energy(CANE)

C5-Mines,Minerals and People(MMP)

1.What would you like us to cover in the Skill Share(general)?

C1- a)Basic human physiology and interactions of the various systems within for our general understanding,

b) The sequence that generally follows in the human body from the various routes of exposure to the health effects- acute and chronic and after(and also we need to understand their various forms like genotoxic, teratogenic, carcinogenic, etc.)

c) Multiple factors or sources are sometimes blamed for the same health problems seen, For eg. In one informal health survey on endosulfan sprayed area in xxx Kasargod we found a very high percentage of women having gynecology related problems- but many also revealed that they had Copper-T implants and they were relating their problems to that.

Going to a major problem.

d) Synergistic effects of various chemicals/ chemicals and lifestyles made causative linking difficult- simultaneously making it easier for the polluters to blame some other thing for the effects (like chewing pan, cigarette smoking, vehicular pollution, malnutrition lack of iodine etc as possible reasons also)

C2-a) Factory act and its occupational and environmental ramifications.

Most companies flout these rules

b) Workmen's compensation Act, ESI Act.

c) Disaster Management planning and antidotal treatment in case of chemical factory disaster, preparedness, training of local doctors and networking.

Lack of information.

C3-a)Known impacts of air and water pollution.

exposure doses.

b) Impacts of constant exposure .

C4-a)Methodology used for Kaiga Health Survey conducted by CANE.

C5-a)Mining and health

Mining brings out a whole new picture.

b)Industrial Pollution and impacts on community

c)Occupational Health

2.What would you like us to cover in the Skill share (Specific to your campaign)

C1 a) A community having health disorders may be due to a single external factor like endosulfan in Kasargod or due to multiple external factors like a mixture of pesticides like in Idukki or due to a waste dump and burning.

issues economics vs health.

Conservation Balance ?! economy

How will it be possible to develop a tool or set of tools to link disorders to the factors, especially when we interact with the community directly with focus on women and children.

B)People in the surroundings of industrial area having a lit of all kinds of chemical industries like fertilizers, pesticides, chlorine and chlorine compound manufacturing units, paper industries, rare earth factory etc- their individual and synergistic actions is madding this too complex conditions.

c) Plantation workers exposed to agro-chemicals over many years and their families affected by the same- directly and indirectly.

d) Workers and community living around and exposed to chemical in pesticide manufacturing units like the Hindustan Insecticides Limited factory at Eloor which manufactures DDT, endosulfan, diclofol, and used manufacture BHC till 1997.

C2-a) Noise induced hearing loss.
b) Occupational lung diseases
c) Hospital waste

C3-a)Suspected cancer in an area downstream of effluent carrying mostly suspected due to fish consumption
b) Impact of heavy metals, organic chemicals on health.

C4-a)How to calculate food and nutrition data in calories (food and nutrition data are collected in grams)
b)Any specific indexes that we need to calculate general health of the people.

C5-a)Health effects of mining(specific mining cases listed below0
b)Effects on workers
c)Effects on women workers(reproductive health)and community members

3.What toxic chemicals/products/processes are you dealing with in your campaign?

C1-a) Pesticide- especially organochlorines like endosulfan and organophosphates like phorate. The health issues due to direct intake by communities exposed to aerial spraying and otherwise, workers involved in spraying, and also indirect intake from contaminated water or food from the area sprayed.

2. b) Pollution due to effluent and emission from pesticides factory producing DDT, endosulfan, diclofol, and BHC (till 1997) The HIL factory lets out the effluents into a stream which contaminates large areas of wetlands before draining into the river Pereira. A Green peace study found 111 chemicals, 56 of which could be reliably identified, of which 39 were organochlorines including DDT and metabolites, endosulfan and breakdown products, HCH etc There are other highly polluting factories in the same area manufacturing phosphate fertilizers (FACT) rubber processing chemicals (Merchem) The study also found high levels of cadmium, chromium, zinc, copper and mercury in the same effluent stream. The stream is not being directly used for drinking water/ other purposes now, but at least 300 families live on its banks directly inhaling the pesticide smelling fumes emanating from the stream and consuming coconuts, ducks, eggs, which smell of the chemicals.

C2-a)Noise
b)Cotton dust and chemical exposures causing lung diseases.
c)HIV, Hepatitis B&C

C3-a) A cocktail of dyes, pharmaceuticals, illntermediate chemicals etc.
b)Decentralized cottage level waste recycling of containers, drums, bags containing chemicals.

Workmen's Compensation Act.

– Births & Deaths Register.
– Record of still births, abortions from PPS, etc.

– Can be natural also.

C4-a)Radioactive Pollution

C5-a)Coal, bauxite, uranium, mica, limestone, granite
b)Downstream industries (coalwasheries, smelters, refineries, crushers,etc,)

4. What experiences/ case studies / videos/ slides/ campaign material would you like to share with others during Skill share.

C1-a) We would like to share the aerial spraying of endosulfan issue in Kasargod and one of the study related to health survey done in a village in Kasargod and findings collated out of a death register survey from three villages.
b) We would like to share the Right to Know campaign and the issue at the Industrial belt at Eloor, with slides on the pollution there..

C2-a) Compensation to workers for occupational lung diseases and noise induced hearing loss as per ESI Act
b) Compensation to workers with radiation injury, accidents as per workmen's compensation act..
c)Books on disability assessment, occupational diseases(in schedule III of WC Act)
d) Books on occupational HIV and hepatitis B&C . Antidotal treatment in case of chemical disaster, experience of struggle by Parivartan in chemical belt in Konkan.

C4-a)Presentation using slides on Base line health survey conducted around kaiga.
b) Nuclear Power Plants and Public Health.

C5-a)Videos: Jadugora uranium;Baplimalli bauxite (Orissa) ; Silicosis
b) Case studies: Mapoon story of Australia(indigenous people and Aluminium companies)Story of Orissa-chromite areas, Environmental Aspects of bauxite and aluminium production in Brazil and Indonesia: Rossing Uranium- revealing health and environmental risks, Mica in AP

5.Any other ideas / suggestion not covered by above.

✓ C1-a) Can we think in terms of producing some fact sheets on health impacts due to the chemicals discussed in this Skill share. This could be one of the outcome of the skill share.
b)Could it be possible to develop an easy to understand note on the terms like genotoxic, teratogenic, carcinogenic and such other terms which are commonly used to depict the toxicity of these chemicals.

Working indices/Defns.

C2-a)Guidelines for impairment and disability assessment for compensation purposes.
b) Doctors" training and networking.

C5-a)How to do health surveys on occupational health.
b) How to monitor industrial pollution
c) Critique of our existing health survey questionnaire.

women having gynecology related problems- but many also revealed that they had Copper-T implants and they were relating their problems to that.

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b) Impact of heavy metals, organic chemicals on health.

C4-a)How to calculate food and nutrition data in calories (food and nutrition data are collected in grams)
b)Any specific indexes that we need to calculate general health of the people.

C5-a)Health effects of mining(specific mining cases listed below0
b)Effects on workers
c)Effects on women workers(reproductive health)and community members

X

3.What toxic chemicals/products/processes are you dealing with in your campaign?

C1-a) Pesticide- especially organochlorines like endosulfan and organophosphates like phorate. The health issues due to direct intake by communities exposed to aerial spraying and otherwise, workers involved in spraying, and also indirect intake from contaminated water or food from the area sprayed.

2. b) Pollution due to effluent and emission from pesticides factory producing DDT, endosulfan, diclofol, and BHC (till 1997) The HIL factory lets out the effluents into a stream which contaminates large areas of wetlands before draining into the river Pereira. A Green peace study found 111 chemicals, 56n of which could be3s reliably identified, of which 39 were organochlorines including DDT and metabolites, endosulfan and breakdown products, HCH etc There are other highly polluting factories in the same area manufacturing phosphate fertilizers (FACT) rubber processing chemicals (Merchem) The study also found high levels of cadmium, chromium, zinc, copper and mercury in the same effluent stream. The stream is not being directly used for drinking water/ other purposes now, but at least 300 families live on its banks directly inhaling the pesticide smelling fumes emanating from the stream and consuming coconuts, ducks, eggs, which smell of the chemicals.

C2-a)Noise
b)Cotton dust and chemical exposures causing lung diseases.
c)HIV, Hepatitis B&C

C3-a) A cocktail of dyes, pharmaceuticals, illntermediate chemicals etc.
b)Decentralized cottage level waste recycling of containers, drums, bags containing chemicals.

C4-a)Radioactive Pollution

C5-a)Coal, bauxite, uranium, mica, limestone, granite
b)Downstream industries (coalwasheries, smelters, refineries, crushers,etc,)

4. What experiences/ case studies / videos/ slides/ campaign material would likes to share with others during Skill share.

C1-a) We would like to share the aerial spraying of endosulfan issue in Kasargod and one of the study related to health a survey done in a village in Kasargod and findings collated out of a death register survey from three villages.

b) We would like to share the Right to Know campaign and the issue at the Industrial belt at Eloor, with slides on the pollution there..

C2-a) Compensation to workers for occupational lung diseases and noise induced hearing loss as per ESI Act
b) Compensation to workers with radiation injury, accidents as per workmen's compensation act..
c)Books on disability assessment, occupational diseases(in schedule III of WC Act)
d) Books on occupational HIV and hepatitis B&C . Antidotal treatment in case of chemical disaster, experience of struggle by Parivartan in chemical belt in Konkan.

C4-a)Presentation using slides on Base lines health survey conducted around kaiga.
b) Nuclear Power Plants and Public Health.

C5-a)Videos: Jadugora uranium;Baplimalli bauxite (Orissa) ; Silicosis
b) Case studies: Mapoon story of Australia(indigenous people and Aluminium companies)Story of Orissa-chromite areas, Environmental Aspects of bauxite and aluminium production in Brazil and Indonesia: Rossing Uranium- revealing health and environmental risks, Mica in AP

5.Any other ideas / suggestion not covered by above.

C1-a) Can we think in terms of producing some fact sheets on health impacts due to the chemicals discussed in this Skill share. This could be one of the outcome of the skill share.
b)Could it be possible of develop an easy to understand note on the terms like genotoxic, teratogenic, carcinogenic and such other terms which are commonly used to depict the toxicity of these chemicals.

C2-a)Guidelines for impairment and disability assessment for compensation purposes.
b) Doctors" training and networking.

C5-a)How to do health surveys on occupational health.
b) How to monitor industrial pollution
c) Critique of our existing health survey questionnaire.

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SUBMISSION ON THE HEALTH STATUS AND HEALTH CARE OF VICTIMS OF THE BHOPAL GAS DISASTER OF 1984

TO THE INTERNATIONAL MEDICAL COMMISSION ON BHOPAL (JANUARY 1994)

by

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MEDICO FRIEND CIRCLE, INDIA.

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"All scientific work is incomplete - whether it be observational or experimental. All scientific work is liable to be upset or modified by advancing knowledge. That does not confer upon us a freedom to ignore the knowledge we already have, or to postpone the action that it appears to demand at a given time."

A.B.Hill

SUMMARY

Studies done and published during the past nine years show concrete evidence of continued, multi-systemic clinical manifestations, which in several thousand victims are severe and in others moderate and mild. Immunological effects and genotoxicity are also evident. There is serious disruption in quality of life.

This has occurred among a population living below the poverty line, who were totally unaware of the hazard potential of their neighbourhood plant.

Medical care has been largely hospital/clinic based, symptomatic, curative care. There is some evidence of irrationality and overdrugging. The preventive aspects of health care are inadequate and there is no attempt at person centred, wholistic health or even of the basics of primary health care or community health.

Further victimization of the victims is evident from protracted legal cases, unjust settlements, grossly delayed processing of compensation claims and disbursements, and disregard for the invaluable human dignity of the affected people.

Comprehensive, just and humane health services are urgently needed. These will necessarily have to build on present realities in the government and voluntary sector. A shift in emphasis towards greater community organisation and building of community capability is suggested so that the victims are in greater control of their own health. Other components of community health also need to be built up/strengthened.

1. INTRODUCTION

Studies since the Bhopal disaster, have increased our understanding of the health effects on people exposed to toxic gases in December 1984. These clinical, epidemiological and laboratory studies done by varied organizations provide evidence of the bodily harm caused to approximately half a million Indian/world citizens. They in no way measure the suffering caused to those affected and their families.

These nine years have also been witness to the response by Union Carbide (the concerned company), the state and national government and the international community. These could be seen in terms of:

* availability/lack of timely authentic information;
* research efforts and utilization of their findings;
* evolution of appropriate therapeutic measures;
* organisation of medical care and rehabilitation; and
* utilization of medical information to work out compensation, etc.

Glaring lacunae exist in all the above, which would be considered beyond the levels of acceptability for other groups of citizens more favourably placed, even within the country. This response is added insult to the injury that was caused to innocent victims.

During present times the concept of social justice and equity in health and health care has been accepted worldwide and has led to the articulation of the Alma Ata Declaration to which most nation states are signatories. It is therefore important for members of the medical profession, and all those involved /interested in health issues, to work towards making these concepts and the goal of "health for all" a reality in specific situations such as Bhopal It may also be worth remembering that Bhopal is no accident, but is representative of a large number of instances of industrial and environmental hazards to which populations, particularly in the Third World, are susceptible.

2. HEALTH STATUS

The definition of Health by the WHO as " a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity", can be taken as the gold standard for health efforts. In the Bhopal situation all the different aspects of health need to be considered in comparison to this standard.

2.1 POPULATION EXPOSED/AFFECTED

Of the total population of 850,000 in Bhopal in 1984, the officially estimated exposed population was 5,21,262 (ICMR).

The ICMR estimates of the distribution of affected people is as follows:

Severely exposed area	:	32,477 people
Moderately exposed area	:	71,917 people
Mildly exposed area	:	4,16,868 people

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It is important to have a reasonably accurate number of those exposed, as they comprise the 'population at risk' who could potentially manifest adverse health outcomes as a result of the exposure. This number would be the denominator for calculating exposure related morbidity and mortality rates, besides being crucial for organizing medical care and arriving at compensation amounts.

The Government does not have a complete list of victims and it is estimated that 1,00,000 victims who are residents of the 36 officially declared gas affected municipal wards have not been registered. It is strange that a country that successfully conducts census operations and regular enumerations for elections, besides other exercises like the Sample Registration Scheme and several other large studies by national research institutions and operations research groups, suddenly finds it near impossible to list a relatively small population in a confined and concentrated geographic area. Factors such as migration are not specific only to post disaster situations and other issues such as verification and misreporting are certainly not as difficult as made out to be. This basic and simple need for reasonably accurate data needs reiteration, as individual and collective rights to compensation, medical care and rehabilitation depend on it.

2.2 MORTALITY

In November 1989 and October 1990 the recorded number of deaths due to the disaster were 3,598 and 3,828 respectively (Dept.of Relief and Rehab., Bhopal Gas Tragedy, Govt. of Madhya Pradesh, Bhopal). Abortions and still births are not included here. However, 10,000 claims on account of death were still pending before the claims commissioner in 1992. Local sources say that over 70 per cent of claims taken up so far have been arbitrarily rejected. Local sources also mention 3 - 4 gas related deaths per week in Bhopal in 1993,based on newspaper reports, i.e., 156-208 excess deaths per year.

The mortality rate among those exposed is decreasing over time (6). This could probably be explained by the fact that those more severely affected have died in the immediate and intermediate period and the more healthy survivors live longer. The mortality rates are however still slightly higher among the severely exposed as compared to the controls (6).

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Crude Death Rate (per 1,000 population)

Year	Severely Exposed	Control
1986	14.10	6.04
1987	11.79	7.23
1991	8.55	7.46

Source : (6,11)

Abortion Rate

1985	24.2%	5.6%
1987	9.6%	2.1%
1991	6.8%	5.9%

Source: (11).

The stillbirth, perinatal and infant mortality rates show a downward trend, but are slightly higher in the severely exposed area as compared to the control (6).

2.3 MORBIDITY : A brief review

2.3.1 Important overall features from a review of literature

a) Long term, progressive symptomatology and clinical findings during the nine years since the disaster. Animal studies and type of lesions developing, suggest a life time continuation of ill health. The acute, subacute and chronic phases, are part of a continuum, representing the natural history of the after effects of exposure.

b) Multi-systemic clinical picture involving the respiratory, ocular, gastrointestinal, reproductive, psychological, neurobehavioural and neuromuscular systems. There is some evidence of depressed cell mediated immunity and of genotoxicity.

Well designed toxicology studies also demonstrate long term, multi-systemic involvement.

c) MIC and its degradation products are highly toxic, reactive and exposure to it is associated with considerable long term effects (20, 13,10,18).

d) The majority of the exposed population live below the poverty line defined by the Government of India. The environmental and occupational conditions of poor housing, unsafe water supply, inadequate sanitation, inadequate nutrition, poor work environment and unemployment is a cause for greater exposure to other infections, to which the victims are more prone, due to factors cited in (b). This further aggravates their ill health.

2.3.2 The Eyes

In the acute phase a large proportion of the exposed population had superficial Keratitis, conjunctivitis and swelling of the eye lid. Several had superficial corneal ulcerations in the interpalpabral region which responded to treatment. There were persistent symptoms of watering of the eye, burning and itching. Later studies (6), (12) found chronic conjunctivitis, deficiency of tear secretion, high prevalence of corneal opacities and early age onset of cataracts.

Another 3 year cohort analysis of community clusters (13) suggests a threefold excess of eyelid inflammation, twofold increase of new cataracts and loss of usual acuity among the more severely exposed clusters. There was also an excess of recent eye infections and hyper responsive phenomenon.Toxicology (animal) experiments also showed evidence of dose related progressive chronic inflammation (13).

2.3.3 The Respiratory System

The experience of people (8), several studies (1),(6),(10),(14) and reviews (3),(9) (18) indicate a heavy load of morbidity due to respiratory problems throughout the post disaster period. It continues to be a major cause of death among the exposed population (10).

An 18 month follow up of a self selected group of patients exposed to the toxic gas revealed a pattern of chronic respiratory disability showing flow volume reductions along with restrictive lung damage with alveolitis (6).

A follow up study of a random sample of 288 case (6) showed that a large number of cases were symptomatic at the end of 5 years. There is an emergence of hyper reactive airway injury with asthma like features among 24%, Chronic Obstructive Airways Disease among 11.4%, bronchiolitis obliterans in 13% and restrictive lung disease in 1.4% of the sample. 12.8% had recurrent chest infections requiring the use of antibiotics. It was concluded that exposure related lung injury had damaged both large and small airways, resulting in different types of obstructive airways disease.

Misra et al (6) studied pulmonary functions of 250 patients with respiratory symptoms during December 1984, with severe and moderate exposure and followed them up every year. After the fourth year prevalence of clinical symptoms were as follows: exertional dyspnoea (98.4%), recurrent respiratory infections

(78.0%) and chest pain (42.0%). 97.5% had evidence of small airway obstruction, which was suggested as a marker for the diagnosis of toxic gas induced lung disease. It was later reported (11), (covering a period till March 1991), that there was no change in the pulmonary parameters of patients examined, but sequelae of chronic bronchitis and corpulmonale were increasing.

2.3.4 The Reproductive System

An early cross sectional community based study (1985) indicated alterations in menstrual flow, length of menstrual cycle, dysmenorrhea and leucorrhoea among women, impotence in men in exposed areas. these were significantly different from control groups (1).

An epidemiological study in September 1985 (2) also showed altered menstrual patterns and reported a significant four fold increase in the incidence of spontaneous abortions. Still births too were significantly high.

An epidemiological study by Varma (reviewed in 10) showed high pregnancy loss - 43.0% of 865 pregnancies at the time of the gas leak, within 1 Km of the plant, did not result in live births.

2.3.4 Mental Health

Exploratory studies in February 1985 showed that 50% of people in the community and 20% of those seeking medical care were suffering from psychiatric problems (5). In a community based epidemiological study in March 1985, 44% of people in a severely exposed area, had anxiety or depression and loss of memory, which was significantly higher than the control group. (1)

Behavioural studies conducted two and a half months post disaster revealed that memory, mainly visual perceptual, and attention/response speed, along with attention/vigilance were severely affected in the exposed population (17).

A later study (5) using standard questionnaires (SRQ) and psychiatric interviews (PSE), found that 22.6% of patients attending general clinics suffered from psychiatric disorders, namely anxiety neurosis (25%), depressive neurosis (37%),adjustment reaction with prolonged depression (20%) and adjustment reaction with predominant disturbance of emotions (16%). In a community based survey using random sampling (done by the same study group) the prevalence rate of psychiatric disorders was 94/1,000. 94% of the patients had a diagnosis of neurosis (neurotic depression (51%), anxiety state (41%), hysteria (2%) and had a temporal correlation with the disaster.

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2.3.6 Immune System

Studies of immune function (16) showed a depression of cell mediated immunity. Among the exposed the T-cell population was found to be less than half (28%) than that found in a normal Indian population (65%). Animal studies corroborate this (10).

2.3.7 Genetic effects

A review indicates that animal and invitro studies demonstrate genotoxic effects of MIC (10). Cytogenetic studies on small samples of exposed people show statistically higher frequency of chromosomal aberrations (16, 10).

2.3.8 Comments

The studies have been done in a post disaster situation and often under several constraints, including a lack of access to available information, due to the medico-legal implications. Though there are methodological limitations to some of the studies (3), (10), (18), (19), when seen together, and with the additional back-up now available of animal and laboratory studies, there is adequate evidence of serious long term damage to the health of the victims who survived. It is only but humane to translate these facts and findings into expressions of adequate medical care, just compensation and rehabilitation with a sense of urgency.

3. MEDICAL/HEALTH CARE

3.1 Maintenance of medical records: In the immediate aftermath of the disaster there was a massive response by the Government health services and by voluntary organisations to respond to the medical crisis. However, lack of maintenance of accurate records has caused a major problem for the victims. This factor needs emphasis even now.

3.2 The lack of authentic information regarding the possible causative agents, along with misinformation, created confusion regarding appropriate therapeutic measures to be adopted. The utilization of sodium thiosulfate (NaTS) as an antidote was embroiled in controversy (1). There have in fact, surprisingly, been no other attempts towards findings appropriate therapeutic agents.

3.3 Medical services: A 30 bed hospital was started by the Government very close to the severely affected area. More recently the number of beds have been increased. Several clinics providing out-patient services by doctors and allied health workers were started at different locations within the exposed areas. These provide primarily symptomatic, curative care.

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Within three months of the disaster the medical officers of these clinics / hospital were trained, by a team from the National Institute for Mental Health and Neurosciences (NIMHANS) Bangalore, to recognise and treat mental health problems that had emerged in the post disaster situation. A manual and several videotapes of case studies were prepared for the purpose.

Voluntary organisations in Bhopal started health services catering to specific geographic areas. Some of these groups trained local community health workers and had more community based services including health education, awareness raising etc. However their number and outreach is small.

3.4 Peoples organisations developed and activist groups also started work. They raised wider issues concerning the disaster and also concerning the health consequences. Epidemiological studies undertaken by some of them, under conditions of severe resource constraints, lack of access to information and suspicion, recognised early the widespread prevalence of multi-systemic clinical symptoms and signs, which could not be explained by lung damage alone (1). Similarly the important area of womens health, which was totally neglected thus far, was studied and highlighted (2). Efforts at evolving a communication strategy were made (22) along with wider advocacy and building of solidarity groups elsewhere. Efforts of victim organisations have been crucial in getting interim relief and challenging court orders

3.5 The Indian Council of Medical Research initiated several studies. Following double blind clinical trials of Sodium Thiosulfate, the ICMR gave recommendations for its use to medical practitioners through the State Health Services. These guidelines were given scant recognition, without reason.

The ICMR also subsequently set-up the Bhopal Gas Disaster Research Centre, based in Bhopal. Twenty two long term research studies were initiated with the involvement of various departments of the Gandhi Medical College in Bhopal and with collaboration / support of several other specialized research centres in the country. Medical officers and staff in the community clinics participate in the data collection for these studies and have received training for the purpose. A supplement to an issue of the Indian Journal of Medical Research published findings of the ICMR studies in 1987. Some papers have also been published in other journals. However other than these, all reports are classified as confidential and are not available to other researchers or to the medical practitioners, and much less to NGO's and the affected people.

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3.6 Medical malpractice / over medicalisation: Chronic ill health has turned out to be a bonanza for private practitioners and pharmacists. We have received personal communications regarding overdrugging and irrational therapeutics. An informal study also revealed the use of several banned drugs. The possibility of iatrogenic problems is real and its extent needs to be studied.

3.7 Preventive/community health: The Integrated Child Development Services were introduced by the government into the area. Victims organisations however even now mention the lack of sanitation and adequate safe water supply (8). Other preventive and promotive health work at the community level with community involvement is lacking. Health education, child health programmes, counselling and supportive services have not developed.

3.8 The procedures for assessing the medical status for processing of compensation claims is said to be convoluted, inefficient, corrupt and tardy. It is also technically flawed (4). A document of the U.S. National Institute of Mental health reports that failure of secondary level support systems is one of the most demoralising experiences for victims. This has been a regular occurance in Bhopal.

3.9 Interest in the Bhopal issue and hence in the people affected is also waning. The ICMR has closed down all but 2 of its research studies. Payment of interim relief has stopped and payment of compensation through the claims courts have had a very slow start. At the current rate they would take several years to complete the job. Rehabilitation work centres for women have also closed.

3.10 While there are a larger number of research papers in international journals every year, very little gets back to Bhopal. This raises an important issue concerning social accountability of research. Besides the victims being used as guinea pigs, it is the public or tax payers money that keeps most of the research institutions running, necessitating public accountability.

4. EVOLVING ALTERNATIVES

4.1 Given the ground realities of :

* Serious, progressive effects on the health, well-being and livelihood of victims;
* a medicalised approach to health care, prone to overdrugging and irrational therapeutic practices;
* waning interest by governmental and non-governmental organisations;

it seems necessary and urgent to build a more comprehensive, humane and just health care service for victims. We however probably need to build on the present realities with all their limitations. Health care services for the urban poor in the country are ill-developed, with the private sector being

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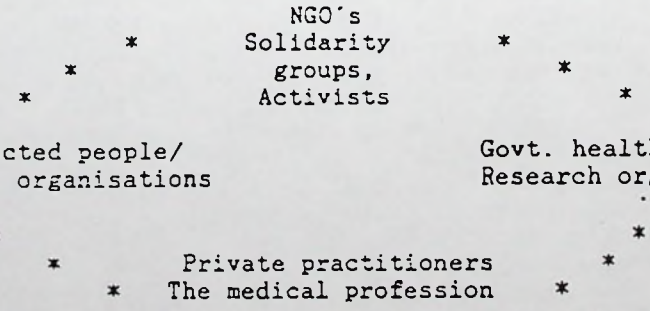
predominant. The functioning of the government health system in general is inefficient and unempathic to people. However it is clear that in Bhopal the prime responsibility for provision of health services to victims is with the government. Steps like setting up of an infrastructure of facilities and staff have already taken place. Working towards improvement in quality and increased responsiveness to the specific health problems of victims, with greater use of the principle of community health is now needed.

Building up peoples organisations within the affected communities with much greater access to information, along with participation in decision making will be some of the steps that can help restore their health in their own hands. The role of NGO's could be in training health workers and building community leadership around the area of health.

4.2 The idea of a national medical commission on Bhopal has been raised several times in the past and deserves thought, support, advocacy and the working through of organizational details.

4.3 It would be useful to have a forum and regular means of communication, by which those interested and involved with Bhopal can keep in touch. This could be through holding more regular national meetings and regular newsletters on Bhopal, in other words developing a Bhopal Network. A Bhopal based core group could be the secretariat. Efforts to maintain continued awareness regarding the situation in Bhopal among wider groups could be a major task and contribution.

4.4 Developing a local communication strategy between various groups would most certainly help.



While interests may seen to differ, even sharply, in the ultimate one group has to affect the other in a positive way, from the viewpoint of the victims.

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4.5 While acknowledging the important role played, of keeping the Bhopal issue alive, the experience of the past 9 years has also exposed the frailties, organizational limitations, problems of leadership and incompatibilities within the "pro-people" NGO/activist sectors as well. In a spirit of introspection many aspects of critiques of the "establishment" could be applicable to us as well. We therefore need to equip ourselves better, be more tolerant, and allow space for dialogue and growth.

4.6 Several suggestions have been given in the past about developing a comprehensive health care system for the people (2),(9), (21) affected by the Bhopal disaster. Key components are:

4.6.1 Basic needs of adequate shelter, potable drinking water and sanitation to be met.

4.6.2 Need for adequate nutrition, income and employment. Just settlement of compensation and provision of alternative employment can provide the purchasing capacity necessary. Working conditions suited to the health situation of the victims need to be ensured, e.g., dust free environment, relatively light work, rest periods, good lighting etc.

4.6.3 Basic medical and health care:

a) Patient retained records /copies in folders that are water, insect, dust proof are suggested as being important for further treatment and for legal purposes in case a reopener clause is allowed.
b) Practice of rational therapeutics, workshops on rational therapeutics for practitioners, provision of therapeutic guidelines to all practitioners in the area on common presenting conditions, with regular updating. Adverse Drug Reactions need to be monitored.
c) Programmes for specific communicable diseases. e.g., TB, trachoma, water borne diseases etc.
d) Health education.
e) Mother and Child health.
f) School health, child to child programmes, play therapy.
g) Mother and child health care.
h) Womens health care.
i) Community based programmes for disability, especially respiratory disability.
j) Mental health care- counselling, selfhelp groups, community building, use of appropriate psychiatric services when needed.

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k) Building community organization through health committees or basic units comprising 10 families each.
l) Identifying, training, supporting community health workers and building links with referral government /NGO health centres/hospitals.
m) Regular assessment of the health situation and health work.

4.7 Research: There is need for continued research efforts-clinical, epidemiological, toxicological and forensic with dissemination of findings.

5. CONCLUSION

A socio-epidemiological analysis of the consequences of the Bhopal disaster on the health of the victims, outlined in this submission, places on Union Carbide, the Government of India, the Government of Madhya Pradesh State, on society in general and all of us in particular, an urgent responsibility to respond meaningfully to the continuing suffering of the victims.

This response has to move from unjust legal remedies, inadequate and tardy monetary compensation and ad hoc medical interventions to a more wholistic and humane community health care support system, sustained and supported by an empowered 'victim' community. While doing so, we need to constantly keep in mind that 'Bhopals' exist widely and many more Bhopals will take place in the coming years, especially in the Third World because of the current economic-political trends. The rights of workers and impoverished communities urban and rural, will therefore to be safeguarded through continuing solidarity of effort at all levels - local, regional, national and global.

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Health Impact of Bhopal Disaster

An Epidemiological Perspective

Thelma Narayan

The chemical accident at Bhopal has been an experience of a public health emergency caused by a technological disaster, a disaster which overwhelmed the capacity of individuals, physically and psychologically. Because of the numbers involved and its complexities it also overwhelmed the capacity of the macrosystem, that is, the social and administrative structures to respond. An epidemiological perspective and method of study is vital to understanding the pattern and distribution of the adverse outcomes in the community and can provide a variety of data.

The article, in two parts, uses an epidemiological perspective to appraise and review available literature concerning the health impact of the disaster and discusses methodological issues relevant to an epidemiological approach to the study of such a disaster.

[The paper is published in two parts. The second part will appear next week. References are appended to part two.]

I
Introduction

THE world's most serious disaster in the chemical industry which occurred at Bhopal is a tragic instance of the adverse impact of chemical agents on human health. The health profession has historically more experience and expertise in dealing with biological and physical agents of disease. Experience with chemical agents was previously limited to small groups of workers in specialised occupations. Health problems arising therein were dealt with by specialised occupational health teams. With rapid growth of the chemical industry, there has been an increasing use of a variety of chemicals in activities of daily life as well as in agriculture. During the past decade there has been a growing realisation that the adverse impact due to human interaction with chemical agents is now spreading beyond the confines of the workplace, to the environment and the public in general. Incidents at Bhopal (methyl isocyanate + ?), Seveso (dioxin), Mexico (butane) and Vietnam (Agent Orange) have demonstrated dramatic instances of these adverse effects. These events are often considered unfortunate, uncommon, freak events or accidents. However, they represent the tail end of the distribution of the more common, less serious, leaks, injuries and minor health effects resulting from exposure to chemicals. The long-term effects of lower dose and/or chronic exposure to several chemicals in use are at present unknown. However, there is accumulating evidence of the adverse effects of some of them, e g, the impact of pesticides on the environment and their effects on animals and man through the food chain.

The increasing use of potentially harmful chemicals, the conditions in which they are manufactured, the health and safety regulations adopted and implemented are closely linked to economic and political factors operating at a national and international level. People living and working in conditions of material poverty bear the brunt of the most adverse effects, because for them employment under any conditions is a necessity for survival. The poor also carry a double burden—suffering from the diseases of poverty, viz, malnutrition and infections along with the modern diseases of industrialisation. A balance sheet approach of costs and benefits to people has to be used in evaluating the role of chemicals in this context.

Responsibility for the safety of workers and communities and the prevention of technological disasters require the involvement of professionals and decision-makers from several fields. More importantly it calls for commitment and political will by wider forces in society. Public health physicians could contribute by using epidemiologic skills to study the health effects of these agents. This would help provide a firm basis of knowledge about possible effects on health, which could then be used for creating awareness and for policy-making. This has already been recognised and interest in environmental epidemiology, which includes the above group of agents has been growing. Being a new area of enquiry, the limitations of the existing tools of research, have also to be kept in mind.

The chemical accident at Bhopal has been an experience of a public health emergency caused by a technological disaster. The World Health Organisation has defined a disaster as "an event that suddenly overwhelms the capacity of the normal system to respond" [Wasserman, 1985]. Though used to describe natural disasters like earthquakes, floods and volcanoes the definition could also apply to technological disasters. In Bhopal, the disaster overwhelmed the capacity of individuals, physically and psychologically. And because of the magnitude of the numbers involved and its complexities it also overwhelmed the capacity of the macrosystem, i e, the social and administrative structures to respond. Technological disasters are very complex and require specialist intervention. Besides the possibility of causing external bodily harm, they may also act at a cellular and biochemical level causing a disruption in physiological functioning leading to unknown pathological states.

Exposure of the population to toxic chemical vapours during the Bhopal disaster has resulted broadly in three adverse outcomes: mortality, morbidity and disability. An epidemiological perspective and method of study is vital to understanding the pattern and distribution of the three adverse outcomes in the community. Epidemiological studies and population profiles can provide data which could be used for various objectives, viz,

(a) to substantiate/support, disprove or provide clues for aetiological hypothesis.

(b) following from the above, to help indirectly in deciding upon rational therapeutic interventions and in initiating secondary and tertiary preventive measures where possible.

(c) to plan health services, including rehabilitation, for the affected people.

(d) to provide supportive evidence in court, regarding extent of injury, in claims of compensation for the victims.

In the context of an epidemiological perspective of the health impact, one must initially consider all available information in broad categories of the epidemiologic triad of agent, host and environment and also in terms of time, place and person. In the Bhopal situation, there were and still are several limitations in attempting this, since there are big 'knowledge gaps' about the chemical agent/s of exposure and also about the possible outcomes on human health. These will be considered in greater detail later.

The situation in Bhopal is also complex in other respects. The incident has enormous medico-legal implications. There has been a delay in publication of results of ongoing studies. It has therefore not been easy to get adequate published references from standard scientific journals. For the purpose of this study a wide variety of secondary sources of information have been used to build up an epidemiological profile.

II
Health Impact

When studying the health impact of the Bhopal disaster, we are faced with a situation where the cause of the presenting complex of symptoms and signs is partially unknown even at present. The long-term effects on human health are also unknown. There is an urgent necessity to understand the toxicology and pathogenesis of the agent/s involved so as to be able to provide rational therapeutic care and if possible to initiate secondary and tertiary preventive measures. Data needed would include facts about the clinical presentation of the disease complex, the pathophysiology of the affected and related organ systems, the analytical chemistry and toxicology of the agent/s.

The role of the epidemiologist would be to provide information about:

— the distribution of the new disease complex in the population,
— the characteristics of people who manifest these adverse health effects,
— the various circumstances which may predispose to the development of adverse effects,
— the morbidity attributable to the exposure as separate from pre-existing levels of morbidity in the community by comparison with control groups of similar age/sex structure and socioeconomic status,
— to provide data relating different symptoms and signs to different degrees of exposure.
— to understand the natural history of the morbidity over time.

Descriptive Epidemiology

An attempt has been made to build up a picture of the descriptive epidemiology of the event and its aftermath from available sources of information. At the outset some of the limitations encountered by groups involved in carrying out medical work with the victims or in studying the health impact must be considered.

(a) There was a lack of authentic information regarding the chemical composition of the cloud of vapours that escaped that night. The leak occurred from a tank containing methyl isocyanate following an explosive runaway reaction. Very little was written (and possibly known) about MIC, its reactions in different circumstances or its toxicology, in standard textbooks or journals. The company did not disclose information that it had accumulated in the process of registering for the commercial production of MIC. Thus medical professionals and research workers were handicapped by ignorance about the identity and properties of the agent whose effects they were trying to study and treat.

Speculations regarding possible agents ranged from MIC, phosgene, carbon monoxide, cyanide, cyanogenic substances and a combination of all the above and/or other unknown chemicals. These drawbacks in carrying out medical work with the victims have been reflected in the reporting of the clinical findings and also in the treatment given.

(b) Details of the number of fatalities and of those affected are not precisely known. Because of the suddenness and magnitude of the disaster, mass burying/cremation of bodies (human as well as animal) was carried out on an emergency footing, to avoid further public health problems. In the conditions of disaster and panic, with many of the staff themselves affected, routine administrative structures could not cope with the need for rigorous documentation vital for future treatment and compensation of victims and for the understanding of the epidemiology of the aftermath. Different sources, therefore, give varying estimates of the numbers who died and who were affected.

(c) Because of the medico legal implications of the disaster a certain degree of administrative overcaution built up in the months following the exposure and results of studies of morbidity, toxicology, etc, conducted by various research groups of the government and the company were not made available to the medical community for scientific debate.

(d) other factors which affected studies in the early phase were: (1) Mass exodus of people from the affected areas away from Bhopal, during 'operation faith' twelve days following the exposure, when the remaining MIC in the plant was 'neutralised'. The people subsequently returned to Bhopal over a period of time. Hence there is a variability in the baseline population in the different studies; (2) Migration outside and into the affected areas altering the population at risk. Most of the affected areas being shanty towns, many people had their roots in villages and towns outside Bhopal. A proportion of people migrated back to their hometowns or villages or elsewhere for treatment, jobs or for other reasons. Similarly, relatives of the victims also came into Bhopal to care for their families. This sort of social support during times of stress is very common in india. It has been claimed that a large number of unaffected people migrated into the exposed areas to claim compensation. Studies have not substantiated this claim. The occasional case reported must be the exception rather than the rule; and (3) invasion by lawyers and other people created confusion and distrust among the people. This may affect the reporting of the history/symptoms to extents that would depend on the degree of trust/rapport created between the people and the research teams.

Time

The leakage occurred on the night of 2/3 December 1984. The leak was first noticed at 11.30 pm in the MIC production area. Workers noticed some dirty water spilling from a higher level in the MCI production structure. They also felt the presence of MIC in the atomsphere by a sense of irritation in their eyes. Due to experience with previous minor leaks they were able to recognise the presence of MIC by its irritant effects. Water was sprayed around the point of leakage, as in the presence of water MIC converts to less harmful products. At 12.15 am indicators showed that pressure in MIC tank 610 was shooting up and by 12.30 am it went beyond the maximum on the scale, i e, 55 psig. The temperature indicator was also beyond its range, i e, +25°C. The safety release valve popped out and a gaseous cloud was seen coming out of the stack which was 120 feet high. The siren was sounded around 12.30 am for a short while after which only the internal factory alarm was continued according to the routine practice followed in the factory. Water was sprayed to neutralise the MIC but could not reach the height from where the gas was emanating. Around 03.00 am the safety release valve of the tank is reported to have sat back and the gas stopped coming out of the tank.

Meanwhile, around 12.45 am people in Jaya Prakash Nagar 100 yards south of the plant, woke up choking, coughing and with a burning sensation in their eyes, nose and throat—reported by the victims "as if chilli powder was in the air".

At Bhopal's 1,200 bed Hamidia Hospital, about 3 km from the factory, the first patient reported at 1.15 am and then they came in thousands. It was around 3.00 am that the first deaths due to the gas leak were reported. There was a stampede as the populace began fleeing the city. People died in their homes, in the hospitals, and on the roads even up to some distance away from Bhopal.

This was the starting point for continuing morbidity and mortality in the exposed population over the next few days and weeks. Standard medical therapeutic practices were adopted. However, it was the experience of local medical practitioners that the exposed people came repeatedly to the clinics with a variety of symptoms and signs affecting several organ systems, apparently unrelated to each other. This continued beyond weeks into months.

Ten days following the disaster it was announced, that as a safety measure, remaining MIC in the two other tanks 611 and 619 were to be neutralised by conversion into carbaryl. This created a panic and despite assurances of complete safety, there was an exodus of people from the vulnerable localities. On December 13, 1984, 1,00,000 people left the city. Many took their animals too. By the next day a quarter of the city's population had fled. Many hospitalised patients also left. Cases of injuries and accidents in the virtual stampede during the fleeing of the city, occurred on both occasions, adding to the morbidity related to the disaster. The second exodus further aggravated the situation as it interrupted treatment, resulted in physical and psychological stress in those already affected and was also an additional financial burden.

Generalising broadly, the event could be described as an exposure of a population to an extremely toxic air borne chemical agent, with sharp localisation in place and time. It resulted in a large excess of deaths and disease frequency in the exposed population. This is characteristic of an explosive, acute, point epidemic. However there is evidence of continuing or persistent morbidity and suggestions of an excess mortality in the exposed population. Reasons for this are not completely understood. Several possible mechanisms have been proposed and will be considered later.

Place

Bhopal has a population of about 8,00,000. The UCIL plant was located in the northern fringe of the city, adjacent to an existing residential area and barely 2 kilometres away from the railway station. Some squatter settlements did grow up around the Carbide plant after it was opened in the late 1960s. But some of the areas worst affected by the gas leak had been inhabited for many years before the Carbide plant opened.

The high vapour density of MIC along with the conditions of atmospheric inversion that winter night caused the cloud of gas to move down and stay close to the ground. The vapours spread slowly in the atmosphere due to the low wind velocity. All these factors resulted in the population being affected greatly. The gas is reported to have spread over an area of about 40 sq km and affected people seriously as far as 5 to 8 km downwind. Classification of areas into seriously affected and less seriously affected were made on the basis of crude post-exposure death rates in different localities. This was done by the state government. The most seriously affected areas were Jaya Prakash Nagar, Kazi Camp, Chola Road, Chandbad, New Kabbad Khana, Sindhi Colony and Railway Colony. The two lakes of Bhopal are said to have averted a larger tragedy as MIC converts to less harmful substances in contact with water.

In studies of the Bhopal disaster, comparisons of place would have to be done between relatively small distances away from the factory, to test a dose response effect of varying degrees of exposure on the outcome. Geographical distance however would be only one among other indicators of exposure as will be discussed later. Despite known limitations of ascertainment and precision, routine sources of data regarding mortality by area would initially have to be used. Results of the few population based epidemiological studies would also be able to provide additional information. Preparation of maps showing the distribution of deaths could be drawn. Relating these numbers to the denominator, viz, the population who were exposed and hence at risk, would give crude death rates following the exposure, according to geographical area or locality. Baseline data of the population available from the census, electoral rolls or even by the surveys conducted after the disaster by governmental agencies, could be used to calculate age and sex standardised mortality rates for different areas.

Person

This aspect will be discussed in terms of the population at risk, its demographic and other characteristics. The picture of mortality and morbidity will be described in later chapters.

(a) Population at risk: Estimates of the total population exposed to the toxic gas or the "population at risk" for the derivation of mortality and morbidity rates are 2,00,000 according to the state government and UNICEF. Results from epidemiological, community based studies [Patel et al, 1985 and Nagrik study, 1985] using control groups 10 km away from the factory, suggest that even the control groups were mildly affected by the exposure. This indicates that the basis for defining the 'exposed population' needs further substantiation. This will be dealt with again in the discussion on the exposure variable.

The factor of post-exposure migration into and out of the exposed localities would have also affected the composition of the population that risk. Andersson et al [1985] observed at the more seriously affected had gone back to their hometowns or villages. Sathyamala C [1986], found that in a population of 8159 surveyed in September 1985, 43 people (0.52 per cent) moved in after the gas leak and 41 (0.50 per cent) had moved out. Both the above movements would result in an overall dilution effect or underestimation of morbidity. Though quantitatively this may not be of a large order (1 per cent in the above study) it must be kept in mind that the qualitative difference may be important if those who were seriously ill had gone away.

New births into the population and deaths (fully, partly or not attributable to the exposure) would also alter the baseline population. Since households have been generally used as the sampling units in the studies conducted so far, this factor has not been considered at the sampling stage. However it would alter the number and composition of the baseline population and would affect the calculation of rates.

Patel et al [1985] extrapolating from prevalence rates of morbidity have estimated that, of the exposed population about 70,000 would be suffering from serious health effects while 45,000 would be suffering moderate to mild effects.

(b) Demographic characteristics: UNICEF officials [Agarwal A, 1985] estimate that, of the affected population: 75 per cent are slum dwellers, i e, from the lower socioeconomic strata; 80 per cent are Muslims; 40 per cent are children below the age of 15, 10 per cent are elderly and 20 per cent are women in the reproductive age group. The basis of this analysis is not known. It was probably done as an estimate for planning and administrative purposes. The demographic data appear to be direct extrapolations from national figures. This would be very inadequate data for a thorough understanding of the aftermath.

Banerji et al [1985] have described the socioeconomic profile of the study population as follows: Muslims: 30 per cent, Lower castes: 20 per cent, Backward castes: 18 per cent. Income of Rs 150/head/month (i e, relatively well off): 10 per cent. Housing: Kutcha (without brick and cement): 70 per cent, pucca (well built/concrete): 30 per cent; Presence of holes in the structure: (allowing air entry) 50 per cent.

Patel et al [1985] found the population to be predominantly Muslims and Harijans in JP Nagar and Tamilians and Maharashtrians in Anna Nagar. They belonged to the lower socioeconomic class—the percentage of skilled workers being less than 10 per cent. The range of occupations included daily wage labourers, construction workers, beedi rollers, cobblers, railway and factory employees, domestic workers, self-employed artisans and potters.

The profile is of a population, the majority of whom belong to the lower socioeconomic class. The poor housing conditions would have offered no protection from the toxic chemicals in the atmosphere.

(c) Community awareness of hazard potential of plant: Most people had no idea about the hazardous nature of the plant operation. Banerji et al [1985] report that the population were not told earlier of the potential hazard of the plant. Nor were they aware of preventive measures to be taken in case of a leakage, e g, use of a wet cloth, moving in a direction away from the wind, not running, etc. Unfortunately most of them ran in the direction of the wind carrying the gas and were further exposed. Patel A et al [1985] found that 8.3 per cent of the population in JP Nagar and 0.08 per cent in Anna Nagar took safety measures at the time of the disaster. Most of these reported to having used blankets/wet towels over the face by instinct rather than due to prior knowledge. The workers in the plant knew of these precautions and all those in the night shift escaped unhurt, except one.

(d) Pattern of utilisation of health services: Banerji et al [1985] found that the utilisation of health services by the study population after the exposure was as follows:

Hospital	40.2 per cent
Camps	46 per cent
Dispensaries	2.5 per cent
General practitioners	25 per cent
Registered medical practitioners	2.5 per cent
Institutions outside Bhopal	9.1 per cent

There is an overlap as some people utilised more than one type of service. These findings are an indication that when studying the distribution of disease in the community, data collection would need to be population based to get true picture of morbidity. When using hospital or clinic based data one would have to keep in mind selection bias caused by selective attendance of patients. Possible determining factors for this could be severity

of illness, accessibility of service, social class of the affected persons and so on.

(e) Impact on income: Patel et al [1985] found that 65 per cent of wage earning individuals in the exposed group experienced a drop in income ranging from 20 per cent to 100 per cent with a median of 50 per cent. In the controls, only 9 per cent reported a drop in income in the range of 20-55 per cent. This occurred due to physical ill-health resulting in occupational disability.

III
Mortality

Exposure-Related Mortality Rates

There is uncertainty as to the exact number of people who died. In its petition in court, the government has claimed 1,700 dead. This is based on death certificates issued/deaths recorded by government authorities. The Indian Council of Medical Research report (1985) states that about 1,200 people died in hospital wards. They estimate the total death figure to be about 2,000. The maximum number of deaths were recorded in JP Nagar, Kazi Camp, Kenchi Chola and Railway Colony. These areas accounted for 777 deaths. They quote a study done soon after the disaster, in which 300 families consisting of 968 males and 863 females were surveyed. 47 deaths in males and 35 deaths in females were recorded, i e, the crude post-exposure death rate for this population was 48.55/1000 population for males and 40.55/1000 population for females. The maximum mortality was in the 0 to 5 year and above 60 year age group. Most deaths occurred within 48 to 72 hours of the disaster. No details are given of exactly how long after the disaster this study was done, from which population the families were drawn, what the method of sampling was or details of the age structure of the population or the dead.

Andersson et al [1985], in an epidemiological study, conducted during the first 10 days after the disaster, found the crude death rate derived from households in the worst affected population based cluster to be 3 per cent or 30/1,000 population (death rates being calculated as number deceased/number exposed). They have stated that this data would confirm estimates of a total of 2000-2500 exposure related deaths. Random sampling methods were not used and exact location of study areas have not been mentioned. However extrapolation of rates from localised study areas to the total exposed population should be made with caution. Reasons for this will be apparent when summing up the results from the various studies conducted.

Patel A et al [1985], in another population based, cross-sectional study, using statistical methods for sample size determination and random sampling methods, found that the crude death rate was 86.6/1,000 population in Jaya Prakash Nagar (01) and 7.9/1,000 in the control area of Anna Nagar (15). The department of information and publicity of the state government had documented the deth rates to be 23.4/1,000 and 3.2/1,000 respectively in the same areas. It appears that there is a gradient of mortality according to the degree of exposure. This is another reason why direct extrapolation of rates from any particular study/area to the total affected population may be misleading.

Banerji D et al [1985] conducted a survey in the affected areas, between January 6 to 15, 1985. Using a sampling frame of 68,000, they randomly selected a 6.66 per cent sample (1 in 15 households), and administered a semistructured questionnaire by trained interviewers. They enumerated 82 dead and 5 missing (presumed dead) in 700 households in the severely and moderately affected areas. The exact denominator has not been mentioned in their preliminary report, to be able to calculate rates. They extrapolated the number to their sampling frame of 68,000 to yield 1305 dead. From this study the crude death rate for the combined population of severely and moderately affected communities is 19.19/1,000 population. The exact area covered by the study has not been mentioned.

Besides the caution mentioned earlier regarding extrapolation of rates, it appears that combining rates from different localities, e g, severely and moderately exposed to give an overall rate may mask important differences in mortality rates.

Sathyamala C [1986], surveyed 3 exposed localities to study the impact of the exposure on the outcome of pregnancy. The basis of selection was the post-exposure mortality rates as given in later unpublished data from the study by Banerji et al. These were as follows: JP Nagar – 65.3/1,000, Kazi Camp – 46.7/1,000 and Kenchi Chola – 35.7/1,000. Their study found the crude post-exposure death rate for the three localities together to be 33.19/1,000 (see Table 1).

There seems to be a wide variation in crude death rates derived from the various studies as well as in those stated by the government. Possible reasons for this could be:

(a) differences in levels of ascertainment, reporting, etc

(b) due to factors related to study design—sample size, sampling methods, etc

(c) real differences in different localities reflecting varying levels of exposure to toxic gas.

The methods used in enumerating deaths would also play a role in accounting for differences between studies in post-exposure death rates. Andersson et al [1984] have mentioned that they calculated death rates as the number deceased/number exposed. Other studies have not stated what they have considered and used in the numerator and denominator. The different studies were conducted at varying time intervals following the exposure. We do not know the time period used in the different studies as cut off points in the enumeration of deaths attributable to the exposure.

From an aetiological point of view, as well as for the victims' families to receive adequate compensation, it is crucial to try and achieve greater precision in enumerating deaths. It is important also to analyse exposure related mortality rates taking into consideration age, sex, locality in which they present at the time of the disaster and degree of exposure.

Demographic Characteristics

Further details of the study by Banerji et

Table 1: Post Exposure Mortality Rates—Summary from Different Sources

Study Group/ Investigator	Population/ Sample Size	Sampling Method	Time of Study	Area of Study	Crude Post Exposure Death Rate
MP State Government	?	?	Early post disaster	JP Nagar Anna Nagar	23.4/1000 3.2/1000
ICMR	300 families (968 males + 863 females)	?	Shortly after disaster	?	48.5/1000 (males) 40.5/1000 (females)
Andersson et al	? number in each cluster	?	10 days post exposure	Worst affected cluster	3 per cent or 30/1000
Patel A et al	148 exposed 138 controls	Random sampling	3 months post exposure	JP Nagar Anna Nagar	86.6/1000 7.6/1000
Banerji et al	700 families	Systematic sampling	1 month post exposure	Severely + moderately affected areas JP Nagar Kazi Camp Kenchi Chola	19.2/1000 65.3/1000 46.7/1000 35.7/1000
Sathyamala	8165 persons	Random sampling	9 months post exposure	JP Nagar Kazi Camp Kenchi Chola together	33.8/1000

al [1985] are given here as it describes the age/sex and socioeconomic profile of the dead.

(a) Males accounted for 60 per cent of the deaths, which they commented was an important and unexplained finding. Majority of these were in the age range of 2 to 20 years. As a first step in interpreting these differences it is important to take into consideration the sex ratio and age distribution, i e, the population structure, of the population at risk. As mentioned before, standardised mortality rates would be more interpretable.

(b) There was one death per household in 49 households, two deaths/household in 11 households, three deaths/household in 4 households and one household had 4 deaths. There is a need to analyse these deaths in terms of degree of exposure.

(c) In an attempt towards determining the degree of exposure it was found that: 75 per cent of the dead were among those who ran on foot, 23.5 per cent among those who remained at home, while none who used a vehicle died. This is related to the finding that 73 per cent ran, 21 per cent stayed in their house and 6.3 per cent used a vehicle. This is plausible because besides direct exposure to the toxic chemical laden atmosphere, those who ran also inhaled deeply and had an increased rate of respiration thus getting exposed to more of the toxic gas.

(d) Among the dead the socioeconomic profile is as follows: 56 per cent lived in houses with large holes, the proportion living in kutcha houses was higher, the proportion belonging to the lower and backward castes was significantly higher, the proportion of Muslims was similar to that in the study population, i e, those who died were the poorest of the poor. The few rich who came within the sweep of the cloud of toxic chemicals did not suffer as much damage "because of their well built houses, healthier bodies and possession of/access to transport".

(e) The study hypothesises that there would have been an underestimation of deaths because of underreporting of deaths among the homeless and destitute who would have been the most exposed and vulnerable. An estimate of 3,000 shelterless in Bhopal has been made [Agarwal, 1985]. Many of these people used to live around the railway station which was directly in the line of the cloud of toxic chemicals.

The Tata Institute of Social Studies, Bombay, conducted a door-to-door survey regarding exposure, mortality, socioeconomic status, etc, the results of which were to become the basis for relief, compensation and long-term treatment. But its total tally of 1,021 dead, even less than the officially counted bodies caused it to lose credibility. The survey failed to cover 600 exposed families in which deaths could have occurred. It could not enumerate 315 families who had migrated outside the city after the disaster and 286 families who had their houses locked. The findings of the study, even with its limitations, would have provided some information of use. However the results have not been published or made available.

Many say that the official numbers are underestimates of the true figures of mortality. Other estimates have been given ranging from 5,000-10,000 [Agarwal, 1985]. However most of this data is anecdotal and hence difficult to interpret.

Regarding mortality in the months following the disaster, but attributable to the exposure, a state government official has stated that during the first year on an average 15 such deaths were occurring per month [Diamond, 1985]. Whatever the basis and validity of this statement it raises the important question of the need to evolve a reliable method to take count of these attributable excess deaths.

The number of excess abortions and still births should also be added to the death toll.

To summarise, therefore, the main features of mortality in the data reviewed are:

(1) Number of deaths: estimates range from 1,700-2,500 – >5,000.

(2) Exposure related death rates: varies in different studies and in different localities.

(3) Area distribution: severely affected areas—JP Nagar, Kazi Camp, Kenchi Chola and Railway Colony.

(4) Sex distribution: apparently an excess in males.

(5) Age distribution: excess in under 5 and over 60 age groups (age/sex estimates based on crude rates)

(6) Socioeconomic class distribution: lower socioeconomic classes most affected.

(7) Excess abortions and still births occurred.

(8) Continuing mortality attributable to exposure needs to be considered.

IV
Autopsies

Autopsies were conducted at the Medico Legal Institute based at Mahatma Gandhi Medical College, Bhopal. Findings have been reported in the ICMR reports (March and May 1985) and are described in some detail here as they are of relevance to understand the pathology produced in the human system by acute, severe exposure.

First Three Weeks

In the first week, the usual postmortem lividity or cyanosis was not present, but there was a pinkish discolouration. Conjunctiva were red. Hypostasis was present all over the body and was not restricted to the dependent parts. A common finding was the presence of thick, tenacious, foamy froth covering the nose and mouth.

Pathological changes were present in the entire respiratory tract. Lung weight was two to three times the normal. The lungs were waterlogged and had a cherry red colour. They showed congestion, haemorrhage and consolidation. The vessels were filled with thick, viscid, dark cherry red blood. The bronchi and trachea were red in colour and the lumen was filled with white tenacious material. Microscopic examination showed severe tracheitis and bronchitis with denudation of the epithelium in some sections and necrotising bronchiolitis in some. There was marked congestion and thickening of the alveolar septa. The alveoli were filled with albuminous fluid. There was very little evidence of secondary infection.

In the second week while grossly and microscopically the lungs continued to be the seat of primary change, there was a gradual transition in the pathological changes. Characteristic cherry red colour of the blood, heavy oedematous darkly reddish lungs and varying degrees of oedema of the brain continued. Acute desquamatous changes in the trachea and main divisions of the bronchi persisted. There were varying degrees of bronchiolitis, bronchopneumonia and infiltration of the alveolar spaces by polymorphonuclear cells.

In the acute phase there was oedema of the brain and congestion of the leptomeninges. In a few cases, the liver showed a mild degree of fatty change which can be either incidental or secondary to anoxia consequent to pulmonary changes.

In the third week the respiratory tract showed the same appearance, though the lungs were relatively reduced in size and weight. However they were still reddish and exuded a lot of fluid from cut surfaces.

A striking feature in some cases was that on opening the thoracic or abdominal cavities, viscera which was normal in colour rapidly acquired a reddish tinge on coming in contact with the atmosphere. There was variable involvement of other viscera. Brains, which were uniformly heavy and oedematous, showed either uncal grooving or tonsillar herniation with compression of the cerebellum by the tentorial edge. In a few cases the liver showed severe congestion. The spleen though markedly congested was shrunken in size and the capsule was wrinkled. The kidney showed extreme congestion in the cortex and medulla. The heart contained blood clots which were cherry red with some chicken fat like material. The liver showed haemorrhage all over. The capsule of the liver was found to be separated and could be easily pulled off. The gallbladder was distended. The stomach and intestines had haemorrhages in the submucosa of the wall. The spleen was found to be softened. The kidney showed haemorrhages.

Histopathologically, the lungs showed congestion and oedema. The bronchial lumen was full of exudate. The trachea showed superficial ulceration and loss of cilia. Muscle fibres in the bronchial wall showed fragmentation. The kidneys showed necrosis of the proximal tubules. Microthrombi were present. The liver showed centrilobular congestion, patchy necrosis and widening of the central veins. Heart showed interstitial oedema and nacrosis. Atrophy of the malpigian capsule was a consistent finding in the spleen. The cornea showed

denudation of the epithelium. The thymus, testis and ovaries showed no changes. Multiple lesions were common. Sections of the lungs of still born showed no abnormalities.

They quote the case of a woman who had manifested MIC effects and subsequently recovered. She died of hyperpyrexia following a Caesarian section in the third week of March 1985. On autopsy (on March 29, 1985) lungs showed congestion, oedema and haemorrhage, and the small bronchioles showed obstruction. There was no pontine haemorrhage. The electron microscopic findings from autopsies showed loss of lining membrane of the epithelial cells in lungs. Type II pneumocytes were present indicating that capacity for regeneration was not totally lost. Red cells looked different—they had lost their electron opacity. This could be because haemoglobin is lost or a change has occurred in the structure of the haemoglobin. Several areas showed zones of activated fibroblasts. Some lungs showed secondary bronchopneumonia. The brain showed presence of siderosomes. Neurones showed flocculent opacity indicating necrosis. Examination of one placenta showed loss of microvilli on the maternal side of the syncitial trophoblast.

V
Morbidity: Clinical Findings

A profile of the morbidity caused by the exposure has been compiled from the following sources of information:

(a) The two reports by the Indian Council of Medical Research (ICMR) in March and May 1985 describe the clinical picture and results of laboratory investigations in the acute and subacute phases. These observations were made by staff of the local Mahatma Gandhi Medical College at its attached Hamidia Hospital as well as by specialists sent in from other parts of the country. Several research projects were set up by the two organisations in the initial phase for long-term follow up of the victims. However further reports of their findings or progress are not available.

(b) Studies done by non-governmental groups. These include research teams from academic departments of universities, independent professional groups and voluntary agencies. The clinical picture of morbidity is described first followed by the epidemiological studies. Comments on the strengths and limitations of the data are interspersed with the description. There will be a further discussion of methodological issues later.

The pattern of morbidity varied over time. For the purpose of this report the acute phase has been considered as the first two weeks post exposure. The subacute phase is from two weeks to four months and beyond that period is the chronic or long-term phase. This classification is arbitrary and partly artificial to help understand the clinical picture over time. The most striking symptoms and signs with which most people presented immediately after the disaster or in the acute phase were related to the eyes and respiratory tract. There were also a wide variety of clinical symptoms related to different organs and systems. A description of the clinical findings in the acute and subacute phases follows.

Acute and Sub-Acute Phases

The Eyes: Mittal [ICMR, 1985] reported the following eye conditions in patients from the hospital OPD and wards of Hamidia Hospital. 8,000 patients were seen here in the first 24 hours, and 34,000 patients were treated in the first few weeks. Patients initially complained of a severe burning/foreign body sensation in the eyes, blurring of vision, profuse lacrimation, and difficulty in opening the eyelids. On examination there was lid oedema. Sixty to seventy per cent had superficial keratitis and conjunctivitis. Superficial ulceration of the cornea in the interpalpebral region was observed in several cases. Many had punctate keratitis in the lower sector. Corneal pathology was mainly confined to the epithelial layers, rarely penetrating the stromal tissues. They observed that children had fewer ocular problems. Eyes of nearly all the patients returned to near normal in a week's time with healing of the lesions. Detailed investigations did not suggest involvement of the posterior chamber. There was no evidence of blindness or deterioration in vision.

Andersson et al [1984] reported findings in 10 hospitalised patients on the eighth day post exposure. All had discrete superficial lesions, usually in a band across the interpalpebral region with the typical whorling pattern of new epithelial growth. No limbal necrosis or abnormal endothelium was detected. Their findings were in keeping with the report given above.

Andersson et al [1984] also reported findings from a study of community based clusters, two weeks post exposure. The exact location and distance of the clusters from the factory were not specified. They reported that over half the community demonstrated eye signs which could be attributed to the exposure. These were mainly interpalpebral injection and signs of healing epithelium. Fundal changes, mostly venous dilatation were more common in the exposed. There was no difference in the age standardised visual acuity between exposed and unexposed groups.

A Bang [1985] reported that in the week after the disaster a quick and crude community survey in Jaya Prakash Nagar (100 yards from the factory) revealed that about 50 per cent of the population had eye symptoms.

The Nagrik study [1985], found that 80 per cent of people within 1 km of the factory had ophthalmic symptoms, as did 60 per cent of those at 2 km and 40 per cent of those at a distance of eight km. This revealed a gradient of effect as well as the fact that exposure occurred even up to 8 km away.

Respiratory System: The ICMR report [1985] states that people initially complained of sudden onset of difficulty in breathing, coughing and in some cases, pain in the chest. On auscultation, many had bilateral crepitations. X-rays revealed interstitial pulmonary oedema, alveolar type oedema, pneumonitis, hyperinflation of lungs and collapse of surrounding area. Rapid deaths following exposure probably resulted from massive pulmonary oedema and associated hypoxia.

A Bang [1985] in the survey mentioned above, found that about 25 per cent of the population in JP Nagar had respiratory symptoms. A large number, even those with minimal respiratory symptoms had coarse crepitations and rhonchi. Many of the 'mild' cases were either not attending clinics or were not being given a thorough clinical examination. He pointed out that with inadequately designed studies and poor documentation the real epidemiology of morbidity may be missed. He also observed that the expected tide of secondary infection did not follow the initial period of chemical pneumonitis. Reasons for this were not understood. At the community level, antibiotic cover was either not given or was too inadequate for most of the affected persons and hence could not explain the phenomenon. There are also anecdotal observations that dead bodies of people/animals discovered a day or two after the disaster were not decomposing. On experimental studies [ICMR, 1985] MIC was found to have a bactericidal effect.

Andersson et al [1985] observed that respiratory distress was most marked in the community cluster "second in distance from the factory", affecting 20 per cent of the population. Many were too disabled by breathlessness to move more than a few steps or even to talk.

S R Kamat et al [ICMR, 1985] noted on 24 subjects, (a self-selected group who had gone to Bombay for treatment shortly after the disaster), that lung function tests suggested restriction, reversible obstruction and defects in oxygen exchange. Blood gas analysis revealed anoxia, compensatory respiratory alkalosis, raised carboxyhaemoglobin and methaemoglobin. They reported evidence of lymphoid granulations in the throat.

They later reported findings from an extensive evaluation of pulmonary function of 82 patients (also self-reporting to Bombay). X-rays in 78 were suggestive of interstitial pneumonitis. This was corroborated by blood gas and lung function studies. Methaemoglobin levels were raised in 63 out of 80 and was stated to be suggestive of interstitial alveolitis. Pulmonary function tests indicated central airway obstruction. A large majority of the 82 also showed some restrictive defect. Needle biopsies in five cases revealed evidence of interstitial fibrosis.

Later the case group seen at KEM hospital, Bombay expanded to 113 people. They were people from the middle class, living in well built houses two km away from the factory,

who had voluntarily presented to the hospital 8—53 days post exposure.
Their symptoms were as follows: breathlessness on exertion—95 per cent; persistent dry cough—97 per cent; irritation of throat—66 per cent; chest pain—68 per cent; vomiting—42 per cent; muscle weakness—22 per cent, and altered consciousness—28 per cent.

The findings on investigation were: low vital capacity of lungs—27 per cent (60 per cent of normal); impaired oxygen uptake—55 per cent; central airway obstruction—43 per cent; respiratory alkalosis—59 per cent; and low oxygen pressure in the blood—23 per cent. Though providing good clinical information this is a highly self-selected sample, not representative of the community.

Vijayan [ICMR, 1985] in a study of pulmonary function on 129 people carried out in January-February 1985 noted that 70 per cent of cases had abnormal ventilatory functions on spirometry. He measured forced vital capacity, forced expiratory volume at the end of one second and forced expiratory flow rate at BTPS. He had classified exposure status as severe, moderate and mild and noted that all those with abnormal pulmonary function had severe or moderate exposure. Pulmonary function was studied in 129 cases—approximately 40 per cent of those who complained of respiratory symptoms had ventilatory impairment, 12 per cent had restrictive lung disease, 6 per cent obstructive airway disease and 22 per cent obstructive-cum-restrictive defect. Ventilatory defects were not observed in patients with mild exposure to toxic gas.

The ICMR report [1985] states that of 35 patients in whom blood gas analysis was done, 23 severely exposed patients had arterial oxygen tension (Pa02) less than 60 mm Hg, i e, moderately low levels. Moderately and mildly exposed patients had normal Pa02. Low arterial carbon dioxide tension (less than 35 mm Hg) was observed in 12 cases. It was stated that these results indicate significant alteration in blood gases and suggest alteration in oxygen carrying capacity of the blood.

Narayanan [ICMR, 1985] reported, from experience in a 30-bedded hospital set up adjacent to the factory and hence more accessible to the affected people, that the exposed populations were suffering from recurring respiratory problems. They also complained of inability to perform accustomed physical activity. They had tachycardia and severe tachypnoea. The haemoglobin level was normal or raised. On blood gas analysis, PaO2 and PaCO2 were moderately low, PvO2 was moderately low and PvCO2 very high and 2,3 DPG (diphosphoglycerate) levels were also raised. These findings suggested a defect in oxygen transport and tissue anoxia.

The ICMR report [1985] states that even two months post exposure, nearly 40 per cent of patients attending the hospital presented with respiratory symptoms of breathlessness, cough and in some cases fever. Persistent tachypnoea was a characteristic feature. In some patients, symptoms were out of proportion to clinical and radiological observations.

It has been reported that many of the delayed deaths were preceded by severe respiratory distress.

Haematology: Ram Singh [ICMR, 1985] reported initial haematological findings, 15 days after the exposure. There was haemoconcentration and leucocytosis. There was no evidence of coagulation disorders. Approximately 25 per cent of severely exposed cases, reporting to hospital, had haemoglobin levels above 14 gm per cent and 33 per cent had raised eosinophil counts (above 20 per cent).

The ICMR report [1985] describes another series of 237 cases investigated during the first two weeks. Polymorphonuclear cells were increased in 35 per cent of cases, 52 per cent had raised lymphocyte counts, 19 per cent had eosinophilia in excess of 20 per cent, and 15 per cent had haemoglobin levels above 14 gm per cent.

The ICMR report [1985] quotes a study finding of a 20-60 per cent reduction of the free amino groups in the haemoglobin of persons exposed to the toxic gas.

Gastrointestinal System: The ICMR report stated that patients also presented with nausea, vomiting and burning in the stomach. Endoscopic examination revealed superficial gastritis and oesophagitis. A small proportion had hepatomegaly.

Neurological System: ICMR reported that immediately after the disaster severely affected cases showed varying grades of loss of consciousness ranging from mild to deep coma. The main presentation in children was coma. They report that in a study of neurological disorders in the affected population, 128 adult subjects were screened and revealed the following: neuromuscular weakness 1, right hemiplegia 1, hearing loss 2, tremors and vertigo 2. The method of selection and source of cases has not been mentioned, nor whether a standardised method of examination was used.

Andersson et al [1984] reported that those who fell unconscious had few or no eye symptoms or signs on recovery. They also found that collapse and unconsciousness was noted in the cluster second in distance from the factory and not in the others. No quantitative data has been mentioned, to see if the difference is significant. This observation suggests that different patterns of morbidity may occur in different clusters.

Bharucha [ICMR, 1985] reported initial observations of coma, tremors and paralysis in some cases soon after the gas leak. No recognisable patterns of neurological disorders were present five months post exposure, though many people complained of general weakness.

In the 113 affected people seen at the KEM Hospital, Bombay, neurological conditions such as sensory motor loss, tremors, loss of consciousness, irritability and depression were found in a significant number of cases.

Psychological Disorders: Sethi [ICMR, 1985], reported that of 168 cases of mental disorders treated in special clinics, the majority were neurotic disorders, viz, neurotic depression, anxiety neurosis and hysteria. Psychotic disorders were rare. Women under 45 years were predominantly affected.

S R Kamat, et al [ICMR, 1985] reported on psychometric evaluations carried out on 68 self-reporting cases: 22 showed evidence of depression and 19 showed evidence of cognitive defects with poor memory performance.

The team from the National Institute of Mental Health and Neuro-Sciences (NIMHANS) found a large community load of mental ill-health following the disaster [ICMR, 1985]. They reported that approximately 10-12 per cent of those affected, who visited community based general practice clinics, were presenting with psychiatric manifestations. Symptoms of anxiety and depression were foremost. Sleep disturbances, nightmares, gas phobia, feeling of hopelessness and grief reaction were common. Families of the affected population were finding it difficult to cope with the stressful situation. This is an area needing further study, as the NIMHANS team noted that long-term after effects have been reported in previous man-made disasters.

Outcome of Pregnancy: The ICMR report [March, 1985] reported findings of 97 women who had delivered. Among them there were still births—5 (5.15 per cent); abortions—17 (17.5 per cent) i e, total pregnancy wastage of 22.7 per cent; congenital anomalies (minor)—3. Most babies were full term but with low birth weight, 2 kg on average. In terms of development the babies appeared normal. The mother's weight was 40-45 kg.

In the ICMR report [May, 1985], Dabke described the results of 645 pregnancies: still births—8, abortions—67, congenital abnormalities (minor)—9, and low birth weight—29.8 per cent. They stated that these were not in excess of those expected in a normal population. Rates are calculated by relating the numerator to a given population, i e, the denominator in a given time period (usually a year). Hence no comments about normality/abnormality can be made from the above data. Comparison with control groups and if possible with national and regional rates should also be made.

Reproductive System: R Bang and M Sadgopal [1985] studied the impact on women's reproductive health two months post exposure. Fifty-five women were examined in Ob/Gynae field clinics in two of the affected slums—94 per cent of these had leucorrhoea, 79 per cent pelvic inflammatory disease and 46 per cent had excessive menstrual bleeding. Women also gave a history of suppression of lactation, impotence in the husbands, abortions and still births. This provided a clue that there were adverse effects on reproductive health, particularly women's health, which needed further investigation. They admitted limitations

of the lack of a control group and small sample size. However there was also the problem of a self-selection in clinic based data.

Therapeutic Trials

Medical management of patients with eye, lung, CNS, gastrointestinal and other presentations was symptomatic and followed standard practice. This approach did prove life saving and offered some degree of relief to many. However, with the passage of time, it was observed that patients kept coming repeatedly either with persistent symptoms or relapses following a remission.

While it was acknowledged that some of the long-term, multisystemic symptoms could be explained as being due to the after-effects of severe lung damage, ICMR scientists [ICMR, 1985] suspected the presence of systemic toxicity. Autopsy findings, laboratory investigations and a rapid literature search lead to the hypothesis of an enhanced cyanogen pool in the body resulting from the exposure either by direct inhalation of cyanide or more likely by the breakdown of MIC within the body. The detailed rationale for this has not been reported.

Autopsy findings had shown arterialisation of venous blood giving a reddish tinge to internal organs and tissues. Carboxyhaemoglobin and methaemoglobin were not detected. However, samples from all victims showed twin bands of oxyhaemoglobin. It was demonstrated that MIC could produce a reddish colour when mixed with blood. Urinary thiocyanate levels were found to be higher in the exposed population. Smoking and/or exposure to smoke, and the eating of certain foods, e g, cabbage, spinach, cassava, etc, are known to enhance the cyanogen pool and result in increased excretion of urinary thiocyanate (which is used as an indicator of cyanide exposure). Rosling [1986] summarised the mechanism of detoxification of cyanide in the body as follows—cyanide is trapped in the erythrocyte fraction of the blood and is converted to the less toxic thiocyanate in the presence of sulfur. This conversion is normally attributed to a reaction with thiosulfate catalysed by the enzyme rhodanase. Thiocyanate is then excreted in the urine. Intravenous administration of sodium thiosulfate is known to increase the capacity for detoxification of cyanide.

The toxic effects of cyanide result from impairment of the mitochondrial respiratory chain by inhibition of the mitochondrial enzyme, cytochrome oxidase. Studies [ICMR, 1985] have shown that pure MIC had no effect on cytochrome oxidase, but its degradation products did. This results in under-utilisation or non-utilisation of oxygen at the cellular level.

Based on the hypothesis of an enhanced cyanogen pool resulting from the exposure to toxic gases, sodium thiosulfate was administered to some patients as an antidote [ICMR, 1985]. It was stated that this resulted in marked clinical improvement and a significant increase in PvCO2 in both central and peripheral veins indicating better utilisation of oxygen by the tissues.

A double blind study using sodium thiosulfate and glucose was conducted. Of 30 patients, 15 each were given two injections of sodium thiosulfate or glucose. Urinary thiocyanate levels were determined at three- and five-hourly intervals and compared to the baseline level before the injection. In patients given sodium thiosulfate there was an 8- to-10 fold increase in excretion of thiocyanate in the urine in a significantly large number—in 10 out of 15 patients. Only one of the 15 receiving glucose injections showed such an increase. Criteria for selection into the study have not been stated.

Subsequently, Narayanan [ICMR, 1985] reported that of 230 cases treated, complete records were available for 167 (87 men, 69 women and 11 children). Symptomatology before commencing treatment was breathlessness and/or general weakness/tiredness. In 29 patients these symptoms were present at rest. While in 132 they were elicited by moderate exercise. Following administration of sodium thiosulfate, 9 showed no improvement while there were varying degrees of improvement in the rest over different periods of time. Details of how the analysis was done has not been stated. There were 10 cases of adverse reactions—five with feverishness and one each of skin rash, transient venospasm, a sense of heat over the body, exaggerated reflexes and loss of memory.

On the basis of these studies, a recommendation to use thiosulfate the therapeutic agent for the victims was made. Indications and contraindications for use, dosages for different age groups and details regarding administration were spelt out.

H Chandra [ICMR, 1985] reporting on the results of sodium thiosulfate in over 2,000 cases stated that it was "found to give beneficial results". It is not possible to comment on this. Anecdotal reports of dramatic cures have also been reported.

N P Mishra [ICMR, 1985] reported on a trial of sodium thiosulfate treatment with 120 cases and 100 suitably matched controls. Only results of clinical observations were recorded as there were no facilities for blood gas analysis. Urinary and serum thiocyanate levels were studied. Urinary thiocyanate levels of controls were in the range of 0.5 to 5.65 mg which is much more than 0.6 to 0.9 mg which has been suggested as the normal range. He therefore doubted the utility of determining urinary thiocyanate levels. He studied clinical findings such as dyspnoea, chest pain, general aches and pains, fatigueability, pain in the abdomen, appetite, pulse rate, lung signs and subjective feelings. All these were given an arbitrary score so that in the worst cases the score totalled to 100. Results showed that in the 100 cases given sodium thiosulfate: 60 showed a decrease in score, 19 had an increase in score, and 21 showed no change. The trial was carried out double blind. An important finding was that the greater the initial score before therapy, the smaller was the reduction of the score after therapy. There were very few cases with side effects. These were feverishness, skin rash, sense of heat all over the body—all of which were relieved by antihistaminics. Urinary thiocyanate levels were estimated in 60 cases. The mean value before therapy was 1.068 $\pm$ 1.03 and after therapy 1.46 $\pm$ 1.113. The basis for selection of cases and controls has not been specified. No comparison between cases and controls has been given regarding response to sodium thiosulfate administration or regarding urinary thiocyanate levels.

The data reported regarding all the studies done is inadequate for a thorough appraisal. It is also known that levamisole was used in a few patients as an immunomodulator. Controlled clinical trials should be performed for treatments being tried, as only then will a scientific evaluation of their efficacy be possible.

Discussion of Clinical Findings

From the above account it is apparent that tremendous effort has gone into the clinical management of the thousands of patients who poured into the dispensaries and hospitals following the disaster. Medical staff worked round the clock, many of them suffering from effects of exposure themselves.

The description reveals the involvement of

several organ systems in the body. This occurred even in the acute phase though it was then masked by the severity of the effects on the eyes and respiratory system.

The Environmental Health Criteria 27 [1983] states that few of the non-biologic agents have unique effects on health and conversely the effects considered may often be related to a wide range of factors. Therefore many aspects of the situation should be taken into account in trying to understand etiology and mechanism of action.

In spite of receiving medical treatment people kept returning to the clinics with histories of persistent symptoms or with relapses following remissions. Recent studies and clinical experience provide evidence of chronic effects.

It was not possible to fit the apparently unrelated symptoms and signs with which people were presenting into definite diagnosis. In the toxic oil syndrome which occurred in Spain clinical observations in the acute and chronic phase showed features resembling those of well known disease entities, but the combined clinical picture and pathology findings were unique and suggested that the syndrome was new [Grandjean and Tarkowski, 1983]. A similar situation is seen in Bhopal. Here, unlike in Spain the exposure is much more delineated in time and place. Though the exact composition of the chemicals causing morbidity and mortality is not fully known, there is certainty about it being MIC and its breakdown products or metabolites. It is the first instance of human exposure to such high concentrations of these chemicals. The event has resulted in a pattern of morbidity which probably comprises a new disease complex.

It has been observed that maintenance of records for individual patients regarding clinical presentation and treatment were a casualty under the acute emergency conditions. This is a lacunae both for the future treatment of the individual patient as well as for a thorough understanding of the pattern of morbidity caused by the disaster.

A number of medical professionals and researchers have documented the general clinical picture with which the affected people presented to the clinics at varying periods of time after the disaster. This does provide very valuable qualitative information about the cases seen and investigated.

The approach in the documentation reviewed has been focused mainly on the individual 'case' and on specific organs and systems. Some of the limitations of this approach are: (a) Because only people who voluntarily attended clinics were considered there is a self selection in the patients seen and documented. This 'selection bias' would result in the picture of morbidity not being representative of the morbidity in the community. However it would still provide descriptive information about the morbidity produced in those individuals.

From the estimated 2,00,000 people exposed or at risk only a proportion would have utilised the government health services on which most of the ICMR reports were based. Banerji et al [1985] have documented this. Other possible health services that people may have utilised are as follows: medical relief camps set up by a variety of voluntary agencies, local private practitioners or registered medical practitioners, special health schemes of which they were members, e g, ESI hospitals, railway health services, etc, health services outside Bhopal, other systems of medicine/healing prevalent in India, e g, ayurveda, unani, siddha, homoeopathy, etc, some may have utilised several systems of medicine or some may not have utilised any service.

Factors affecting utilisation of services would include accessibility in terms of finance and distance, severity of illness, tolerance of symptoms, mental health status and the beliefs and culture of the people.

(b) Cases reported only represent individual patients and cannot be related to a population to derive rates. Morbidity rates besides providing an estimate of the magnitude of the problem and its distribution in the population, could also help one to identify priority groups for treatment and care.

(To be concluded)

Health Impact of Bhopal Disaster

An Epidemiological Perspective

Thelma Narayan

The chemical accident at Bhopal has been an experience of a public health emergency caused by a technological disaster, a disaster which overwhelmed the capacity of individuals, physically and psychologically. Because of the numbers involved and its complexities it also overwhelmed the capacity of the macrosystem, that is, the social and administrative structures to respond. An epidemiological perspective and method of study is vital to understanding the pattern and distribution of the adverse outcomes in the community and can provide a variety of data.

The article, the first part of which appeared last week, uses an epidemiological perspective to appraise and review available literature concerning the health impact of the disaster and discusses methodological issues relevant to an epidemiological approach to the study of such a disaster.

VI

Review of Epidemiological Studies

THERE have been very few epidemiological studies about the health impact of the disaster. Reports that are available have been of studies conducted by non-governmental groups. They provide important information about the type and distribution of morbidity in the community. The methodology and findings of these studies will now be described in some detail. Findings from the population-based, cross-sectional study by Banerji et al have been discussed earlier in the section on mortality.

General Morbidity

(1) Andersson et al [1984] conducted a survey in the first fortnight (December 11-17, 1984) "to assess possible long-term visual disability among survivors". The sample comprised of 8 clusters of households, selected in different localities which had received varying degrees of exposure. Two localities of similar socioeconomic status, 15 and 17 km away from the factory, were selected as the control groups. Details of location of the exposed groups are not known. The sample size consisted of 261 exposed and 91 unexposed individuals. The sample size and distribution of the population in each cluster is not known. It was stated that the sample size was restricted because of shortage of time before the exodus from Bhopal during Operation Faith, which disrupted daily life for some weeks. Assumptions to determine sample size have not been mentioned. It was observed that the worst afflicted families had left by the time of the survey leading to an underestimation of effect. Method of sampling has not been mentioned—it was probably not randomly done. Three ophthalmologists (one with an interpreter) were the interviewers. An attempt to maintain uniformity was made—standard questions, method of examination and simplified nomenclature was used.

The findings are: The post exposure death rate (which was specified as the number of deceased/the number exposed) in the worst affected cluster was 3 per cent. There were differences in symptoms between the various clusters or exposure groups: burning of eyes and throat and coughing were the most frequently mentioned symptoms; vomiting was the third most frequently mentioned symptom in clusters close to the factory; further away choking and shortness of breath was higher; collapse and unconsciousness was reported only in the cluster second in distance from the factory—among those unconscious, there were few or no eye symptoms, upon recovery; signs of respiratory distress were most marked in this cluster affecting about 20 per cent of the community; over one half of this cluster demonstrated eye signs; fundal changes were more common in the exposed group especially venous dilatation; there was no case of blindness, irreversible eye damage or difference in age standardised visual acuity; there was a significantly higher proportion of people with active eye infection in the unexposed communities (5 per cent as compared to 1 per cent)—it was stated that this was possibly due to widespread use of antibiotics in the week preceding the survey (absence of secondary infection was observed by Bang in the respiratory system); there was a similar incidence (this should be prevalence) of Bitot's spots in the exposed and control groups reflecting a similar nutritional status in the two groups; and there was evidence of fairly widespread trachoma in all the groups, though very few active cases were seen.

Andersson et al [1985] reported on a two-month follow up in the clusters mentioned above. Among the exposed excluding one cluster to which they had 'no access' the follow up rate was 50 per cent. In both the exposed and non-exposed groups only 36 per cent (131/360) were located and reexamined. This is a very high drop-out rate. No information has been given about the baseline or known characteristics or attempts to follow up the dropouts. The clusters were enlarged and 490 people were examined. No information is given about the new examinees, viz, regarding their distribution according to localities, their demographic structure, method used for their selection, etc. Hence data will have to be interpreted with caution. The findings were:

There were no cases of blindness, decrease in visual acuity or defect in colour vision. There were no corneal scars in the original group but six scars which could impair vision were detected in the new examinees. It was not stated whether these were attributable to the disaster. There was regression of the early healing seen in the first examination. There was one case of persistent unilateral corneal oedema and three with complaints of persistent excess watering in an otherwise quiet eye.

A Patel et al [1985] conducted an epidemiological study of the general health status of the exposed people (see Tables 2-4). It was a population-based, cross-sectional study, using an exposed and a control group. The study was conducted three months after the disaster. Post exposure mortality rates for the different localities, as given in publications by the state government, were taken as indicators of the degree of exposure. Jaya Prakash Nagar, 100 yards from the factory in the direction of the wind that fatal night, had an exposure mortality of 2.34 per cent and was chosen as the study population. Anna Nagar, 10 km from the factory with an exposure mortality of 0.32 per cent, was used as the control group. Both areas were comparable with respect to housing, sanitation and economic status of the population. Study results showed that mortality rates were useful indicators of exposure. However the crude mortality rates found in the study population were much higher than those reported in the government publication. The study findings were: JP Nagar - 86.6/1,000 population, Anna Nagar - 7.9/1,000 population. Post disaster hospitalisation rates were also found to indicate differences in exposure: JP Nagar - 30 per cent, Anna Nagar - 0.72 per cent. Sample size determination was made on the assumption that morbidity would be 15 per cent in JP Nagar and 5 per cent in Anna Nagar. With a 5 per cent level of significance and 90 per cent power, a sample of 180 persons in each group (exposed and control) was chosen. Persons of both

sexes, more than 10 years of age were studied.

Numbering of all the households to provide a sampling frame was already done by the ICMR and the same was utilised in this study. As random selection of individuals was not possible, a random selection of 50 household units was made to yield the required sample size.

A house-to-house survey was conducted. This consisted of the following: (a) a detailed history on a predesigned questionnaire. Non-standardisation or pretesting of the questionnaire has been accepted as a limitation, and was reported not to have been done because of shortage of time. (b) general clinical examination of all the systems, the parameters for which had been defined. (c) pulmonary function tests using Morgans electronic spirometer set at BTPS. A trained investigator, with experience in field-based studies carried out the tests. (d) estimation of haemoglobin percentage. (e) open-ended questions on the people's perception of the health services available after the disaster.

Information about training of the interviewers has not been given. They were not blind to the hypothesis as this was not possible in any of the studies conducted in that situation. Group meetings were conducted in the community to obtain consent. The people were informed about the research group—that they were not related to the government nor were they providers of services, nor involved with the claims for compensation. This would reduce the possibilities for 'compensation malingering' as claimed by some. It was found that members of the particular sample chosen had not been included in any of the other studies being conducted, thus ruling out the possibility of the learning effect or Hawthorne effect.

The two populations were comparable with respect to age and sex structure, body surface area, history of chronic disease and smoking. The exposed were slightly better off socioeconomically than the controls.

There was a rather high non-response rate of 29 per cent in the exposed group and 15 per cent in the control group. However available information about the non-responders was collected. Their age and sex structure was similar to the responders and 50 per cent or more of them were exposed. Sixty and 50 per cent of non-responders in the exposed and control groups respectively were out of town, while 25 per cent were away for work. There were no refusals. Repeated visits were made in the time availabie to maximise the response rate (the investigators were a group of people who had come from different parts of India and were not resident in Bhopal). It has been argued that since the actual difference in morbidity was much greater than the 10 per cent assumed in sample size calculations, a smaller sample size would have demonstrated a difference and non-response may not make such an impact. Nevertheless the high non-response would have altered the process of random selection and it must be kept in mind that the non-responders may differ from the responders with respect to the outcome following the exposure in unknown and variable ways, e g, as stated by Andersson et al if the more seriously ill were among the non-responders there would be an underestimation of effect.

Briefly the study findings are as follows: Prevalence rates of 26 symptoms were measured in the exposed and control group at the time of the study. Tests to see if the differences were statistically significant were done.

The following 15 symptoms were found to be highly significantly different, being higher in the exposed group: cough with expectoration, breathlessness on usual exertion, chest pain/tightness, blurred vision/photophobia, fatigueability, weakness in the extremities, muscle ache, headache, tingling/numbness, loss of memory, nausea, abdominal pain, flatulence and anxiety/depression.

The following six symptoms were significantly different: dry cough, breathlessness at rest, watering of eyes, skin problems, bleeding tendency and impotence.

The following five symptoms were not significantly different: fever, blood in sputum, jaundice, vomiting, blood in vomit and malaena.

As many as 63 per cent reported all the important symptoms. Only 2.7 per cent reported exclusively pulmonary symptoms, while 35.14 per cent did not report any pulmonary symptoms. Every person in the exposed group reported at least one serious symptom, but quite a few in the control group did not report any.

There was a significant difference in the number of attacks of respiratory infections in the month preceding the study. In the exposed group it was often described as a continuous respiratory problem. It was said that this could be a supportive finding to indicate a state of lowered resistance or immunity.

Exposed women had a significantly higher rate of abnormalities of menstrual flow, alteration in the length of the cycle, dysmenorrhoea and leucorrhoea. The sample was too small to report on abortions and still births. Fifty per cent of exposed mothers in the exposed group reported failure of lactation or a decrease in milk output post exposure, compared to 11 per cent in the controls. Impotence in men was reported by 8.1 per cent in the exposed group and 0.72 per cent in the controls.

On examination: There was no difference in the resting pulse and respiratory rates. The mean haemoglobin per cent in both males and females was significantly higher in the exposed group. There was no case of cyanosis. This was stated to be a significant negative finding in view of the findings of 87 per cent with breathlessness on exertion, the raised haemoglobin concentration and that extensive lung damage was expected to have occurred. 9.4 per cent of the exposed had crepitations and rhonchi in the chest, as against 2.1 per cent in the controls ($P<0.025$). This rate was also stated to be too small to account for the much higher rate of breathlessness on exertion.

There was a statistically significant difference in pulmonary function tests in both sexes in the age groups of 15-45 and 45-60 years. The difference in other age/sex categories were not significant. However there were only a small number of observations in these categories. The mean values of FEV1 and FVC and the FEV1/FVC ratio in all age/sex categories were diminished in JP Nagar compared to Anna Nagar. The 15-45 and 46-60 age groups showed a restrictive pattern while the over 61s had an obstructive pattern. It was stated that the control population was also minimally exposed, thereby diluting or masking the effect of the exposure.

Women's Reproductive Health

R Bang [1985] conducted a study of the status of women's reproductive health three months post exposure. This followed the earlier survey of a small number of women

Table 2: Comparison of Symptoms Reported by Individuals in JP Nagar and Anna Naga. (Expressed in percentage. Numbers-of cases are shown in brackets)

Sl No	Symptoms	JP Nagar (Per Cent)	Anna Nagar (Per Cent)	P Value* (a)
1	Dry Cough	27.70 (41)	14.49 (20)	P<0.01
2	Cough with expectoration	47.29 (70)	23.91 (33)	<0.001
3	Breathlessness at rest	10.13 (15)	2.89 (04)	<0.025
4	Breathlessness on usual exertion	87.16 (129)	35.50 (49)	<<0.001
5	Chest pain/tightness	50.00 (74)	26.08 (36)	<<0.001
6	Weakness in extremities	65.54 (97)	36.95 (51)	0.001
7	Fatigue	81.08 (120)	39.85 (55)	0.001
8	Anorexia	66.21 (98)	28.26 (39)	0.001
9	Nausea	58.10 (86)	16.66 (23)	< 0.001
10	Abdominal pain	53.37 (79)	25.39 (35)	<< 0.001
11	Flatulence	68.91 (102)	25.36 (35)	<< 0.001
12	Lacrimation	58.78 (87)	42.62 (58)	<< 0.01
13	Blurred vision/photophobia	77.02 (141)	33.40 (53)	<<0.001
14	Loss of memory for recent events	45.27 (67)	11.59 (16)	<<0.001
15	Tingling/numbness	54.72 (81)	20.28 (28)	<<0.001

*(a) P Values were calculated by χ^2 method.

Source: Patel A and Patel A [1985]. The Bhopal disaster aftermath: an epidemiological and sociomedical survey.

in the two affected slums (refer to section on morbidity). The sample consisted of 114 women in two severely affected areas and 104 women in a control area (see Table 5). Reasons for selection of sample size have not been given. Selection of the sample was from community based ob/gynae clinics. This introduces the problem of self selection as women with ob/gynae problems would be expected to attend these clinics. These cases cannot be related to any population or denominator. Hence epidemiological extrapolations from these case studies cannot be made. It is not known if standardised questionnaires or examination schedules were used. The findings of the study were reported in Table 5. The differences are all highly significant ($P < 0.001$).

The results shown are from a smaller subset of the original sample, as pelvic examination could not be performed in some women due to various reasons like pregnancy, not being married, and refusals, i e, a selection at this stage has also occurred. However in spite of the limitations mentioned and also because similar factors of self selection occurred for both the exposed and control groups the difference between them is large enough to suggest real differences in the two groups and point to the need to study this area. Other studies, subsequently, too have reported similar findings [Patel et al, 1985 and Sathyamala 1986].

In the exposed group there was a history of spontaneous abortion in seven, still birth in four, threatened abortion in one and incomplete abortion in one after the gas leak. No women in the control group reported any of these adverse outcomes of pregnancy.

Severe pallor was found in 37 (36 per cent) of the control group but only in 3 (3 per cent) of the exposed group. This corresponds to the finding of an increase in haemoglobin percentage in the exposed population found in other clinical and epidemiological studies.

Outcome of Pregnancy

Sathyamala C [1986], conducted a community based study of pregnancy outcome, 10 months post exposure (see Tables 6-8). A large sample was needed to detect significant differences in rates of abortion and still birth. The sample size took into account a non-response rate of 25 per cent which had been found in earlier studies. A total population of 8,165 people in 1,632 households were surveyed. Details regarding assumptions to determine sample size, power of study, etc, were not reported. Three exposed localities (bastis) were selected on the basis of post exposure morbidity and/or mortality rate. These were as follows:

JP Nagar - mortality rate 65.3/1000, morbidity rate 66 per cent

Kazi camp - 46.7/1000, 54-60 per cent respectively and

Kenchi chola - 35.7/1000, 91.9 per cent respectively.

These figures were taken from later, unpublished analysis of the study by Banerji et al. The sampling frame provided by the ICMR was utilised and random sampling of households done. A 'historic control' was utilised, i e, history of pregnancy outcome in the year preceding the disaster, in the same population was used as a comparison. This was chosen on the basis of studies carried out elsewhere which demonstrated an abortion recall of 82 per cent accuracy even after a lapse of 10 years. This may have lead to an under-reporting in the controls and an overestimation of the difference between the groups.

A pre-tested questionnaire was used. Methods used to train interviewers and to avoid interviewer bias have not been mentioned. The definition of abortion, missed periods and delayed periods used for the purposes of the study have not been mentioned. Misclassification between the three could possibly occur. The findings were: The non-response rate was 22 per cent, within the limits of what had been considered in sample size determination.

There were 275 live births and 13 still births in the population after the gas leak. The birth rate was stated to be 33.68/1000 population and was said to be comparable with the national birth rate. However births for only 10 months were taken to calculate the rate. Normally a period of 12 months is used and hence the rate calculated would be an underestimation. It is also the crude birth rate, not being standardised for the age and sex structure of the population. The still birth rate post exposure was found to be 47.27/1000 live births. However live and still births together should be taken in the denominator. The rate then is 45.25/1000 births. No comparison with national, regional or study based still birth rates has been made.

The overall spontaneous abortion rate after the gas leak was 370.96 which was statistically very significantly higher than the spontaneous abortion rate of 32.178 before the gas leak.

A second important finding is that the rate of spontaneous abortions in women who conceived after the gas leak is again statistically highly significantly greater than the abortion rates before the gas leak. The increase being about 5 times greater than before the gas leak.

The overall foetal death ratio was statistically significantly increased in the year following the gas leak in comparison to the previous year.

While past obstetric history, parity, period of gestation at the time of abortion, etc, were measured they were not taken into consideration in the analysis. These are important interactive and confounding variables. Changes in regularity of the menstrual cycle, delayed and missed periods, length of cycle and type of flow, were also found to be statistically significantly different before and after the gas leak.

Case Referent Study of Watering of Eyes

Andersson et al [1986] conducted a case referent study of persistent eye watering. An eye hospital started in Bhopal in response to the disaster was used as the source of cases and controls. Two consecutive retrospective series of clinical records were drawn for outpatients on whom exposure data were available. This would be a source of selection bias as it is probable that exposure status may not have been recorded equally in the exposed and non-exposed groups. The method by which exposure was assessed and recorded has not been mentioned. The findings were:

Table 3: Comparison of Significant Symptoms Reported by Individuals in JP Nagar and Anna Nagar

Sl No	Symptoms	JP Nagar (Per Cent)	Anna Nagar (Per Cent)	P Value* (a)
1	Skin problems	29.05 (43)	11.59 (16)	<0.01
2	Bleeding tendency	9.45 (14)	2.89 (04)	<0.025
3	Headache	66.89 (99)	42.02 (58)	<0.001
4	Muscle ache	72.97 (108)	36.23 (50)	<0.001
5	Impotence	8.10 (12)	0.72 (01)	< .05
6	Anxiety/depression	43.92 (65)	10.14 (14)	<<0.001

Notes: Numbers of cases are shown in brackets.
* (a) Values were calculated by X^2 method.

Table 4: Comparison of Non-Significant Symptoms Reported by Individuals in JP Nagar and Anna Nagar

Sl No	Symptoms	JP Nagar (Per Cent)	Anna Nagar (Per Cent)	P Value* (a)
1	Blood in sputum	10.13 (15)	7.24 (10)	NS
2	Fever	27.70 (41)	28.98 (40)	NS
3	Jaundice	0.67 (01)	00	NS
4	Blood in vomit/stool/malena	12.16 (18)	10.14 (14)	NS
5	Vomiting	11.48 (17)	5.79 (08)	NS

Notes: Numbers of cases are shown in brackets.
*(a) P Values were calculated by x^2
Source: Patel A and Patel A [1985].

Gas exposed people were three times more likely to present with watering eyes (odds ratio – OR- 2.96, 95 per cent confidence interval – CI – 2.3 - 3.4) and nearly 4 times more likely to present with watering and at least one other irritant symptom (burning, itching, redness) (OR 3.8, 95 per cent CI 3.12 - 4.4). There was no association between exposure and refractive errors (OR 1.16, 95 per cent CI 0.83 – 1.9).

There is no explanation for the symptom of persistent watering of the eyes. The report suggests tear film instability due to long-term effect of exposure on epithelial maturation or abnormality of the mucus component of the tear film which is derived from the epithelium itself and from conjunctival goblet cells.

In summary, the epidemiological investigations conducted have studied different aspects of the health impact of the disaster at different points in time (see Table 9). They vary in methodology used and critical comments regarding this aspect have been given above. They were conducted in difficult circumstances and despite some methodological limitations they all record very serious effects on the health of those exposed. They support clinical findings of multisystemic and long-term effects. However, some of the important findings from these studies, that may provide clues for etiology, if followed up are:

(A) The varying pattern of morbidity in clusters at different distances away from the factory in the acute phase. This was not just in magnitude of effect, but there were qualitative differences of differing symptomatology (Andersson et al) in different clusters. This points to the possibility of the role played by different chemicals. Follow up studies should look at different clusters over time.

(B) The presence of a percentage or proportion of individuals with multisystemic symptoms in the absence of lung disease (Patel et al) in the sub-acute phase. This suggests that severe lung damage may not account for all the chronic effects.

(C) Significantly higher adverse outcome of pregnancy in exposed women conceiving after the disaster, compared to controls. Congenital abnormalities also need to be studied. This very serious observation points to the presence of continuing toxicity.

Infants, pre-school and school age children, a vulnerable group, have not been studied. Respiratory disability has not been studied at the population level. Natural history of the morbidity and the excess mortality that continues to occur also remain to be studied.

VII
Experimental Studies

Pre-Disaster: Data on the toxicology of MIC was scarce at the time of the disaster. Median lethal doses in animals were available, e g, it was 5 ppm for 4 hours by inhalation in the rat. In another experiment a dose of 62.5 ppm for 4 hours killed all the exposed rats. Corneal injury has been recorded in rabbits. A dose ranging study in human volunteers has been referred to by the ACGIH (American Conference of Governmental Industrial Hygienists). There were no effects at 0.4 ppm but exposure to 21 ppm was unbearable.

Mention has been made of the intense irritation caused to eyes, nose and the throat. Kimmerle and Eben [1964], studying MIC toxicity by inhalation exposure, observed that it was highly irritating to skin and mucosa and that it produced pulmonary oedema. There was little published material on the effects of sublethal doses, dose response and metabolic/chemical breakdown products of MIC.

Post-Disaster: Several toxicological studies on different animal models have been conducted after the disaster. Because of the short life span of the animals used, each animal year being equivalent to several years of human life, an estimate of long-term effects of exposure can be made relatively early. Experiments and pathological investigations not ethical or permissible to be conducted on humans can also be performed. The main limitation of animal studies however, in general is that extrapolation of results to humans has to be made with caution because of the differences in the biological systems. Another limiting factor to be borne in mind in this particular case is that in all the animal experiments conducted so far, only pure MIC has been used as the agent of exposure. In Bhopal under the prevalent conditions of high pressure and temperature and in the presence of catalysts other chemical reactions could have occurred with the formation of other chemicals. However the advantage is that these experiments can indicate lesions attributable to MIC. They can be used to support/explain epidemiological observations and similarly epidemiological data can provide clues for experimental work. The objective of both endeavours together being to explain mechanisms/pathogenesis to the extent necessary for rational interventions in the treatment and/or rehabilitation of victims and in the prognosis of their condition.

The method of MIC exposure used in animal studies has been by inhalation, with doses varying between experiments. They all tried to simulate the possible dose range that could have existed during the Bhopal disaster.

Harding et al [1985] reported the development of lens opacities or cataracts when rat lenses were incubated with MIC.

Salmon et al [1985] reported that at low concentrations in rats MIC caused severe sensory irritation with slow, irregular breathing and the production of a sedative effect. At higher concentrations this was masked by arousal resulting from respiratory distress. Eye damage was always confined to the epithelial layer with most severity at intermediate exposures suggesting that at high doses some protective response was evoked. Urinary thiocyanate levels in the exposed were lower than in the controls. They observed a dose dependent response and supported the use of death rates and incidence of pulmonary damage as a crude index of exposure in epidemiological studies.

Nemery et al [1985] reported that at very high concentrations (10 mg/L for 15 mins) 50 per cent of the rats died. The lungs were enlarged with air. Gross oedema or haemorrhage was present only in 2 rats killed after exposure. The main effects of low concentrations of MIC on the respiratory tract was to injure the proximal airways with little alveolar injury. At high concentrations lung parenchyma was also damaged with resulting interstitial and alveolar oedema, inflammation and haemorrhage. Though there was complete destruction of bronchiolar epithelium, repair took place. However despite rapid resolution, they found isolated foci of more recent injury in animals killed 2-3 weeks after exposure. They found MIC to be a respiratory irritant, i e, both a sensory (stimulation of nerve endings in the nasal mucosa) and pulmonary irritant (impact on lower respiratory tract).

Ferguson et al [1986] im mice experiments also found MIC to be a potent sensory and pulmonary irritant. They have considerable experience in working with isocyanates and have found MIC to be the most potent pulmonary irritant they have tested in the isocyanate series. They found that the RD 50 (the concentration evoking a 50 per cent decrease in the respiratory rate) and the RD 50 TC (the RD 50 in tracheally cannulated mice) was separated only by a factor of 1. Thus a concentration capable of evoking intense sensory irritation of the eyes, nose and throat is close to that capable of inducing pulmonary irritation. MIC is thus classified as a respiratory irritant. They found it to be seven times more potent than chlorine.

Luster et al [1986] found a steep dose response for toxicity. During 90-day recovery studies epithelial injury generally resolved,

TABLE 5: FINDINGS OF R BANG'S STUDY

	Exposed Group	Control Group	Chi Square
Total no studied	114	104	—
Pelvic exam done	72 (63%)	52 (50%)	—
Leucorrhoea	65/72 (90%)	14/52 (27%)	51.67
PID	57/72 (79%)	14/52 (27%)	34.67
Cerv erosion/endocervicitis	54/72 (75%)	23/52 (44%)	11.39
Excess menstrual bleeding since exposure	27/87 (31%)	1/81 (1.2%)	26.19
Suppression of lactation	16/27 (59%)	2/16 (12%)	10.17

The differences are all highly significant ($P < 0.001$).

but prominent fibrosis developed in the walls of the major bronchi. They reported no injury to the spleen, liver, kidney, thymus or brain. Haematological values except for slightly increased haematocrit were within the normal range. They found humoral immunity to be unaffected. In spite of a 30 per cent suppression in T cell lympho-proliferative response they found host response resistance not affected.

Fowler and Dodd [1986] studied rats, mice and guinea pigs. Gassert [1986] observed that this study was the most comprehensive inhalation study of MIC to date. It was produced some years before the Bhopal disaster under private contract 48 with Union Carbide but was not published until 1986. It provided evidence of bronchiolitis obliterans in guinea pigs (only) exposed to 10.5 and 5.4 ppm MIC for six hours. They also noted dose related lesions in the respiratory tract. No deaths occurred in animals exposed to 1 or 2.4 ppm MIC. The majority of deaths for 10.5 and 20.4 ppm occurred through post posure day 3; at 5.4 ppm deaths occurred roughout the 14 days. Deaths were attributed to pulmonary vascular alterations.

ICMR studies [1985] found that the cherry red appearance of the blood could be due to the direct action of MIC (by carbamylation) and need not necessarily be due to cyanide or carbon monoxide. Carbon monoxide poisoning was ruled out. Analysis of human tissue by gas chromatography indicated the presence of monomethylamine. On animal studies they found that MIC had an LD 50 dose of 85 mg in mice, but with thiosulfate therapy it shifted to 195 gms. For rats the figures were 270 and 344 respectively. Normal rabbit lungs weighed 6 gms, following MIC exposure they weighed 29 gms and had a large number of haemorrhagic patches. When given sodium thiosulfate immediately after MIC exposure the lungs weighed 24 gms but the appearance was normal. With pure MIC they also found a dose-dependent response in the respiratory tract. They found that MIC had bactericidal activity.

Salmon [1986] also reported that MIC could produce a reddish tinge to blood. However differences could be detected on spectrometric analysis.

Varma et al reported adverse effects on the oestrus cycle and fertility in male and female mice.

Gassert et al [1986] reported on a 14-month follow up of rats exposed to MIC. Two exposed rats died at 6 and 8 months following sudden onset of respiratory distress. Six rats killed at 14 months revealed a history of mild respiratory infections. Mild interstitial fibrosis in the peribronchiolar region was present in all exposed rats. A notable finding was that MIC exposed animals had four times the amount of lymphoid aggregates found in control animals adjacent to the bronchiolar airways. A mild infiltrate of eosinophils was present in the bronchiolar mucosa. Eosinophil and lymphoid infiltrates were found in the mucosa of the conjunctiva of the eyelids and perilimbal regions. They state that long-term changes in the eyes and lungs may result from a single two-hour exposure to acute sublethal doses of MIC vapours and that the immune system is most probably directly involved. They suggest that lymphoid hyperplasia may be due to persisting exposure related antigens or to an increased susceptibility to other immunostimulating agents following MIC exposure.

Thus animal experiments reveal that MIC is extremely toxic on inhalation—being a potent respiratory irritant. Chronic morbidity and a continuing increase in mortality has been reported in the exposed animals. The studies suggest three possible mechanisms by which this may occur: (a) due to long-term sequelae of severe lung damage caused by the direct toxic or irritant effects of the chemicals. (b) due to damage to the immunological system. (c) due to systemic toxicity caused by mechanisms as yet unknown.

TABLE 6: RATE OF SPONTANEOUS ABORTION BEFORE AND AFTER GAS LEAK

	Before	After
Total conceptions	404	310
No of abortions	13	115
Abortion rate	32.178/1000 conceptions	370.96/1000 conceptions

TABLE 7: ABORTION RATE IN CONCEPTIONS BEFORE GL ABORTED BEFORE GL AND ABORTION RATE IN CONCEPTIONS AFTER GL

Conception BGL	Abortion BGL	Abortion Rate	Conception AGL	Abortion AGL	Abortion Rate
404	13	32.178/1000 Conceptions	310	45	145.16/1000 Conceptions

(BGL-before gas leak, AGL-after gas leak).

TABLE 8: FOETAL DEATH RATIO BEFORE AND AFTER GAS LEAK

Quarter	1984			1985		
	Number Delivered (LB+SB)	Number Aborted	FD Ratio	Number Delivered	Number Aborted	FD Ratio
January-March	30	2	6.66	76	27	35.52
April-June	87	12	13.79	77	24	31.16
July-September	56	3	5.35	94	20	21.27

(LB - live births, SB - still births; FD ratio - foetal death ratio).

Note: The foetal death ratio has not been defined but appears to be the number of abortions per 100 live and still births.

VIII
Discussion

The discussion on methodological points will cover the following areas: a) the exposure variable, b) the population at risk, c) the health outcomes, d) confounding variables and e) sources of bias.

EXPOSURE VARIABLE

Results from the few early studies conducted, together with experience of physicians and social workers in Bhopal and toxicological studies in animals indicate that the exposure has resulted in long-term adverse effects on health. These findings point to the need for long-term follow-up of the victims. As a first step valid measurements of exposure need to be evolved.

(a) *Defining Exposure*: It is necessary in the conduct of epidemiological studies in Bhopal to have a working definition of the exposure variable. Indicators or measures of the degree of exposure are also needed to estimate possible dose-dependent responses in the outcome variables of mortality, morbidity and disability.

Previous studies have used the following as indicators of exposure: post-exposure mortality rates in defined localities as reported by the state government study findings have shown that these did provide a rough estimate of exposure in different localities. The rates found in the studies were, however, much higher than the rates reported by the government. Issues concerning mortality rates have been discussed earlier: A combination of death in the family or exposure-related mortality rates along with grades of morbidity as a measure of exposure; one study found that immediate post-exposure hospitalisation rates were also related to the degree of exposure.

(b) *Variability in Exposure*: Epidemiological studies reveal that control areas 10km away from the factory have been mildly exposed. Studies have also shown a variability in the picture of morbidity in different localities as well as variability in individuals or groups of people living in the same locality. Besides differences in individual susceptibility accounting for some of the variability, both the above observations suggest that the factor of 'exposure' needs to be considered more carefully. The two important issues to be considered are: the area and hence the population exposed may be larger than the accepted 2,00,000, several variables which determine the exposure level for an individual—results from the various studies have indicated that these are: (1) distance

from the factory at which the individual was at the time of the disaster, taking into consideration the direction of the wind; (2) type of housing: pucca (well built), kutcha (without brick and cement), presence of gaps/holes letting in air (3) action taken at the time of the disaster, viz, a) measures of exposure to the atmosphere: kept all doors and windows closed and remained indoors, opened doors and windows, stayed in the house, went out, remained in the area; (b) measures of exertion: left area, walked, left area, ran, left area, cycled, left area, used motorised transport; (c) use of neutralising/protective measures: used a wet cloth over the face, covered face with a blanket, went in a direction opposite to that of the wind.

Thus a single parameter by itself, e g, distance away from the factory, may not reflect the true exposure status of the individual which would also depend on other actions that the person took at the time of the disaster. This could be one of the reasons to explain the variability in mortality and in the pattern and degree of morbidity in different individuals even in the same locality. Other factors like age, level of nutrition and general resistance, presence of other diseases, etc, would also play a role. All the above will have to be considered in studies of morbidity as well as in determining priority groups of people who would need greater care and follow up.

(c) *Exposure at individual and population level*: Mortality rates could be a measure of exposure to classify localities and areas, i e, they could be used as indicators of degree of exposure at the population level. While the other factors outlined above could be used as measures of the exposure status of individuals.

(d) *Measurement (assessment) of exposure*: History taking is the traditional medical method of determining the exposure status of an individual. However in Bhopal a large population has been affected. Several studies into the health effects will need to be conducted over a long period of time and several interviewers will be involved. To ensure comparability between studies and consistency over a period of time, a standard, repeatable and valid method of determination of exposure should be used. A standardised questionnaire, using the factors discussed earlier would provide a simple, inexpensive, non-invasive tool of investigation.

There have been attempts to develop biological markers of exposure, e g, antibodies or enzyme-related makers. They are still in the experimental stage and will have to be field-tested. However, any invasive method—in this case blood samples will be needed—have the drawback of increased nonresponse. Besides this, increased costs, the need for investigators who have requisite skills, the availability of laboratory facilities, etc, will have to be considered. Studies carried out so far have shown that the use of crude morbidity and mortality rates have served as markers of degree of exposure. Salmon et al [1985] have confirmed this on the basis of experimental studies. With a little refining as suggested above, standardisation and pretesting, questionnaires could continue to be used to measure the degree of exposure.

Population at Risk

The population at risk would comprise all those who were exposed to the agent and who could potentially manifest adverse health outcomes as a result of the exposure. It would form the denominator in calculating exposure-related rates of morbidity and mortality for the population. Various subgroups of this population could also be studied, e g, according to age, sex, socio-economic status, degree of exposure, etc. Epidemiological profiles for groups broadly classified as severly, moderately and mildly exposed could be built up. Factors discuss-

Table 9: Summary of Epidemiological Studies Conducted in Bhopal—Methodological Aspects

Investigator	Focus of Study	Type of Study	Time	Place	Person	Sample Size	Sampling Method	Non-Response	Study Instrument
1 Andersson et al	Eyes, general morbidity	Population based, clusters + controls, +2 month follow up	December 1984, and February 1985	Severely + moderately + mildly exposed areas	General population	261 exposed, 91 unexposed persons	Opportunistic sample, i e, as many as could be examined	64 per cent at follow up	3 ophthalmologist interviewers, attempts to maintain uniformity in history-taking and examination
2 D Banerji et al	Mortality, general features	Population based, cross-sectional	January 1985	Severely + moderately exposed areas	General population	700 households	Random sampling	?	Pre-designed questionnaire, trained investigator
3 R Bang	Women's reproductive health	Clinic based case series in exposed + control areas	February-March 1985	Severely exposed + control areas	Women-reproductive age group	114 exposed, 104 unexposed persons	Self selected sample, women attending field based Ob/Gyn clinics	Pelvic exam not done in 43.2 per cent	1 gynaecologist investigator, routine history-taking and clinical exam
4 A Patel et al	General health	Population based, cross sectional, exposed + control areas	March 1985	Severely exposed + control areas	General population >10 yrs of age	180 persons in each group	Random sampling	29 per cent in exposed, 15 per cent in control group	Pre-designed questionnaire with defined parameters, ? training of investigators
5 Sathyamala	Outcome of pregnancy	Population based, cross-sectional, historic control	September 1985	3 severely exposed areas	Pregnant women out of general population	8165 persons in 1632 households	Random sampling	22 per cent	Pre-designed, pre-tested questionnaire, ? training of investigators
6 Andersson et al	Watering of eyes	Case control, record based	November 1985-January 1986	Eye hospital	Eye patients from general population	989	Those with recorded exposure status	—	Hospital case records

ed under exposure variable will have to be considered.

Numbering of all the households to create a sampling framework was done shortly after the disaster. Since a relatively small population has been affected and there is a need for long-term follow-up, a population register or case registers could be maintained on computer after a census of the exposed population.

This would provide a good base for follow-up studies.

Health Outcome

(a) *Mortality rates/standardisation*:

The number of deaths following the disaster would have to be related to the exposed population to derive crude rates. These could be standardised for age and sex by comparison with a standard population of similar socioeconomic status, and Standardised Mortality Ratios (SMRs) could be calculated. The time period during which deaths are enumerated would have to be considered in the calculation of exposure-related mortality rates. As with morbidity this could be calculated for the acute, subacute and long-term phases. Rates for different localities should also be calculated.

These rates could be calculated using routine sources of data. However in the longitudinal study, life table analysis could be done. There should be a good reporting system for deaths in the exposed and control populations. Staff and investigators should be trained in the use of the International Classification of Diseases and if necessary suitable, standardised criteria could be evolved for the classification of deaths. Autopsies should be preformed in a sample of deaths among the exposed group, as is the requirement in any medico legal case.

(a) *Assessment criteria*: This has been the first time that a whole population has been exposed to high concentrations of these chemical agents. The exposure has, therefore, resulted in a group of symptoms and signs which together do not fit easily into established disease entities. This new disease complex would have to be named appropriately, e g, the 'Bhopal Toxic Gas Syndrome'. For the purpose of epidemiological studies working case definitions of this disease complex would have to be developed. This would have to be done based on the clinical experience of medical professionals treating the exposed population together with the help of epidemiologists to ensure simple, standard criteria which can be applied in the field. It would basically comprise of groupings of characteristic symptoms and signs.

(b) There may be a lag period between the exposure and some pathological conditions which have not as yet manifested. Rothman [1985] states that one must allow for the following: a biologically appropriate induction time during which a sufficient cause becomes complete. This may be quicker for heavy exposures and slower due to interaction with other factors for lower doses of exposure; and latent period, which is the period after causation before the disease is detected.

Early studies may thus miss still evolving disease conditions which could be picked up by prospective longitudinal studies or epidemiological monitoring systems.

(c) Complementary causes or predisposing factors would play a role in the development of the disease outcome by increasing the susceptibility of individuals. People with a larger set of complementary causes would need a smaller dose of exposure to complete a sufficient cause and result in a diseased condition [Rothman 1986]. Exposure to the toxic chemicals may unmask or exacerbate existing disease, e g, chronic bronchitis, asthma, TB, etc. These would be considered confounding factors in the analysis of studies. But, from the point of view of the health condition of the people and for the provision of health care services, their presence would cause the individual to be placed in a priority group.

Confounding Variables and Sources of Bias

Socioeconomic status is closely related to exposure and to outcome and would be a confounding factor. Stratification in design or group matching could be used to account for this. Age and sex would also have to be considered. In the Bhopal situation, smoking, exposure to smoke or air pollution in the home (cooking on smoky fires) or at work, nutritional status, presence of chronic diseases, e g, TB, trachoma, asthma, chronic bronchitis would be interactive factors which would have to be measured and allowed for in the analysis.

Several sources of bias have to be considered: (a) Stewart [1985] has raised the issue of 'survivor bias' in follow up studies of survivors of the atomic bomb explosion in Hiroshima and Nagasaki. This could occur in any cohort of people surviving a major catastrophe. The parent population loses a high proportion of vulnerable individuals—the very young, the old and the sick. Thus when comparisons of mortality are made with a control group in follow-up studies there will be an underestimation of the effect. One may get a normal death rate in the survivors, though it may actually be slightly raised. This is similar to the bias caused by the "healthy worker effect" in studies of occupational groups. This factor would have to be kept in mind in long-term studies in Bhopal.

(b) There would be a selection bias in hospital or clinic based studies due to self selection of people attending these services. With the plurality of services and factors of accessibility this would be important in Bhopal. The utilisation of health services in the subacute phase as reported by Banerji et al [1985] shows that this occurs.

(c) Bias due to migration of people into and out of the population, new births and deaths, all of which would affect the baseline population have been considered earlier in the report.

(d) Misclassification of exposure status or of outcome (if the diseased condition is undiagnosed or misdiagnosed) will enhance or decrease the association depending on the direction of the misclassification. In Bhopal this is very likely when using routine sources of data, as many medical professionals dealing with a previously unknown situation, have tended to use the nearest known diagnosis to fit the presenting symptoms and signs. This re-emphasises the need to have a working definition of the outcome for documentation and study.

(e) The non-response rate has been found to be quite high (20-29 per cent) in all the studies conducted in Bhopal. Besides altering the sample size this would also affect the composition of the sample, depending on the characteristics of the non-responders. Allowance for non response should be made in determination of sample size and also in budgeting for time and finances to allow for more intensive follow-up of a percentage of the non-responders.

(f) Observer bias leading to a bias in history-taking, recording, interpretation of findings or in diagnosis may occur. The factors that play a role specifically in Bhopal are: Those who believe that all is well in Bhopal try to underplay or explain away the symptoms of the people. This is evident in the attitude of many who attribute every symptom to the presence of chronic diseases or as psychosomatic symptoms or as compensation malingering. On the other hand those who believe that a conscious anti-people crime has been committed in Bhopal may let their beliefs affect reporting or interpretation of what the people say.

The above factors could be reduced by the training of interviewers and in the use of blind techniques when possible in certain investigations, e g, in reading X-ray films, etc. Keeping investigators blind to exposure status is not possible.

(g) Measurement bias would be important to keep in mind especially when using instrumentation for lung function tests. Standardised instruments and techniques are available. The instruments should be calibrated and maintained to give accurate and reliable readings over a period of time.

Suggestions

Several research projects, involving different specialities, are being undertaken in Bhopal and elsewhere, on various aspects of the disaster. As outlined earlier there is a need for supportive epidemiological studies, especially those that are population-based.

In Bhopal a cohort of people have been exposed at a point of time to chemical agents. There is a need to study:

(1) the range of health effects stemming from the exposure,

(2) the natural history of these health effects.

An epidemiological study is basically an exercise in quantifying disease occurrence and using a logical method in deriving inferences/explanations to account for varia-

tions in disease distribution by relating them to putative causes. In this particular situation, where the exposure has defined time and place characteristics, though the composition may be uncertain, observational follow-up or longitudinal studies seem logical. Here the study population are selected with reference to their exposure status.

The application of case control studies, where the study population are selected with reference to their disease status, would be limited. The disease outcome in Bhopal, is not a well defined entity and is still evolving. The prevalence of what has occurred, is not rare, but affects 30-60 per cent of the severely and moderately exposed population. Also, a large proportion of the local population of similar socioeconomic background have been exposed to the agent, to some degree.

Cross sectional studies in the subacute phase have provided prevalence rates of various symptoms and have also indicated areas of importance. A repeat cross sectional study could give prevalence rates of symptoms and signs post exposure. It could provide age, sex and area specific distribution of the "Bhopal toxic gas syndrome". Relationships with respects of the exposure variable could also be tested. Cross-sectional studies using exposed and control groups, a variant of case control studies, could be used for analytical purposes, to study the relationship between symptoms or groups of symptoms and exposure.

Longitudinal Study: A cross sectional study should form the baseline for a prospective, longitudinal study. Important points in the conduct of a longitudinal study are now considered.

(1) Objectives: The hypothesis should be explicitly stated. There is a need to define the time period of the study. This would be selected based on biologic assumptions of the disease outcome and its relationship with the exposure. The broad objectives could be:

(a) to study the prevalence/incidence of the 'Bhopal toxic gas syndrome'.

(b) to relate symptoms/signs observed at the start or appearing during the course of the study, to various aspects of the exposure.

(c) to study the natural history of the condition—its severity, fatality, the impact of therapy, etc.

Other specific areas to be studied are (a) the percentage of exposed individuals with multisystemic symptoms and signs in the absence of lung findings. (b) levels of urinary thiocyanate in the exposed and control population. (c) prevalence of psychiatric disorders in the two groups. (d) outcome of pregnancy in the years following the disaster. The specific parameters of these outcomes would have to be evolved locally.

(2) Sample: Small clusters in different localities could be selected to be able to study the variation in outcome in the different localities. Other aspects of the exposure variable would also have to be measured in the individuals in these clusters.

Sample size determination would have to be done locally, with details of the baseline population. Differences in the prevalence of symptomatology between the exposed and control groups, as found in previous studies, should be used for the calculation. The level of statistical significance and power required for the study should be decided. The high non-response rate as found in previous studies and possible dropout rates should be considered.

To ensure representativeness and to avoid bias, population based, random sampling should be used. With this method the probability of selection into the sample is the same for all individual units. Though the sampling framework has been set up, it could be rechecked keeping in mind the discussion of the population at risk. The method used in the cross-sectional and longitudinal studies would have to be a house-to-house survey.

Community meetings as in the study by Patel, et al, should be conducted with the people to inform them of the study, discuss with them the need for continued study, reasons for random sampling, etc.

(3) Ethical aspects: Obtaining consent from study participants and maintenance of confidentiality of patients records should be planned for.

(4) Study population: Besides the general adult population, infants, preschool and school age children should also be considered. This group has not been studied in the studies reviewed. The advantages of this group are that they would have had no serious exposure to smoke (though passive smoking would have to be considered) and occupational pollutants. Chronic disease would also be minimal. Their respiratory systems are also more sensitive to insults which makes it easier to detect adverse effects. It has been found that children can carry out spirometric lung function tests from about seven years and can manage a single measurement of PEFR at five years [Florey and Leeder 1982].

(5) Control population: An unexposed or minimally exposed population is needed for comparison. It should be comparable in terms of broad socio-economic characteristics. It would provide an estimate of disease rates expected to occur in the absence of exposure.

(6) Measuring the exposure and outcome variables: The main issues regarding these variables have been discussed. Working criteria/case definitions for the assessment of exposure and outcome need to be defined. Several types of outcome can be observed, e g, post exposure mortality, specified decrease in lung function, onset and frequency of respiratory infections in addition to those mentioned under specific objectives. Sub-classification into definite, probable and possible 'cases' could be made. Criteria and methods of assessing the exposure and outcome variables should be the same in both the exposed and control groups.

(7) Examination techniques: Simple, valid, repeatable, field tested instruments will have to be used. These would include questionnaires, clinical examination, lung function tests, etc. The parameters to be measured at entry and follow-up should be specified. Numerous studies of diseases of the respiratory system and its risk factors have been conducted. Instruments which are valid and reliable are available. Three standard questionnaires have been developed for the study of respiratory epidemiology by the British Medical Research Council, US National Heart and Lung Institute (NHLI) and the American Thoracic Society. A suitable one could be combined with general health questionnaires. Standardised methods for spirometric lung function tests are also available. Random and systematic sources of error in measurement must be minimised.

(8) Other factors to be considered are the training of investigators, pilot testing and planning for the follow-up of a percentage of non-responders.

(9) Analysis: In a longitudinal study an unbiased estimate of the relation between exposure and outcome is obtained. The relative risk (incidence rate in the exposed/incidence rate in the unexposed) and absolute risk (incidence rate in the exposed-incidence rate in the unexposed) can be calculated. It would be more useful to work out person years of risk and calculate the force of mortality/morbidity or the instantaneous mortality/morbidity rate. The risk of developing a particular outcome (death/disease) can be estimated for a variety of initial characteristics, e g, distance from factory, action taken at the time of disaster, main presenting symptom in the acute phase, etc.

(10) Difficulties: Dropouts causing attrition of the sample are to be expected. Every effort to get a good follow-up should be made. Substantial loss to follow-up may raise doubts the validity of the results as bias would be introduced if the loss is correlated with both exposure and disease.

It is important also to maintain consistent criteria and techniques for measurement throughout the study period. This is in view of the fact that turnover in staff and availability of newer instrumentation and techniques will occur over time.

A longitudinal study is also a major undertaking in terms of resources—personnel, facilities, finances, etc. The seriousness of the situation, however, demand this effort, which would be best conducted under the auspices of the state health authorities and the ICMR.

Multiple or Serial Cross-Sectional Studies: Difficulties inherent in the conduct of cohort studies have led to the use of multiple cross sectional studies. This would be carried out on random samples of the population at different points in time. In Bhopal they would be able to show if there are changes in prevalence from one survey to another. However, since the same individuals would not be followed up, the natural history of the disease will not be studied. Changes in population structure in the intervening period could cause a change in the measure

of outcome. The sampling method, method of data collection and analysis and response rate should be comparable at each examination. Comparison of mean values or frequencies of variables such as age and sex could give an idea of changes occurring in the population structure. Sample sizes will be larger than for cohort studies because the greater power of tests of difference between paired observations in the same individual cannot be exploited [Florey and Leeder 1985]. Independent non-governmental groups could probably undertake this study design.

A detailed longitudinal study with intensive efforts to obtain a good response rate and follow-up need be done only for a small sample of the exposed cohort. The setting up of an epidemiological monitoring unit should be considered for the entire exposed population. This would be based on routine records from hospitals and health centres regarding admissions and deaths. It would necessitate the building up of an efficient system of recording, reporting and analysis. A special census of the exposed population could be conducted and a method of identification of exposed individuals evolved. The system would be able to pick up important changes in morbidity or mortality on which appropriate action could be taken.

IX
Conclusion

The Bhopal disaster has been a human tragedy of immense dimensions. The suffering caused is incalculable. Important tasks remain ahead for the provision of the best possible care for the victims and for the prevention of such events in the future.

There is a need, first, for the measurement, understanding and documentation of the impact of the disaster on the health of those exposed, so as to be able to provide rational care. It is necessary also to document the seriousness of the effects so as to prevent an easy erasure from human memory of the event. Epidemiologic skills could help in this effort as described in this report.

At the present time it is known that similar small-scale 'technological disasters' occur frequently. Larger scale disasters could also occur. Hence, along with the deeper causes of these disasters being tackled, there is a need to have a strategy to deal with such events.

Outlines for this are as follows:

It is necessary to have epidemiological data for an adequate understanding of the effects on human health. This would include data regarding the numbers and demographic structure of the population at risk, the age/sex/area distribution of the fatalities if they occur, and similar data regarding morbidity.

Through collaboration between clinicians and epidemiologists, it would be necessary to evolve simple, standard criteria for assessment and documentation of morbidity.

Similarly, a method to assess exposure needs to be evolved.

Collaboration and communication between administrators, service providers and researchers is important.

Close contact and communication with the affected people is the most important factor. In the absence of this, one could easily slip into esoteric, theoretical exercises, which are meaningless to the problem at hand.

These efforts have to be seen in the context of the broader issues raised by such events. In Bhopal, these would include: the economic relationship between multinationals and countries of the third world which determine factors like technologies and safety systems used; the exploitative relationship with the workforce and the local community to maintain high profit margins; the siting and safety systems of hazardous chemical plants; legislation regarding and implementation of safety controls; the workers, and communities, right to information; the role of pesticides; and the acceptable limits to the chemicalisation of our world. The true causes of the disaster and the scope for preventing such events in the future, lie in the matrix of these issues.

(Concluded)

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Lay, Community and Worker 'Epidemiology' – An Integrating Strand in Participatory Research

Andrew Watterson

Introduction

Effective public health should be based on the World Health Organisation (WHO) principles of 'upstream' health interventions to prevent the development of avoidable diseases, rather than focus on 'downstream' medical interventions to treat preventable diseases. The achievement of such an approach should therefore rest on decision-making underpinned by the precautionary principle.

The precautionary principle depends as much on informed social, economic and political decision-making as it does on science and medicine. Indeed for the famous medical practitioner, Rudolph Virchow, medicine was 'applied politics'. Central to the approach is a need to assess the purpose and impact of any developments that might impinge on health in terms of environmental factors – be they personal, social or physical. In this context the first step in protecting public health should be the prevention of approval of dangerous substances or processes – be they in food, water, air, for domestic, leisure or workplace use. This should be achieved through rigorous toxicology or other scientific and technological testing.

In this context 'lay/worker/community' activity for the good of the public health has a part to play in the process of vetting substances, processes, materials, buildings, factories and other types of plant and installations. We have witnessed globally the over-confidence of scientists, regulators and politicians in the past when dealing with potential public health problems: their inability to deal with uncertainty, their failure to take data gaps seriously when carrying out risk assessments, their failure to go beyond very narrow risk assessments and skewed cost-benefit analyses which constantly favour capital over community and workers. Some communities live with the consequences of the failure of such approaches daily - whether in India and Pakistan, or Nigeria, China, the USA, the UK, Italy, Belarus, or Ukraine. Lay/worker/community action on public health issues can highlight these failures and bring important precautionary approaches to bear effectively on decision-making.

A case study – risk mapping on a grand scale

The Women's Environment Network (WEN) breast cancer survey with local community groups illustrates how communities themselves can explore possible health issues and look at ways to promote health supported by NGOs (WEN 1999). Appendix A contains some of the maps that the women developed. The UK has been top of the world league for several years on deaths from breast cancer in women. Local community groups have found in the east of England that they have some of the highest breast cancer mortality rates in the country, especially for women in younger age groups. The official response was to ignore these facts. The women themselves did not and organised a variety of means to investigate the problem and raise awareness of the disease – and the fact that perhaps at best only 40 % of all cases of the disease have established causes. They asked what role environmental factors could play in the disease and why so little data were available about environmental exposures and environmental risks related to breast cancer (Watterson 1995). The WEN breast cancer project has provided a community based means for such factors to be explored that may complement or possibly question some of the conventional tools used by epidemiologists.

These participatory studies now draw on Geographical Information Systems (GIS) approaches but their roots lie in the risk mapping activities of workers in a Fiat plant in Italy many years ago. The maps so prepared of course rely on worker/community knowledge of processes and procedures rather than managerial and 'expert' assessments that may sometimes reflect the theory rather than the real practice of processes and chemical usage. Appendix B shows risk maps prepared by Canadian factory workers.

WEN and other NGOs represent the prudent decision-makers, the precautionary principle advocates in the public health field, although this is only part of what can be a polarised picture on tackling environmental risks as Diagram 1 below reveals.

Diagram 1: Community environmental epidemiology and toxicology: models of environmental policy and practice

Technological optimists

1. "EXPERTIST"	-	White coat syndrome.
	-	Laws irrelevant.
(small pox	-	No freedom of information.
(asthma	-	"Paternalist".
(asbestos		
(endocrine disrupters		
(aluminium sulphate water pollution		
(lead in petrol		
(CFCs in fridges		
2. LEGAL	-	Science and law-led and operationalised by politicians "unholy alliance"?
	-	No need to enforce laws as experts solve problems.
	-	paradoxically often a non-enforced model.
3. PARTICIPATIVE MODEL - non expertist		
(uses community	-	Non jargonistic.
(environmental	-	Community as partners in (epidemiology and standard setting/vetting.
(toxicology.	-	Minimum legal standards.
	-	Right to information.
	-	"Maternalist".

[Source: Costanza 1992; Watterson 1994a]

Prudent decision-makers

These different philosophies underpin the different approaches to risk and to epidemiology. Prudent decision-makers who use lay epidemiology approaches are searching for public health data showing there are no major risks associated with hazards: the burden of proof lies with the manufacturer/government to show processes are 'safe'. The approach is informed but not dictated by science and scientific methods and recognises the limits of science. This is 'the prove it's safe' position.

Technological optimists rely on the 'scientific method' and on the null hypothesis. They look for evidence that a process or product is hazardous and with clear and calculated risks and assume no hazard and no risk often when data are lacking or limited. This is 'the prove it's dangerous' position The next section deals with how lay epidemiology has developed and how it engages with the technological optimists.

Origins of lay epidemiology

To determine the nature of 'lay epidemiology' it is first necessary to explore conventional epidemiology a little. Epidemiology has been defined as:-

> *'The study of the distribution and determinants of health and disease related conditions in populations. It is concerned with both epidemic (excess of normal expectancy) and endemic (always present) conditions...The basic premise of epidemiology is that disease is not randomly distributed across populations'.*
>
> (M Shenker in LaDou 1997)

Comprehensive epidemiology studies, if done on a large enough scale, over a long period of time and with designs that exclude bias may prove very effective ways of assessing disease causation in populations. This is, however, a very expensive process. It is also fundamentally limited because, although such studies may inform decisions – through exploring correlation between exposures and diseases, though not identifying individual disease causes - on other potential public health risks, they simply do not prevent diseases and disasters in the study being undertaken. Effectively they close stable doors after horses have bolted or shut the cage after the tiger has escaped. Toxicology and engineering are meant to be 'secure stables and cages' – we know that they are not.

Like most professional groups, epidemiologists do not like to discuss their failures in public. Some epidemiologists criticise commentators for using positive studies to dam materials and processes and point out that such studies are often not capable of proving something is not risky. However, such epidemiologists may be silent on the limitations of epidemiological studies that show no risks from a hazard exist. This is called 'negative epidemiology'.

Negative epidemiology

' "The prevailing view" is usually subjective in science' according to Hernberg. Hence the following basic problems sometimes occur in epidemiology to produce 'negative' results, but such results are effectively inconclusive and do not prove processes and materials are safe.

Table 1: Limits of 'negative' epidemiology

1. No studies carried out
2. Studies too small to have statistically significant results
3. Studies poorly designed and not sensitive
4. Problems with validity of control groups
5. Follow up periods insufficient for effects to materialise or materialise fully or follow up incomplete
6. Accuracy of exposure data needed
7. Wrong exposure categories are studied
8. Exposure is too low and/or too short
9. Measures of morbidity are crude
10. There are random errors
11. Wrong or irrelevant morbidity indicators are used

(Source: based on Sven Hernberg 1992)

The science of epidemiology, viewed as so critical to the development of 'academic', rigorous and high status public health medicine, has replaced clinical case studies as the most effective and credible science for sorting out disease clusters. The view of clinical cases is generally

that they are statistically limited sources of information. However, non-epidemiological data, linked to clinical cases or observations, have sometimes resulted in very effective actions. For instance the links between exposures to soot and cancer came from Percival Potts' clinical observations and case reports in the late 18th century. The links between exposure to vinyl chloride monomer and the rare liver cancer, angiosarcoma, came through primary care physicians near a US chemical plant connecting clinical cases. The 'Back to Sleep' campaign in the UK which cut 'sudden infant death' rates came from observational studies, not conclusive physiological studies that could explain mechanisms of mortality (DOH 1998:61).

In the 1920s and 1930s, Sir Thomas Legge who was an early user of 'sentinel' events to trigger investigations of health hazards, (Legge 1934:25-29) used observational data from workers to identify hitherto relatively unknown risk. For instance, he visited a docks site where the dockers themselves had linked work with a hard wood to ill-health cases in their members.

Trade union identification of workplace hazards

Workers have always used observations, knowledge of 'sentinel' events – sometimes single warnings or one worker presenting with an unusual or hitherto unnoticed disease – and varied data to make risk assessments of their workplaces and recognise occupational diseases, sometimes well ahead of medical and scientific investigators in those workplaces. The table below illustrates this clearly.

Table 2: Successful trade union recognition of occupational diseases

INVESTIGATOR	HAZARD	ACTION
Alfred Greenwood, Glass Bottle Makers Secretary 1891 using social insurance records	cataracts in glass workers	1900s: compensation but no action on the process.
Local woodworkers trade union secretary observing workforce 1900s	Narcotic effects of African boxwood through slowing heartbeat	Substitution with safer woods as best available local exhaust ventilation still created dust inhaled by workers
South Wales Dockers Union secretary observed pitch dust exposure of briquette workers	skin cancer known for centuries in tar workers	1927 finally recognised as an industrial disease for briquette workers
Sheffield Occupational Health Project 1990	chrome ulceration	The project team found more cases in one small Sheffield factory than were recorded for the nation in official records
Local unemployed centre in Sunderland 1994	mucous membrane disease in engineering worker	The centre revealed gross under-reporting of the disease

[Sources: Legge 1934, Watterson 1999]

Rapid appraisal

One approach that now encapsulates much of lay epidemiology is 'rapid appraisal'. 'Rapid appraisal is primarily a methodology which provides timely, relevant information to decision-makers on pressing issues they face in project and programme setting (Kumar 1994 cited by Ong 1996:3). Hence it can be a diagnostic tool or an agent for change or both. It does, however, not necessarily draw on communities in the appraisal as lay epidemiology always would. Communities, whether geographic or workplace-based, should be public health decision-makers as well as the politicians and scientists. The methods that rapid appraisals deploy are very familiar to those engaged in lay epidemiology and might include a number of elements.

Table 3: Elements of rapid appraisal

Mixtures: mapping matrices, focus groups, time lines and trend analysis and faster than 'conventional methods'

1. Field work emphasis
2. Reliance on learning directly from local people
3. Semi-structured, multi-disciplinary, flexible , innovative approaches
4. Focuses on 'insights, hypotheses, best bets rather than final truths or fixed recommendations'

[Source: Ong 1996:2]

The key steps in the process would include those outlined below.
Step 1 defines purpose, identify target groups and agencies.
Step 2 identifies leader/team to conduct rapid appraisal.
Step 3 organises workshops.
Step 4 entails fieldwork, observation, secondary data collection, interviews.
Step 5 includes data collection and analysis.
Step 6 prioritises needs.
Step 7 feeds back to community and discusses possible actions.
Step 8 develop a programme of change.
Step 9 evaluates the work and, if necessary, redefine priorities.
Step 10 explores a second rapid appraisal or a view of future based on the first appraisal (Ong 1996:9)

Participatory research

This draws on lay epidemiology and rapid appraisal techniques to involve communities actively in the appraisals rather than simply being the passive subject of the appraisal. This entails opening up the research process to ensure communities and workers can influence any changes proposed as a result of the research undertaken.

Table 4: The benefits of participatory research

- exposing unrecognised levels of disease
- studying subjective symptoms in an effective way, for instance ME ,Chronic Fatigue Syndrome (CFS), MCS, syndromes, ULDs, asthma, occupational stress
- low cost way of identifying a wide range of exposures to possible disease causes and outcomes through interactive approaches able to deal with rapidly changing situations
- increasing capacity of communities and workers to involve themselves in public health
- recognising and using knowledge and experience of communities in identifying particular health risks
- new approaches to conceptualising knowledge
- enhancing the potential for action outcomes from research findings and raising awareness of policy-makers linked to an identification of key local concerns

(Source: adapted from Loewenson 1996)

Table 5 : Weaknesses of participatory research

- aim to identify community perspectives may mean no precise quantification of a particular problem occurs
- may provide inaccurate perspectives although there is major difference between lay perspectives and lay epidemiology eg malaria examples and CHD work.

Lay epidemiology

This should be a major strand of participatory research although it is often neglected as it sometimes appears too difficult to mount and potentially open to challenge by regulators and scientists. The uses of the technique are many and various and do not simply relate to the investigation of a health hazard and the scientific proof of correlations and causes of diseases. They also contain important community, individual, political and social elements (Watterson 1994b, Popay and Williams 1994 and 1996).

Table 6: Benefits of lay epidemiology

- Inform communities about public health problems and solutions
- Involve communities in public health policy and monitoring of solutions
- Sustain communities and individuals dealing with a common problem requiring community solutions
- Empower communities and individuals in an organisational and possibly social setting
- Change attitudes, approaches, sources of data, possible solutions to public health problems
- Educate professionals through lay groups about new or different public health perspectives and vice versa
- Campaign for positive change

Definition of lay epidemiology

'...the process by which lay persons gather statistics and other information and also direct and marshal the knowledge and resources of experts in order to understand the epidemiology of diseases.'

(Brown 1989)

Table 7: Principles of lay epidemiology - tools, mechanisms, techniques

These may include methods that:-

- appear 'easy' but are not in terms of data gathering
- sometimes observational – different types of data differently used
- generate similar data to that used by epidemiologists and toxicologists but perhaps more comprehensive, more up to date, more relevant, more current, better informed .
- are qualitative – records and histories that may be used in conventional epidemiology but given different weighting here. Problems exist already about recall, about job categorisation and about location and length of exposure and exposure levels in conventional epidemiology. Records of incidents, accounts of exposures, details of suspected adverse effects may all be more richly documented in lay epidemiology than some other sorts of epidemiological study.

The types of questionnaire that may be used in lay epidemiology studies are illustrated by the Vinatex study (see Appendix C) where the ex-workers organised, planned and partially implemented a study of workers exposed to PVC to try to track a range of health effects possibly linked to workplace exposures to vinyl chloride monomer (VCM), a gas used to make PVC. The workers themselves, in conjunction with an NGO, produced questionnaires, conducted interviews and gathered data. The questionnaires were modelled on those used by government departments and international agencies to protect the study from accusations of using 'subjective' data gathering methods. The results were analysed by a university in conjunction with the ex-workers group. The study has raised major questions about under-estimates of the ill effects of VCM exposure.

Data collection in lay, community and worker studies may also come in other forms, some of which would be readily recognised and accepted by conventional epidemiologists. These

approaches are illustrated, to some extent, by the Indonesian pesticide studies carried out recently on behalf of the FAO by Helen Murphy and her colleagues (Appendix D). These methods include recruiting local health workers and key community activists to gather data through observation and interviews using house, locality and body maps and also questionnaires comprehensible and quickly understood by the local population in which the study was being conducted.

Table 8: Strengths of lay epidemiology

- draws on qualitative and quantitative research methods for generating a rich mix of data
- relatively cheap to do, draws on local data, can relate to many people pooling knowledge.
- draws on a socio-participative/participative model
- transparency in study design, execution and analysis
- open
- inclusive
- empowering
- recognises uncertainty
- positive
- if wrong, 'will do no harm'
- relatively easy to do
- complements and may test other methods
- links in to current international and national agendas relating to WHO Charter on Environment and, involving locals communities in their health care. Health inequalities, warning of problems without waiting for disaster to occur
- links workers and communities

The approach offers, in some instances, a better way forward because:-

- it goes beyond the rhetoric of transparency and empowerment
- it may link with "health alliances" concept
- data may be more accurate and experiences and subjective symptoms may be more readily analysed

Table 9: A better way forward for lay epidemiology

- methodological difficulties
- resistance or ignorance of professional scientists
- may be restrained by lack of funds
- training and information issues
- lack of credibility
- lack of rigour
- too rough and ready
- lack of access to data
- lack of resources
- lack of tools tried and tested to analyse data
- size of sample and numbers and times of exposures
- visibility
- response from other groups
- associations not causes demonstrated (as for conventional epidemiology)
- problems of proving random/causal clusters (as for conventional epidemiology)
- lack of good data on exposures, effects etc. (as for conventional epidemiology)

Forms of conventional and lay epidemiology

Lay epidemiology may come in several and sometimes hybrid forms and is sometimes totally excluded from conventional epidemiology studies. For instance:-

1. Epidemiologists design, carry out, analyse and present the study.
2. Epidemiologists design, study and train and use lay staff to carry out survey.
3. Epidemiologists invite lay people to contribute to design of study protocol. Lay staff carry out questionnaire surveys and interviews.
4. Epidemiologists analyse and present data.
5. Epidemiologists invite lay people to contribute to study design. Lay people carry out surveys. Epidemiologists, with lay people, analyse and present results.
6. Lay people identify problem and invite epidemiologists to investigate the problem. Back to (1).
7. Lay people identify problems, involve epidemiologists. Joint protocol is drawn up. Back to (3) and (4).
8. Lay people identify problem, involve epidemiologists. Joint protocol. Lay people and epidemiologists jointly investigate problem and analyse results. Joint presentation of results.

The best approach is contained in number 7 above but this may also the most difficult to achieve because of resistance, apathy or ignorance from health professionals. Compromises along the way may need to be negotiated.

Ways forward

The benefits of lay, worker and community-led health studies are enormous. How can they be introduced more widely and supported more clearly? The following approaches may help the process. Strengthen the means available for social, economic or geographical communities to participate and indeed initiate lay/community epidemiology and toxicology projects both on suspect hazards and on industrial and other processes:

- by ensuring that 'no cost' freedom of information about disease and prevention are available at community level.
- by ensuring easy access to such information.
- by creating information systems that disseminate information rather than restrict information because communities do not know what information is available or are only given information if they ask very specific questions.
- by re-educating health workers in community epidemiology principles and techniques.
- by incorporating the need to involve communities in the monitoring, review and audit of pollutants into the new training of health and technical staff in public and private sectors.
- by all regional health authorities, trusts, local authorities, commercial bodies adopting the WHO Charter on Environment and Health with a commitment to implement its principles and practice (Appendix E). Public Health Medicine Departments in health authorities around the country should have a key role in this process as should community health councils.
- by central and local government and other funding agencies ensuring that lay/community epidemiology is built in as a requirement for any research grants or programmes which involve working on communities or health hazards affecting particular groups.

- by the adoption of cleaner production and toxics reduction methods, again based on community/worker input and audit on environmental hazards and the precautionary principle.

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People's Health Charter

We the people of India, stand united in our condemnation of an iniquitous global system that, under the garb of 'Globalisation' seeks to heap unprecedented misery and destitution on the overwhelming majority of the people on this globe. This system has systematically ravaged the economies of poor nations in order to extract profits that nurture a handful of powerful nations and corporations. The poor, across the globe, as well as the sections of poor in the rich nations, are being further marginalised as they are displaced from home and hearth and alienated from their sources of livelihood as a result of the forces unleashed by this system. Standing in firm opposition to such a system we reaffirm our inalienable right to and demand for comprehensive health care that includes food security; sustainable livelihood options including secure employment opportunities; access to housing, drinking water and sanitation; and appropriate medical care for all; in sum - the right to **Health For All, Now!**

The promises made to us by the international community in the Alma Ata declaration have been systematically repudiated by the World Bank, the IMF, the WTO and its predecessors, the World Health Organization, and by a government that functions under the dictates of International Finance Capital. The forces 'Globalisation' through measures such as the structural adjustment programme are targeting our resources - built up with our labour, sweat and lives over the last fifty years - and placing them in the service of the global "market" for extraction of super-profits. The benefits of the public sector health care institutions, the public distribution system and other infrastructure - such as they were - have been taken away from us. It is the ultimate irony that we are now blamed for our plight, with the argument that it is our numbers and our propensity to multiply that is responsible for our poverty and deprivation. We declare health as a justiciable right and demand the provision of comprehensive health care as a fundamental constitutional right of every one of us. We assert our right to take control of our health in our own hands and for this the right to:

- A truly decentralized system of local governance vested with adequate power and responsibilities, provided with adequate finances and responsibility for local level planning.
- A sustainable system of agriculture based on the principle of *land to the tiller* – both men and women – equitable distribution of land and water, linked to a decentralized public distribution system that ensures that no one goes hungry
- Universal access to education, adequate and safe drinking water, and housing and sanitation facilities
- A dignified and sustainable livelihood
- A clean and sustainable environment
- A drug industry geared to producing epidemiological essential drugs at affordable cost
- A health care system which is gender sensitive and responsive to the people's needs and whose control is vested in people's hands and not based on market defined concept of health care.

Further, we declare our firm opposition to:

- Agricultural policies attuned to the needs of the 'market' that ignore disaggregated and equitable access to food
- Destruction of our means to livelihood and appropriation, for private profit, of our natural resource bases and appropriation of bio-diversity.
- The conversion of Health to the mere provision of medical facilities and care that are technology intensive, expensive, and accessible to a select few
- The retreat, by the government, from the principle of providing free medical care, through reduction of public sector expenditure on medical care and introduction of user fees in public sector medical institutions, that place an unacceptable burden on the poor
- The corporatization and commericialization of medical care, state subsidies to the corporate sector in medical care, and corporate sector health insurance
- Coercive population control and promotion of hazardous contraceptive technology which are directed primarily at the poor and women
- The use of patent regimes to steal our traditional knowledge and to put medical technology and drugs beyond our reach
- Institutionalization of divisive and oppressive forces in society, such as communalism, caste, patriarchy, and the attendant violence, which have destroyed our peace and fragmented our solidarity.

In the light of the above we demand that:

1. The concept of comprehensive primary health care, as envisioned in the Alma Ata Declaration should form the fundamental basis for formulation of all policies related to health care. The trend towards fragmentation of health delivery programmes through conduct of a number of vertical programmes should be reversed. National health programmes be integrated within the Primary Health Care system with decentralized planning, decision-making and implementation with the active participation of the community. Focus be shifted from bio-medical and individual based measures to social, ecological and community based measures.

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Final

2. The primary health care institutions including trained village health workers, sub-centers, and the PHCs staffed by doctors and the entire range of community health functionaries including the ICDS workers, be placed under the direct administrative and financial control of the relevant level Panchayati Raj institutions. The overall infrastructure of the primary health care institutions be under the control of Panchayats and Gram Sabhas and provision of free and accessible secondary and tertiary level care be under the control of Zilla Parishads, to be accessed primarily through referrals from PHCs.

   The essential components of primary care should be:

   - Village level health care based on Village Health Workers selected by the community and supported by the Gram Sabha / Panchayat and the Government health services which are given regulatory powers and adequate resource support
   - Primary Health Centers and sub-centers with adequate staff and supplies which provides quality curative services at the primary health center level itself with good support from referral linkages
   - A comprehensive structure for Primary Health Care in urban areas based on urban PHCs, health posts and Community Health Workers under the control of local self government such as ward committees and municipalities.
   - Enhanced content of Primary Health Care to include all measures which can be provided at the PHC level even for less common or non-communicable diseases (e.g. epilepsy, hypertension, arthritis, pre-eclampsia, skin diseases) and integrated relevant epidemiological and preventive measures
   - Surveillance centers at block level to monitor the local epidemiological situation and tertiary care with all speciality services, available in every district.

3. A comprehensive medical care programme financed by the government to the extent of at least 5% of our GNP, of which at least half be disbursed to panchayati raj institutions to finance primary level care. This be accompanied by transfer of responsibilities to PRIs to run major parts of such a programme, along with measures to enhance capacities of PRIs to undertake the tasks involved.

4. The policy of gradual privatisation of government medical institutions, through mechanisms such as introduction of user fees even for the poor, allowing private practice by Government Doctors, giving out PHCs on contract, etc. be abandoned forthwith. Failure to provide appropriate medical care to a citizen by public health care institutions be made punishable by law.

5. A comprehensive need-based human-power plan for the health sector be formulated that addresses the requirement for creation of a much larger pool of paramedical functionaries and basic doctors, in place of the present trend towards over-production of personnel trained in super-specialities. Major portions of undergraduate medical education, nursing as well as other paramedical training be imparted in district level medical care institutions, as a necessary complement to training provided in medical/nursing colleges and other training institutions. No more new medical colleges to be opened in the private sector. No commodification of medical education. Steps to eliminate illegal private tuition by teachers in medical colleges. At least a year of compulsory rural posting for undergraduate (medical, nursing and paramedical) education be made mandatory, without which license to practice not be issued. Similarly, three years of rural posting after post graduation be made compulsory.

6. The unbridled and unchecked growth of the commercial private sector be brought to a halt. Strict observance of standard guidelines for medical and surgical intervention and use of diagnostics, standard fee structure, and periodic prescription audit to be made obligatory. Legal and social mechanisms be set up to ensure observance of minimum standards by all private hospitals, nursing/maternity homes and medical laboratories. Prevalent practice of offering commissions for referral to be made punishable by law. For this purpose a body with statutory powers be constituted, which has due representation from peoples organisations and professional organisations.

7. A rational drug policy be formulated that ensures development and growth of a self-reliant industry for production of all essential drugs at affordable prices and of proper quality. The policy should, on a priority basis:

   - Ban all irrational and hazardous drugs. Set up effective mechanisms to control the introduction of new drugs and formulations as well as periodic review of currently approved drugs.
   - Introduce production quotas & price ceiling for essential drugs
   - Promote compulsory use of generic names
   - Regulate advertisements, promotion and marketing of all medications based on ethical criteria
   - Formulate guidelines for use of old and new vaccines
   - Control the activities of the multinational sector and restrict their presence only to areas where they are willing to bring in new technology

- Recommend repeal of the new patent act and bring back mechanisms that prevent creation of monopolies and promote introduction of new drugs at affordable prices
- Promotion of the public sector in production of drugs and medical supplies, moving towards complete self-reliance in these areas.

8. Medical Research priorities be based on morbidity and mortality profile of the country, and details regarding the direction, intent and focus of all research programmes be made entirely transparent. Adequate government funding be provided for such programmes. Ethical guidelines for research involving human subjects be drawn up and implemented after an open public debate. No further experimentation, involving human subjects, be allowed without a proper and legally tenable informed consent and appropriate legal protection. Failure to do so to be punishable by law. All unethical research, especially in the area of contraceptive research, be stopped forthwith. Women (and men) who, without their consent and knowledge, have been subjected to experimentation, especially with hazardous contraceptive technologies to be traced forthwith and appropriately compensated. Exemplary damages to be awarded against the institutions (public and private sector) involved in such anti-people, unethical and illegal practices in the past.

9. All coercive measures including incentives and disincentives for limiting family size be abolished. The right of families and women within families in determining the number of children they want should be recognized. Concurrently, access to safe and affordable contraceptive measures be ensured which provides people, especially women, the ability to make an informed choice. All long-term, invasive, systemic hazardous contraceptive technologies such as the injectables (NET-EN, Depo-Provera, etc.), sub-dermal implants (Norplant) and anti fertility vaccines should be banned from both the public and private sector. Urgent measure be initiated to shift to onus of contraception away from women and ensure at least equal emphasis on men's responsibility for contraception. Facilities for safe abortions be provided right from the primary health center level.

10. Support be provided to traditional healing systems, including local and home-based healing traditions, for systematic research and community based evaluation with a view to developing the knowledge base and use of these systems along with modern medicine as part of a holistic healing perspective.

11. Promotion of transparency and decentralization in the decision making process, related to health care, at all levels as well as adherence to the principle of right to information. Changes in health policies to be made only after mandatory wider scientific public debate.

12. Introduction of ecological and social measures to check resurgence of communicable diseases. Such measures should include:

    - Integration of health impact assessment into all development projects
    - Decentralized and effective surveillance and compulsory notification of prevalent diseases like malaria, TB by all health care providers, including private practitioners
    - Reorientation of measures to check STDs/AIDS through universal sex education, promoting responsible safe sex practices, questioning forced disruption and displacement and the culture of commodification of sex, generating public awareness to remove stigma and universal availability of preventive and curative services, and special attention to empowering women and availability of gender sensitive services in this regard.

13. Facilities for early detection and treatment of non-communicable diseases like diabetes, cancers, heart diseases, etc. to be available to all at appropriate levels of medical care.

14. Women-centered health initiatives that include:

    - Awareness generation for social change on issues of gender and health, triple work burden, gender discrimination in upbringing and life conditions within and outside the family; preventive and curative measures to deal with health consequences of women's work and violence against women
    - Complete maternity benefits and child care facilities to be provided in all occupations employing women, be they in the organized or unorganized sector
    - Special support structures that focus on single, deserted, widowed women and minority women which will include religious, ethnic and women with a different sexual orientation and commercial sex workers; gender sensitive services to deal with all the health problems of women including reproductive health, maternal health, abortion, and infertility
    - Vigorous public campaign accompanied by legal and administrative action against sex selective abortions including female feticide, infanticide and sex pre-selection.

15. Child centered health initiatives that include:

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Verbal Autopsy

Introduction

At the Bhopal Peoples' Health and Documentation Clinic run by the Sambhavna Trust, Verbal Autopsy (VA) is used as a method for monitoring mortalities related to the December 1984 Union Carbide disaster in Bhopal. VA is a scientific method of proven validity used for establishing the cause of death of individuals in a community. This is particularly useful in situations where the proportion of deaths occurring under medical care are low and where no autopsies are carried out. This method has been successfully employed in India, Bangladesh, Kenya, Nigeria, Philippines, Indonesia, Egypt, and several other countries to determine the cause of death of individuals in various circumstances.

The Technique of Verbal Autopsy

This method is based on the assumption that most causes of death have distinct symptom complexes and these can be recognized, remembered and reported by lay people. It involves trained workers administering a questionnaire on the carer of the deceased. Information is collected on the symptoms suffered by a panel of physicians individually and independently for ascertaining the probable cause of death.

Appropriateness of VA in Bhopal

Since the official committee for recording exposure-related deaths was wound up in December 1992, there is no official agency to monitor continuing exposure-related deaths in Bhopal. Also, an overwhelming majority of these deaths occur in people's homes resulting in autopsies rarely being conducted and often there being no competent doctor to certify the cause of death. Medical records of the deceased prior to death are often unavailable as they have had to be deposited with the compensation tribunals. Where available these are often incomplete. Given such a situation, VA appears to be the most appropriate method for monitoring exposure-related deaths in Bhopal.

How VA is carried out at the Sambhavna Clinic

The four fieldworkers conduct door-to-door surveys to identify households and question carers of the deceased on the medical history and clinical symptoms suffered. Using culturally appropriate language, the fieldworkers, all of whom are known in the community, apply stringent criteria in the collection and recording of information. Information is recorded on a questionnaire designed to elicit details of exposure to the toxic gases, the health status of the deceased prior to and after exposure, medical examinations and their results, treatment including duration etc. All fieldworkers have been trained in interviewing skills, administration of the questionnaire and signs and symptoms of diseases.

The VA questionnaire

The 21 page verbal autopsy questionnaire (VAQ) begins with general, introductory questions to determine the lifecycle of the deceased. An instruction sheet is used by the field workers as a guideline for administration of the questionnaire. The health workers also confirm which medical records of the deceased are in the possession of the carer. General questioning familiarizes the carer with the type of information to be collected and enables the interviewer to create favorable conditions for the carer to speak openly regarding personal and often traumatic details regarding the deceased.

Direct questions on symptoms existing prior to the gas exposure are asked to compare the health status of the deceased in the post disaster situation. The health worker then begins an open section in which the interviewee is invited to explain what happened in their own words, details of the exposure, subsequent illness/es, and responses to treatment received till the death of the deceased. The statement is recorded verbatim and serves as one of the means to check the veracity of information given by the interviewee. With the use of filter questions, specific recordings of the symptoms related to different body systems are then made. Thus the health worker identifies a body system, e.g. the respiratory system and encourages the carer to provide voluntary information on any particular symptoms, e.g. breathlessness, cough, expectoration tightness in chest etc. Care is taken to ensure that the interviewer does not provide any direct or indirect suggestions during questioning. The systems of the deceased, as the carer may be embarrassed or unaware of the medical implications of certain symptoms such as recurrent nightmares. Information on medical treatment received and documents related are also gathered.

Assessment of Verbal Autopsy Questionnaires

The filled VAQ is then sent to a panel of three physicians along with available medical records of the deceased. The physicians in the verbal autopsy assessment panel write their opinions on the probable cause of death of the individual and whether it is attributable to the individual's exposure to the Union Carbide's gases. The doctors who are volunteering their services in the assessment panel are:

Dr. U.N. Das (MBBS, MD) Chief, Division of Internal Medicine and Clinical Immunology, L. V. Prasad Eye Institute, Hyderabad. He was awarded the prestigious Shanti Swaroop Bhatnagar prize for his contribution to Medical Sciences in 1992.

Dr. Ajitt Vigg (MBBS, DTCD, MRCP) Consultant physician and chest specialist at Apollo Hospital, Hyderabad. He is one of the members of the international panel for lung cancer in India.

Dr. P.N.Rao (MBBS, MD, DM) Consultant Hepatologist and Gastro-enterologist, Mediciti Hospitals, Hyderabad.

Dr. Daniel Chandramohan. Head of the Verbal Autopsy group at the London School of Hygiene and Tropical Medicine, UK is the advisor to the verbal autopsy project at

Sambhavna Clinic. He has made two visits to the clinic to review the work being carried out and has expressed satisfaction with the quality of work.

The final opinion on the probable cause of death and relatibility with exposure to Union Carbide's toxic gases until just recently was given by Dr M. P. Dwivedi, former Director of the Bhopal Gas Disaster Research Centre (BGDRC) set up by the Indian Council of Medical Research (ICMR). The final opinion is arrived at on the basis of the level of agreement among the three dependent medical options. In case all the three doctors in the assessment panel opine that death has been caused due to exposure to Carbides' toxic gases, the final opinion states that the 'most probable' cause of death is attributable to the December 1984 gas disaster. The final opinion states 'probable' in case two of the three doctors agree on the nexus between exposure and subsequent death and 'possible' if only one of the doctors in the panel mentions exposure as a probable cause of death. In case all three doctors opine that the disease or condition of death is not related to the person's exposure to Union Carbide's gases in December 1984, the final opinion issued by the Sambhavna Trust states that the cause of death is unrelated to the disaster.

Validity of the method of Verbal Autopsy in ascertaining cause of death

The method of Verbal Autopsy has been found, through numerous studies carried out in different parts of the world, to have a positive predictive value in the range of 70% to 80% depending on the cause of death and age of the deceased. This range of validity has been confirmed through comparison of opinions on cause of death as ascertained through usual autopsies (post-mortem examinations) and that through Verbal Autopsy.

Verbal Autopsy Data

The information collected through Verbal Autppsy up to March 31, 2000 is presented below in Table - X

Deaths recorded	Interviews completed	Medical autopsy done	Verbal Autopsy final opinion	Most Probable	Probable	Possible	Unrelated to exposure
219	99	01	81	14 [17.28%]	30 [37.0 %]	26 [32.1 %]	11 [13.5 %]

Com H 64.

DataCenter

Information for a Change 1904 Franklin St. Suite 900, Oakland, CA 94612. tel:510.835.4692 fax:510.835.3017

rev. 07/99

WORLD WIDE WEB RESOURCES

ImpactResearch's List of Helpful Sites on the Web for Progressive Activists

The World Wide Web holds thousands of opportunities for progressive activists to use and strengthen their campaign. We have compiled a list of sites we find particularly useful. Most of these sites are free, however, we have noted those that do require a subscription or download fee. Please remember that the web changes hourly and some of sites may have changed or simply disappeared. We have organized our list into the following categories. Please cross check because there is overlap among the categories.

Category	Page
Search Engines and Databases Tools with which to search the web as a whole, databases that search publications.	1
Company Information Specific company documents, stock information, business press. Both private and public companies	3
Corporate Responsibility Organizations that research, monitor and report on company behavior. Generally applies to public companies.	5
Money and Politics Sites of organizations that follow the money and/or legislation. Of particular note is the Federal Election Commission Info site.	6
Labor Lists sites with information on worker's rights, health and companies labor record. Also includes organized labor research guides.	7
Environment Large list of environmental databases tracking company behavior, toxins, and networking opportunities.	8
Alternative Politics and Progressive Activism Progressive reports clearinghouses and support organizations.	10
Government Information Government and NGO sites with government information. Some sites taken from above. Information on using FOIA.	12

We would like to thank Will Colette and the AFL-CIO for contributing.
The 💣 symbol represents a site we find particularly useful.

Search Engines and Databases

All-in-One Search Page http://www.Allonesearch.com
"Over 400 of the Internet's best search engines, databases, indexes, and directories in a single site."

Alta Vista http://altavista.digital.com
We like to use Alta Vista to find information about a specific term or name (such as a person or hard to find company). Alta Vista often turns up a whole stack of relevant links right at the top of the list. Its sources include government and "public interest" sites. Be sure to place your specific term in quotation marks.

Christian Science Monitor http://www.csmonitor.com
Complete archives back to 1980 – free!

DejaNews http://www.dejanews.com
Searches Usenet newsgroup archives. Usenet newsgroups are international public discussion forums on a huge range of subjects; Deja News archives approximately 15,000 newsgroups going back to 1995. Particularly useful for tracking down movement information that may not show up on the Web. Caution: Usenet is a highly democratic communications medium, and includes a full range of information, ideas, and opinion. Be sure to check your sources before counting on the reliability of the information.

Dogpile http://www.dogpile.com
Dogpile is a meta-search engine that runs your search on multiple search engines at once, and brings you back the top responses from: Yahoo!, Lycos' A2Z, Excite Guide, GoTo.com, PlanetSearch, Thunderstone, What U Seek, Magellan, Lycos, WebCrawler, InfoSeek, Excite, AltaVista. It's a good tool to use if you come up empty on individual search engines. Dogpile also offers corporate searching through its Business Wires setting. Limitation: search techniques that work on one search engine will not necessarily work well on Dogpile, due to variances between the search engines.

DowJones News Retrieval http://www.djinteractive.com
Available on the web for a $69 yearly fee and a document charge of $2.95 to view anything more than a headline. Only source for the **Wall Street Journal** full text.

Federal Web Locator http://www.law.vill.edu/fed-agency/fedwebloc.html
The Federal Web Locator is a service provided by the Center for Information Law and Policy and is intended to be the one stop shopping point for federal government information on the World Wide Web.

HotBot http://www.hotbot.com
HotBot provides sophisticated search options in plain English, making it a quick and straightforward search engine to use. An all around excellent search engine, and one that draws from key movement information resources. If you're looking for an organization's web site use HotBot's "page title" option. HotBot also offers the option of searching with the Lycos search engine.

InfoSeek Ultraseek http://www.infoseek.go.com

KnowX http://www.knowx.com
Search public records on businesses or people. Searches reasonably prices after peak hours. Charges for documents range from $1 - $7.

Librarians Internet http://sunsite.berkeley.edu/InternetIndex/
Excellent source of "internet bibliographies".

Northern Light http://www.northernlight.com
Search over 130 Million Web pages and articles of more than 5,400 full text sources. Sources include some alternative press. Service is free, but a charge from $1 - $4 for articles from "Special Collection". Also has Investext (stock market analysts reports).

(Search Engines and Databases, continued)

The Argus Clearinghouse http://www.clearinghouse.net
"Provides a central access point for value-added topical guides which identify, describe, and evaluate Internet-based information resources." Evaluates sites and is nicely organized in categories.

Yahoo http://www.yahoo.com
Extensive subject index, a good starting point if you are looking for a specific company, government agency, or organization web site. Company information includes a profile, news, stock information, officers, number of employees, contact information, web site. You can search Yahoo if you can't find what you want in subject indexes. Yahoo also lets you search the Web with an Excite search engine.

Company Information
(see also Labor, Campaign Finance, Environment, Corporate Responsibility)

The Company's own web-site "http://www.(company name, or abbev, or acronym).com"
Some contain a surprising amount of critical information useful for activists. You can find company web pages by doing a title search in various search engines using the company's name or CBS MarketWatch and Hoover's often provide links to company websites.

American City Business Journal http://www.amcity.com
"American City Business Journals Inc. is the nation's largest publisher of metropolitan business newspapers, serving 40 of the country's most vibrant markets." Use pull down menu to choose city. Very helpful IF your city/region is listed. Useful for information on private companies.

Annual Reports Gallery http://www.reportgallery.com
Annual reports on public companies available on line.

The Annual Reports Library http://www.zpub.com/sf/arl/
Annual reports of banks, foundations, mutual funds and public institutions from around the world can be ordered. Cost of membership in the library is $75 a year for non-profits

CBSMarketWatch http://cbs.marketwatch.com
Scroll to the bottom of the page to see the useful stuff, in particular the Insider Trading. Shows what the board members are trading in a particular company, click on their name and see what other stock they own.

CEO Express http://www.ceoexpress.com
"Useful on stop shopping for links on company research, investing and IPO research, Statistics, Business News, Daily News" (AFL-CIO)

CEO Information from Proxy Statements http://people.edgar-online.com/people
"EDGAR Online People searches SEC Filings by a person's name or displays all people associated with a specific company name."

CompanySleuth http://www.companysleuth.com
"Company Sleuth scours the Internet for free, legal, inside information on the companies you select." Updates you daily via e-mail on the latest on the company you are interest in.

Corporate Information http://www.corporateinformation.com
"Provides great one-stop-shopping with links for doing research on private and public companies world-wide." (AFL-CIO)

Executive Pay Watch http://www.aflcio.org/paywatch/index.htm
Compares workers' wages with their CEOs of Fortune 500 companies.

FDIC Institution Directory http://www.fdic.gov
"Financial information on FDIC-insured banks. Data includes: Assets and Liabilities, Total Deposits, Real Estate Owned, Income and Expense, and Performance Ratios. Use for leverage in corporate campaigns – a company you are researching might have money invested in a particular bank or a bank CEO may be on the board of directors of the company. (Notice "interstate branches" link when you find the bank of your choice.) Click on "Bank Data" icon, choose "Institution Director" on lift hand side of screen. (Hint: faster if just type I city, leave institution name blank.)" (AFL-CIO)

Fortune500 http://cgi.pathfinder.com/fortune/fortune500/index.html
Fast summary of Fortune 500 companies.

(Company Information, Continued)

FreeEDGAR http://www.freeEDGAR.com
Free, unlimited access to indexed SEC EDGAR Filings. Also provides free alert service.

Guidestar http://www.guidestar.org
A clearinghouse of information on nonprofit organizations presently including the activities and finances of more than 650,00 nonprofit organizations. See full description under Government Information section.

Hoover's Corporate Information http://www.hoovers.com
Database containing news articles, financial information and company overview. Must pay for expanded information. Good for brief overview of company.

Investorama http://www.investorama.com
An investor's research tool. Scroll down and click: Research a Stock Online. "Provides links to more than 75 web sites, with news, charts, quotes, financial statements, earnings estimates, industry reports, and other data for any stock."

Public Record Annual Reports http://www.prars.com/
Through this site you can order, at no charge, the annual reports and prospectus' or 10-K's of over 3200 public companies.

PR Newswire http://www.prnewswire.com
Has press release news stories on companies. See Company News on left hand side of page. Good for private companies.

U.S. Securities & Exchange Commission http://www.sec.gov/
The Securities and Exchange Commission provides on-line copies of government filings made by publicly traded companies. Beginning in 1997, the SEC has required all public companies to file electronically. Selective filings are available back to 1994. Financial statements include: 10Q's; 10K's and Proxies

Proxy Statements (or 14A's) : Issued when official notification is given by a company to designated classes of shareholders of matters to be brought to a vote at a shareholders meeting. Proxy votes may be solicited for changing the company's officers. Contains executive compensation data.

10Q Statements: Provides quarterly financial statements, management discussion, legal proceedings, changes in securities, defaults upon senior securities, submission of matters to a vote of security holders, exhibits and reports on Form 8-K (major events).

10K Statements: Provides fiscal year financial statements, most of what appears in 10Q, but, for year end. Contains description of business, properties, directors and executive officers, security ownership of certain beneficial owners of management.

Corporate Responsibility

Citizens Index Mutual Fund Family http://www.efund.com/
Lists the holdings of Citizens Index Mutual Fund, described as "300 of the country's cleanest and most innovative companies." Gives profiles of many of the companies and their positions on issues of social responsibility

CorporateWatch http://www.corpwatch.org/
Online magazine about transnational companies. Highlights their social, environmental and economic impact on the world. Issue or campaign focused. Searchable archives. Environmental justice and labor are main focus. Provides tips on how to research transnational companies.

Council on Economic Priorities http://www.cepnyc.org/
SBW (Shopping for a Better World) is a database of companies with CEP ratings on issues of social responsibility.

Infact http://www.infact.org/
Annual Corporate Hall of Shame posted on this site – top ten worst companies, usually focused on an issue (e.g. influence peddling in DC). Currently doing a major campaign against the tobacco industry.

Kinder Lydenberg Domini (KLD) Domini Social Equity Fund http://www.domini.com
Fund of 400 companies that pass detailed social screens. Web site lists the 400 companies, explains the criteria for each social screen, and provides links to activist organizations.

Kinder Lydenberg Domini (KLD) Socially Responsible Investing Links http://www.kld.com/wlink.html
Links to SRI websites and resources (groups, investment management sites, fund information, banks)

Multinational Monitor http://www.essential.org/monitor/
Monthly magazine that tracks corporate activity. Focusing on the export of hazardous substances, worker health and safety, labor union issues and the environment, particularly in the Third World. Searchable database from 1992-.

Social Investment Forum http://www.socialinvest.org/
Site lists socially responsible mutual funds which belong to the Forum and provides monthly updates of their investment performance from inception to the present

Money and Politics

Ballot Initiative Strategy Center http://www.ballot.org/
Western States Center project that tracks reactionary ballot initiatives around the country. Section "In Your State" provides information by state and by issue (not updated since mid-1998). Resources section has archived articles on ballot initiatives, bibliography and links to organizations and publications on the issue.

Center for Responsive Politics http://www.opensecrets.org/
Special reports on the correlation between the sources of lawmakers campaign funds and how they voted, as well as industry and topical analysis to campaign contributions (for example, top ten agribiz contributors). Have full text archives of various CRP publications (Monday Morning Alert, Captial Eye, etc.) It can be searched by name of congress member, by issue, or keyword (for example, company name) . Also has contact information for locating state campaign contributions.

Common Cause http://www.commoncause.org/
Reports on industry links to campaign contributions and legislation.

Congressional Quarterly's American Voter http://www.campaignline.com/
Check up on your members of Congress, rate your representative!

Federal Electoral Commission Info http://www.tray.com/fecinfo/
FECINFO provides free public access to campaign contributions to federal representatives and candidates, and the major national parties (soft money). Search by company (employer) and name. The main page is hard on the eyes, stay focused on the left side of the screen. To search by candidate/representative click US HOUSE/SENATE CAMPAIGN MONEY. To search by contributor use both LOOK-UP CONTRIBUTORS BY THEIR NAME (use company name here, too), and CONTRIBUTOR OCCUPATION/EMPLOYER LOOK-UP. Clear instructions are provided as you go along.

Follow the Money http://www.followthemoney.org
National Institute on Money in State Politics website. Database on campaign contributions at the state election level (not federal offices). Can search across states and by issue for contributors as well as by candidate. Not comprehensive (only 6 states for 1998 information) but the database is under continuous construction. One of very few sites with this type of information.

Project Vote Smart http://www.vote-smart.org/
Voting records, campaign finance data, issue positions, performance evaluations, biographical and contact information on president and current members of congress. The amounts received by current office holders from specific interest groups, such as agriculture, are shown back to the late 1980's. Similar information on state legislators, governors and non-incumbent candidates. Has a section under: Government & Politics - Issues – Research the Issues, that provides a background on an issue with links to advocacy organizations working on that issue. Vote Smart is non-partisan and lists groups from left to right. They also provide links to Think Tanks and Research Institutes.

Public Campaign http://www.publicampaign.org/
Provides links to publications and public interest groups which are involved in campaign finance reform, as well as reports on the issue. Has full text archive of their publication linking contributions to legislative activity, "Ouch" (which you can subscribe to via e-mail). No search engine.

StateNet http://www.statenet.com
State Net monitors 100% of all pending bills and regulations in the 50 states and Congress. There is a monthly subscription fee of several hundred dollars, depending on how many services you want. (We subscribe to StateNet at ImpactResearch)

Thomas http://thomas.loc.gov/
Congressional web site that tracks bills (with full text and amendments, voting record), committee members, links to state and municipal governments.

Labor

Company Research on the Web:A Guide for Union Activists
http://www.afscme.org/afscme/wrkplace/corprsch.htm
AFSCME's research guide with hyperlinks.

Department of Labor http://www.dol.gov/
US Department of Labor statutory and regulatory information. Labor related data. Under Wage and Hour Division is the No Sweat Campaign that includes "Garment Enforcement Reports" listing wage violations of contractors and the manufacturers doing business with them.

FAST Manual of Corporate Investigations http://www.fastaflcio.org
For $25 you can access Jeff Fielder's Manual of Corporate Investigations. A must read for anyone engaging in a corporate campaign.

LaborNet http://www.igc.apc.org/labornet/
"The internet home for AFSME, the Teamsters, the United Electrical Workers ... and more," (with links to each organization's own site). News features and a huge links list including points to sister-sites (PeaceNet, EcoNet, etc.), which include hundreds of "conferences" (i.e. bulletin boards), containing information on topics of concern to progressives.

LaborWEB (AFL-CIO homepage) http://www.aflcio.org/
Labor news, policy statements, and public document; economic research library with essays on selected economic issues; and extensive links to other union sites.

National Labor Relations Board http://www.nlrb.gov
Full text of recent decisions. Click on Decisions. Either view a volume of decisions or us "search Instructions" link to search by keyword.

Occupational Health and Safety Administration http://www.osha.gov
This government web site provides full reports of OSHA inspections. These include regular inspections and those filed due to complaints or accidents. Violation, fines and descriptions of incidents are available. You can get a nation-wide record of a company or focus your search to specific plant. Click on LIBRARY, then ESTABLISHMENT SEARCH. Be sure to check off Exact Match or you will get irrelevant information.

Sweatshop Watch http://www.sweatshopwatch.org/
Campaigns re the garment industry

Environment

CLEAR (Clearinghouse on Environmental Research and Advocacy)
http://www.ewg.org/pub/home/clear/clear.html
Tracks Anti-Environmental Activities of Wise Use Movement. Searchable database of Wise Use groups by state, staff, board members, and funding. Also contains database of air and water violations in your state (by company name). Back issues of Clear Newsletter (1994-1997).

Communities for a Better Environment http://www.igc.org/cbe/cbe.html
Urban environmental health organization that fights industrial pollution and organizes to empower communities. Major project on oil refineries.

Co-op America http://www.coopamerica.org/
National Green Pages database. Information on boycotts and sweatshops.

Envirolink http://www.envirolink.org/
Comprehensive listing of environmental resources. Search engine for locating environmental information (ex. enter a company name for a list of articles and reports involving that company).

Environmental Defense Fund Scorecard http://www.scorecard.org/env-releases/us-map.tcl
Find detailed reports on chemicals released by more than 17,000 plants in the US. Search by company and location (city, zip, county, state, etc.). Includes rankings of plant to industry.

Environmental Justice Network http://www.econet.apc.org/envjustice/
People of Color Environmental Groups Directory, links to organizations, reports & articles, government resources, African-American and Asian American resources, issues and action alerts.

Environmental Protection Agency http://www.epa.gov
Home page. Envirofacts page provides search engine for all EPA databases (TRI, Superfund, etc.) http://www.epa.gov/enviro/index_java.html. Able to search by zip code!

Environmental Protection Agency - SFIP http://www.epa.gov/oeca/sfi
Sector Facility Indexing Project database. Compliance and enforcement records for five industries (auto, pulp, iron/steel, petroleum, nonferrous metals) in conjunction with information on chemical releases, spills, and production capacity. This is under Data Access link.

Greenpeace http://www.greenpeace.org/
Good search engine using keyword.

International Rivers Network http://www.irn.org/
Information on efforts to stop dam-building around the world. Good search engine.

League of Conservation Voters http://www.lcv.org/
Environmental scorecard on congress' performance, giving percentage ratings to each elected official. Recent environmental votes are also highlighted

Pesticide Action Network http://www.panna.org/panna
"The Pesticide Information Service (PESTIS) is an online database that contains pesticide reform-related material, including articles, newsletters, reports and action alerts. It includes almost everything that PANNA has published plus materials from many other organizations such as the Northwest Coalition for Alternatives to Pesticides, Washington Toxics Coalition. The Pesticides Trust (PAN Europe), Mothers & Others for a Liveable Planet, Community Alliance with Family Farmers and more."

Project Underground http://www.moles.org/ProjectUnderground/search_new.cfm
Important source for information on the oil and mining industry. Nice searching capabilities.

Clinton, CT
Rockford, NC

(Environment continued)

Rachel's Environmental and Health Weekly http://www.rachel.org

Sign up for a free electronic subscription. Site searches the archives of this informative, important and cutting-edge newsletter.

Right-to-Know Databases http://www.rtk.net/

The Right to Know Network (RTK) provides free access to government information on toxic releases, toxic spills, superfund sites and other environmental results of manufacturing/industry. You can search by company, industry or geographic area. Once on the homepage, click DATABASES to the left of the screen, now you need to decide which databases to search. A MASTER search will search all of the databases simultaneously.

Alternative Policies & Progressive Activism

Bay Area Progressive Directory http://www.cmf.net/~cheetham/index.html
Alphabetical directory with index by subject.

Center for Campus Organizing http://www.cco.org
Student activism, links to student groups and progressive groups

Center for Third World Organizing http://www.ctwo.org/
Issues and action in communities of color, training opportunities.

The Electronic Policy Network http://www.epn.org
Searchable database of articles and reports on social issues by wide variety of progressive think tanks (e.g., Citizens for Tax Justice, Center for Policy Alternatives). Good resource for alternative policies. Links to these think tanks.

Environmental Support Center http://www.envsc.org
"Since 1990, the Environmental Support Center (ESC) has assisted almost 1300 local, state and regional organizations working on environmental issues. ESC's goal is to improve the environment in the United States by enhancing the health and well-being of these organizations. Our Training and Organizational Assistance Program, Technology Resources Program, Workplace Solicitation Program, and new Environmental Loan Fund help these vital environmental groups become better managed, funded and equipped."

Foundation Center http://www.fdncenter.org
How-to guides on grant writing, research foundations, and find their affiliate libraries.

Left on Line http://www.lol.shareworld.com/
Z Magazine's site to keep us Lefties up to date on the progressive point of view.

National Freedom of Information Coalition http://www.reporters.net/nfoic/
Links to resources on FOI, both by federal and by state.

National Organizers Alliance http://www.noacentral.org
The National Organizers Alliance is a progressive support center for organizers. "NOA is a wildly diverse, beloved community of progressive organizers to challenge, nurture and sustain us in our struggle for social, economic and environmental justice."

Preamble Center http://www.preamble.org/
Progressive think tank - full text reports that examine social and economic justice issues (ex. Living Wage campaign in Baltimore).

The Progressive Directory http://www.igc.apc.org
Search IGC's membership by topic and by organization's name.

Public Citizen http://www.citizen.org/
Consumer advocacy organization. Under their Freedom of Information Clearinghouse (Litigation Group page) they have a finding aid to government records on the web.

United for a Fair Economy http://www.stw.org/
Progressive analysis of economic issues. Reports, tools for action, and newsletter.

Government Information
(see also Money and Politics)

The Electronic Activist http://www.berkshire.net/~ifas/activist/
Directory of e-mail addresses of federal and state legislators and many media entities, listed by state. There are also entries (e-mail or street addresses) for many departments of state government and some for local government.

U.S.Census Bureau –Tiger Map Service http://tiger.census.gov
The main purpose of the TIGER Map Service project is to provide a good-quality, national scale, street-level map to users of the World Wide Web. Can custom create maps with census information (income, race, etc.) Also, can produce custom reports of detailed statistical information from the census.

Department of Labor Statistics http://stats.bls.gov/infohome.htm/
Economy at Glance has data on labor force, unemployment, earnings, productivity, Employee Cost Index, Consumer Price Index, producer Price Index. Can be search by key word.

Environmental Protection Agency http://www.epa.gov
Home page. Envirofacts page provides search engine for all EPA databases (TRI, Superfund, etc.) http://www.epa.gov/enviro/index_java.html. Able to search by zip code!

Federal Electoral Commission Info http://www.tray.com/fecinfo/
FECINFO provides free public access to campaign contributions to federal representatives and candidates, and the major national parties (soft money). Search by company (employer) and name. The main page is hard on the eyes, stay focused on the left side of the screen. To search by candidate/representative click US HOUSE/SENATE CAMPAIGN MONEY. To search by contributor use both LOOK-UP CONTRIBUTORS BY THEIR NAME (use company name here, too), and CONTRIBUTOR OCCUPATION/EMPLOYER LOOK-UP. Clear instructions are provided as you go along.

FREEDOM OF INFORMATION ACT

American Civil Liberties Union http://www.aclu.org/library/foia.html
Step by step guide for using the Freedom of Information Act.

Reporter's Committee for Freedom of the Press http://www.rcfp.org/rcfp
Has on-line support assistance for filing FOIAs.

General Accounting Office Reports http://www.gao.gov
Full text of GAO reports from 1995 to present. Great source of information on wide variety of topics. Searchable by subject.

Guidestar http://www.guidestar.org
A clearinghouse of information on nonprofit organizations presently including the activities and finances of more than 650,00 nonprofit organizations. Enter the non-profit's name in <Charity Search> box. After reviewing the retrieved list of nonprofits, click on your targeted organization and use your browser to print. Fill out IRS Form 4506-A, *Request for Public Inspection or Copy of Exempt Organization Tax Form.* Include the EIN (Employer Identification Number) provided by Guidestar. Attach the Guidestar printout with your request to the appropriate Internal Revenue Service Center. Within two to six weeks you should receive photo-copies of the non-profit's IRS Form 990 with a fee for photocopying. The 990 has a wealth of information including the salaries of the top five employees and outside contractors, and a list of officers and directors.

HPI Political Infrastructure (Harden Political InfoSystems) http://hpi.www.com/us50/index.html
Data by state, county and city. Has census data and maps, contact information for local officials.

National Association of Counties http://www.naco.org
Go to the "About Counties" link for local data. Has census data and maps, contact information for local officials, links to "Model Programs" regarding such issues as criminal justice (searchable by topic or county).

National Library of Medicine http://www.nlm.nih.gov
Search the NLM site is most useful. Lot's of good stuff on chemicals and their effects.

Occupational Health and Safety Administration http://www.osha.gov ✓
This government web site provides full reports of OSHA inspections. These include regular inspections and those filed due to complaints or accidents. Violation, fines and descriptions of incidents are available. You can get a nation-wide record of a company or focus your search to specific plant. Click on LIBRARY, then ESTABLISHMENT SEARCH. Be sure to check off Exact Match when searching, otherwise you'll get inaccurate results.

Right-to-Know Databases http://www.rtk.net/
The Right to Know Network (RTK) provides free access to government information on toxic releases, toxic spills, superfund sites an other environmental results of manufacturing/industry. You can search by company, industry or geographic area. Once on the homepage, click DATABASES to the left of the screen, now you need to decide which databases to search. A MASTER search will search all of the databases simultaneously.

State and Local Government Information http://www.piperinfo.com/state/states.html
Click on a state site and see categories: State Home Page; Statewide Offices; Legislative/Judicial/Executive Branch/Boards and Commissions/Regional; Counties; Cities.

U.S. Security and Exchange Commission http://www.sec.gov

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(1) Network of consisting a large number of scientists, doctors and toxicologists.
International POPs Elimination Network
www.ipen.org

(2) Health Care Without Harm (Network of medical professionals fighting for Health Care Without Harm) - Medical waste.
www.noharm.org

(3) Global Anti-incineration Alliance (GAIA)
- Progressive garbage management + critique of waste disposal techniques.
Write to gaia.sec@surfshop.net.ph

Community Health / Environment Survey Skillshare (CHESS)
Date : 13 – 17th August, 2001
Venue : United Theological College, No. 63, Millers Road, Benson Town, B'lore - 46

Registration Form

1. Name					
2. Organisation represented					
3. Address					
Tel No.		Fax No.			
Email :					
4. Postal Address (If different from above)					
5. Work background					
6. Arrived on		By (mode)		At (Time)	
7. Departure on		By (mode)		At (Time)	
8. Accommodation required ?		Dates	12th night		
			13th night		
			14th night		
			15th night		
			16th night		
11. Any special requests?					

Date :
Place :

Signature

(Please fill in this form and return it to Registration Desk)

COM H 64.

LIST OF PARTICIPATING GROUPS/ ORGANISATIONS / CAMPAIGNS IN SKILLSHARE

Resource groups/personnel:

1. **Nityanand Jayaraman**,an independent journalist working on toxic issues for over 5 years.
   E mail: nity68@vsnl.com

2. **Greenpeace, India**:
   Represented by Manu Gopalan, Navroz Mody,NirmalaKarunan,Michelle Chawla. Manu is from and is working in Kerala, paricularly in Eloor among the communities affected by industrial pollution. Navroz is from Kodaikanal, and is currently involved in the campaign against Unilever to clean up its mercury pollution in Kodaikanal and assess and remediate the damage to its worker's health.
   E mail: mangoforu@vsnl.net , navrozmo@vsnl.net

3. **Community Health Cell (SOCHARA), Bangalore**:
   Represented by Dr.RaviNarayan, Dr. Mohan Isaac,Dr. Rajan Patil ,Dr.Praveen and Lalit Narayan.
   Associated members of CHC in Skillshare: Dr.Girish(MSRMC), Dr. Unnikrishnan(OXFAM), AS Mohammed(SJANMS).
   A voluntary health organisation and community health resource and policy centre working closely with the governments and communities to improve health and access to health care. Also involved in training health workers to empower communities at grass root level.
   E mail: tnarayan@vsnl.com socharа@vsnl.com
   Address: 367, Srinivasa Nilaya, Jakkasandra 1st Main, 1st Block, Koramangala, Bangalore 560 034.
   Phone: 080 5531518/ 5525372

4. **Occupational Health and Safety Centre, Mumbai**
   Represented by Dr. Murlidhar V and Vijay Kanhere
   Dr. Murlidhar V is a Mumbai based doctor with experience and interest in community health surveys and environmental health issues. Vijay Kanhere is a labour activist who has worked for the compensation of workers in industry.
   E mail: murlidharv@vsnl.com
   sujvij@vsnl.com
   webmaster@ohscmumbai.org
   Address:6, Neelkant appartments, Gokuldas Pasta Road, Dadar(E), Mumbai-400 014
   Phone(O): 766 0178, (R)886 8329

5. **Regional Occupational Health Centre, Bangalore**
   Represented by Dr. Rajmohan(Director), Dr. Krishan Murthy(Organic Chemistry) and Mr. Rajan.
   Branch of National Institute of Occupational Health , Ahmedabad
   Address: Ground Floor, Central Library Block, BMC Campus, Bangalore-560 002

6. **Toxics Link, Delhi** Chennai
   Represented by Rajesh Rangarajan
   Email: tlchennai@vsnl.com
   Chennai

7. **Dr.Rakhal Gaitonde, Dr.Subashri Gaitonde,**
   CMC,Vellore.

Campaign Groups

1. **Thanal Conservation Action and Informatin Network,Thiruvananthapuram**:
   Represented by Usha.S, Sridhar R, Rajasree VV
   A community oriented organisation working on conservation issues and toxic related issues. Cuurently engaged in a community RIGHT TO KNOW campaign in Eloor, Kerala and a proposal to move Kovalam toward a zero waste model.
   Email: thanal @ md4.vsnl.net.in
   shreepadre@sancharnet.in
   Address: Post Box No: 815, Kawdiar, Thiruvanthapuram, 695 003, Kerala
   Phone: 0471 311896

2. **Paryavaran Suraksha Samiti, Gujarat**
   Represented by Anand Mazgaonkar or Rajni Dave or Swati Desai
   A Voluntary self help organisation working primarily in South Gujarat on a variety of issues, including Industrial Pollution and RIGHT TO KNOW.
   Email: pss@narmada.net.in
   Address: 37/1, Narayan Nagar, Chandni chowk, Rajpipla-393145, Narmada district, Gujarat
   Phone: 02640-20629

3. **Citizens for alternatives to Nuclear energy (CANE)**
   Represented by Kavitha BS
   A Bangalore based NGO working aganist radioactive pollution.
   E mail: kavaythri@yahoo.com
   aravinda@cisco.com
   Address:#390, 5th main, 12th cross, West of Chord Road, 2nd stage, Mahalakshmipura, Bangalore-560 086
   Phone:080-3592059/60

4. **Mines, Minerals and People(MMP)**
   Represented by Bhanu, Praveen Mote, Mahalakshmi
   MMP is a national network of mining- affected communities and community groups and working with meining affected communities in any manner.
   E mail: samatha@satyam.net.in; mmpindia@hd2.dot.net.in
   Address: 1249/A, road No. 62, Jubilee Hills, Hyderabad- 500 033. Phone: 040-3542975/6505974

5. **Sambavna**
   Represented byR VT Padmanabhan
   A Bhopal based voluntary organisation engaged in delivering holistic medical services to gas affected people. Has undertaken several pioneering initiatives in the field of community health, particularly in the context of communities affected by industrial pollution.
   E mail: sambavna@bom6.vsnl.net.in

6. **Palni Hills conservation Commitee**
   Represented by Kanan
   A NGO based in Kodaikanal fighting for the cause of workers affected in Mercury factory of HLL.
   E mail:kanan@vsnl.com

7. **Endosulfan Spray Protest Action Commitee, Kerala**
   Represented by Dr. Sripathy Kajampady
   Espac was formed at Perla, Kasargod by local farmers and the affected people to fight the acrial spraying of endosulfan and they have ben very sucessful in bringing this issue to a larger media and people's attention.
   E-mail: shreepadre@sancharnet.in
   Address:C/O Kajampady Nursing Home, P.O. Perla-671 552, Kasargod District, Kerala. Ph:895088

8. **Periyar Malineekarana Virudha Samiti,Kerala**
   Represented by Jose V J
   PMVS is a local group of activists fighting the pollution issue in the Eloor and Edayar belts of the River Periyar, where there are about 250 industries of all sorts mainly chemical.
   E-mail: thanal@vsnl.com
   Address: Periyar Malineekarana Virudha Samiti, Eloor Depot, Udyogmandal P.O. ,Kochi, Kerala. Ph:98460-13483

9. **Chintan Environmental Research and Action Group**
   Represented by Bharathi Chaturvedi
   A Delhi based NGO working on environmental issues, particularly waste and toxics.
   E mail: bharatich@hotmail.com
   Address: 238, Siddharta enclave, New Delhi-110 014. Phone:0091-11-338 1627

The Community Health / Environment Health Survey Skillshare (CHESS)
CHESS - A CHC process initiative, 13 - 17th August 2001.

A. BACKGROUND.

A polluted environment will manifest itself in the form of health disorders amongst human and other living populations exposed to the polluted environment.

Based on numerous cases around the country, common sense evaluation clearly confirms that industrial pollution has damaged community health. However, the specific nature of the damage or its extent remains unknown. As a result, community health has hardly influenced pollution policy. The indications that this is the case is evident:

1. Pollution legislation aims at controlling pollution rather than preventing it.

2. Pollution legislation merely prescribes norms that legalise pollution.

3. What is legal is not healthy. Pollution norms are prescribed based on an assumption of assimilative capacity of nature rather than on facts that point to the cumulative nature of the most deadly kinds of pollutants and their risks to community health.

4. Polluters remain unpunished for their pollution and effects on community health.

Importance of Community Health Surveys

Citizens and community groups need to be able to identify environmentally-caused health disorders, and the sources of environmental disturbance(s) that cause such disorders. This is important for several reasons:

1. Ensuring that the "Polluter Pays": The Polluter Pays principle is important not merely as a deterrent for further or future pollution, but also in the context of recovering the ecological debt owed to the communities of living beings and their future generations. Ecological debt goes beyond the fiscal and requires a deep-rooted sense of apology by the polluter for the damage caused by its actions.

1. Mobilising the Community: Often health disorders within a community are seen at a family level, with people blaming the compromised health of their family members on fate or accident. Many of the subtler effects – learning disorders, immune system depression, reproductive or gynecological anomalies - are noticeable as trends only when seen at a community level. Mapping the health of a community brings home the fact that the fate of the community as a whole is linked to its environment.

2. Preventing Future Harm: Armed with the knowledge that certain kinds of industries and pollution can cause community wide health effects, communities can play a more active and informed role in deciding the course of their communities' development. Combined with an operational understanding of the Precautionary Principle, such knowledge can help in preventing the setting up of polluting industries.

3. Countering Government/Industry: Community health surveys need not be conclusive in establishing cause-effect relationship between environmental disturbance and health disorders. They need to sufficiently appeal to the common sense of the community members and the public to be able to challenge the baseless assertions by Government/industry that a community's ailments have nothing to do with the pollution they are subject to. Health surveys can help reverse the burden of proof, with communities demanding industries and governments to establish beyond doubt that their polluting activities/industries are not related to the community's health problems, or will not cause health disorders.

5. Health Care Needs: Health surveys also allows for better understanding of the health care needs of communities living in environmentally disturbed areas. Such an understanding is crucial to designing the health care interventions necessary for the community members.

B. AIM:

Equipping Communities and campaigners to deal with Health Surveys:

C. OBJECTIVES:

- To create a multidisciplinary resource base of medical practitioners, community activists and toxicologists capable of conducting community health surveys in communities subject to industrial and environmental pollution;

- To promote interaction between community activists and community health experts to facilitate a discussion aimed at understanding the limitations and strengths of community health surveys;

- To understand the role of community health surveys in campaigns against industrial pollution.

D. THE SKILLSHARE (ORIGINAL PLAN)

The skillshare would discuss the following elements:

1. Toxicology

2. Pollution & Community Health

3. Design and Implementation of Health Surveys - Resource Implications (costs, personnel, time etc)

4. Understanding the strengths and limitations of community health surveys

5. Using Community Health Surveys for campaigning.

6. Resources and resource sharing opportunities.

7. Case Studies

Participants

Community activists, medical practitioners from affected communities, occupational health doctors/activists, community health doctors/activists, toxicologists, lawyers.

Discussions have been held with community Health Cell, Bangalore, the functional unit of the Society for Community Health Awareness, Research and Action to facilitate an interactive, participative skillshare that will address these aims and objectives.

(This background is a modified version of an earlier note circulated by Nityanand Jayaraman and Manu Gopalan.)

The Community Health—Environmental Survey Skillshare- 2: 26-28th July, 2002.

The Background

A polluted environment will manifest itself in the form of health disorders amongst human and other living populations inhabiting it.

Based on numerous cases around the country, common sense evaluation clearly confirms that industrial pollution has damaged community health. However, the specific nature of the damage or its extent remains unknown. As a result, community health has hardly influenced pollution policy.

The indications:

1.Pollution legislation aims at controlling pollution rather than preventing it.
2.Pollution legislation merely prescribes norms that legalise pollution.
3.What is legal is not healthy. Pollution norms are prescribed based on an assumption of assimilative capacity of nature rather than on facts that point to the cumulative nature of the most deadly kinds of pollutants and their risks to community health.
4.Polluters remain unpunished for their acts and communities seem to be forever in the wait for their rightful rehabilitation and compensation.

Importance of Community Health Surveys:

Citizens and community groups need to be able to identify environmentally caused health disorders, and the sources of environmental disturbances that cause such disorders. This is important for several reasons:

1. ***Ensuring that the "Polluter Pays":*** The Polluter Pays principle is important not merely as a deterrent for further or future pollution, but also in the context of recovering the ecological debt owed to the communities of living beings and their future generations. Ecological debt goes beyond the fiscal and requires a deep-rooted sense of apology by the polluter for the damage caused by its actions.

2. ***Mobilising the Community:*** Often health disorders within a community are seen at a family level, with people blaming the compromised health of their family members on fate or accident. Many of the subtler effects – learning disorders, immune system depression, reproductive or gynecological anomalies - are noticeable as trends only when seen at a community level. Mapping the health of a community brings home the fact that the fate of the community as a whole is linked to its environment.

3. ***Preventing Future Harm:*** Armed with the knowledge that certain kinds of industries and pollution can cause community wide health effects, communities can play a more active and informed role in deciding the course of their communities' development. Combined with an operational understanding of the Precautionary Principle, such knowledge can help in preventing the setting up of polluting industries.

4. Countering Government/ Industry: Community health surveys need not be conclusive in establishing cause-effect relationship between environmental disturbance and health disorders. They need to sufficiently appeal to the common sense of the community members and the public to be able to challenge the baseless assertions by Government/industry that a community's ailments have nothing to do with the pollution they are subject to. Health surveys can help reverse the burden of proof, with communities demanding industries and governments to establish beyond doubt that their polluting activities/industries are not related to the community's health problems, or will not cause health disorders.

5. Health Care Needs: Health surveys also allows for better understanding of the health care needs of communities living in environmentally disturbed areas. Such an understanding is crucial to designing the health care interventions necessary for the community members. Women and Children are seen as especially vulnerable in certain environmental stress conditions. Health surveys can help ascertain the nature of the broad problem and help address their specific needs/concerns.

Historical Context:

Keeping the above in mind , Chess, Community Health Environmental Survey-Skillshare started on August 13th, 2001 at United Theological College, Bangalore involving a small group of individuals and organization. All the participants were present in time and really enthusiastic about the program. Since it was a small group of about 40 people and that the groups would be together for the next 5 days, a personal introduction round was included. This broke the initial barriers of unknown and created a added sense of familiarity to the entire meeting. This was followed by the scheduling of the entire event It was important to know the different campaigns of the participants, the extent of their invovlvement and their reuqirements. There has been some meaningful activity in the hotspots as a result of that interaction. We have had our fair share of problems too. But all of it has helped us to improve our understanding of how to handle the tense and desperate situations we encounter as we go about performing health surveys.

Ever since there has been a constant urge for us to get back together evolving a clear framework for action in the various pollution/radiation hotspots we work in.

Some of the issues and topics covered in detail were :-

- The aerial spraying of "Endosulfan", a POP pesticide, on cashew plantations, in Kasargod, a district in North Kerala by Usha. S, from Thanal Conservation and Action Committee from Trivandrum, Kerala. The highlighted problems as part of her presentation were - little knowledge of toxicology and its effects on human body; Not being able to relate the medical problem in community to anything in particular initially; Later, the onus of proving the endosulfan as the problem was thrust upon the local people.
- The Kodaikanal issue about Mercury was narrated by Mr. Mahendra Babu, an ex-worker in HLL's thermometer plant in Kodaikanal and now the president of ex-

List of Participants – CHESS II

Survivors,Community-based activists and individuals:

Bangalore :

1. A S Mohammed (SJANMS)*
AS Mohammed is the Asst. Professor of statistics and demography in the Department of Community-Medicine, St. John's Medical College and has been involved in numerous studies and reports on health care and evaluation. He is a society member of CHC.
Address: Department of Community Health, St. John's Medical College,
Bangalore- 560 034
Phone: 080-2065043
Email: aa.sjmc@vsnl.com

2. Gururaj Budhya (TIDE)
Having worked with different environment groups and movements, his strength lies in bringing people together from diverse background. Also a member of environment journalist group in Karnataka. A strong networker in Karnataka.budhyag@hotmail.com
Mobile:0-9844069634(M) Phone: 080-3315656/3462032

3.Dr. Girish Rao
Dr. Girish Rao is an Associate Professor of Community Medicine in M.S. Ramaiah Medical College, Bangalore with a longstanding interest in all aspects of hospital waste management. He is also an Associate of CHC.
Address: Faculty of Community Medicine, M.S. Ramaiah College, MSRIT Post, Bangalore- 560 054
Phone: 080-3600968
Email: girishrao@hotmail.com

4. Mahalakshmi Parthasarathy
Mahalakshmi is working with mining struggle groups. She is also involved with legal and media advocacy and information documentation.
Email: pmahalak4hmi@yahoo.com

5.Mohan
Trade Union Movement Researcher, Bangalore.

6.Dr. Rajan Patil
Dr. Rajan is an epidemiologist and is presently a Research/ Training Assistant in CHC with a special interest in vector bourne diseases. He has been involved with creating an interactive science teaching module on mosquitoes and their control.
Email: rajanpatil@yahoo.com

7.Dr. Ravi Narayan
Dr. Ravi is the Community Health Advisor of CHC with professional interest and training in public health, industrial health and preventive and social medicine. Earlier as an Associate Professor of Community Health at St. John's Medical College he worked on occupational hazards of the tea industry and the health effects of agricultural development.
Email: tnarayan@vsnl.com

8.Dr.Thelma Narayan is the present coordinator of CHC. She is an epidemiologist with a doctorate in public health policy. She has been involved as a resource person for studies on the Bhopal health disaster and is currently a member of the Karnataka Government Task Force on Health and Family Welfare.
Email: tnarayan@vsnl.com

9.T Prakash
fighting GE crops
ICRA, Bangalore

10. DR. Unnikrishnan P V
OXFAM
Media Strategist and specialist in Disaster Management. Email: unnikru@vsnl.com

11.Dr. Venkatesh
Dr. T. Venkatesh is the Professor of Biochemistry at St. John's Medical College and the Director of 'Project Lead Free' of the George Foundation. He is also the head of the National Referral Centre for Lead Poisoning in India.
Address: Department of Biochemistry and Biophysics, St. John's Medical College, Bangalore- 560 034
Phone: 080-5532146/ 2065058
Telefax: 080-6640293
Email: venky_tv@hotmail.com

12. Viswambhar Pati
Indian Scientists against Nuclear Weapons, ISANW, Bangalore
Pati has been very active in the mobilization of citizens' groups across Bangalore city against the nuclearisation of India. He is teaching at the Indian Statistical Institute, Bangalore.

Bhadravati

13. Dr. Narendra Babu
Local resident of bhadravati. Dr.Babu takes time out from his clinic to participate in Save tungabhadra federation's work, a forum fighting against the pollution of River Tungabhadra due to Mysore Paper and Pulp Industry and the mining work around Kudremukh. He was involved in a study related to health impact due to pollution of bhadra river around kudremukh mining area.

9845226678 (M)
#08282-66690 ®

14.Verghese Cleatas
Project Director, Vikasana
An organization working for 10 years on the issue of environment with presence in 45 villages.Has taken up the issue of pollution and its effect on community through awareness programmes; with wide outreach to about 8000 students, running environment awareness programme in schools.Facilitating the process of promoting traditional herbal medicine. Running three model herbal gardens. Also has taken out books in kannada literature
P.B. No: 23
Tarekere – 577228
Chikmangalore; Karnataka
0826-422500/422570/423739
email : vikasana_ngo@sify.com

Bhopal:

15. Nishant:
As a community researcher Nishant has worked exhaustively in Bhopal doing a health survey of children born to exposed parents as opposed to unexposed ones to the gas tragedy. His new survey has become an innovative stick to beat the Indian Government with, for the survivors of the disaster.

16.Satinath Sarangi - Sambhavana
B 2 - 302, Sheetal Nagar,
Berasia Road, Bhopal; Ward
An M Tech in Metallurgical Engineering, Satinath came to Bhopal a day after the disaster and has been involved with relief, rehabilitation and issues of justice for the Bhopal victims since then. He is one of the Founder Members of the Bhopal Group for Information and Action that carries out documentation, research and publications. He is also actively involved with legal actions as well as national and international campaigns.
Email:sambhavana@vsnl.com

Chennai :

17.Nityanand Jayaraman
Nityanand is an independent journalist working on toxic issues for over 5 years.
Address: 218, 6th Main, 6th Cross, Rajarajeshwari Nagar, Bangalore-560 098
Phone: 080-8601033
E mail: nity68@vsnl.com

18.Rajesh Rangarajan
Toxics Link, Chennai.
tlchennai@vsnl.net

Rajesh has been working on the issue of municipal waste in the city of Chennai as part of Toxics Link.

Delhi :

19.Achin Vanaik
Campaign for Nuclear Disarmament and Peace CNDP)
Achin is a writer-activist fighting for nuclear disarmament and peace in these troubled times

20.Ananthapadmanabhan
Ananth is the Executive Director of Greenpeace India. He had been teaching school-children for more than a decade. He also spent a few years in the Environment Division of a leading financial institution.
Email: ananth@dialb.greenpeace.org

21. Dr. Arun Mitra
Indian Doctors for Peace and Democracy (IDPD)
The Indian affiliate of the International Physicians for Prevention of Nuclear War
idpd2001@yahoo.com

22. Bejon Mishra
Consumer Voice, New Delhi

23.Bharati Chaturvedi
Coordinator of Chintan Environmental Research and Action Group.

24.Bidhan Chandra Singh
Bidhan is a trainee campaigner with Greenpeace India.
Email: deogharbiddu@hotmail.com

25.Divya Raghunandan
Divya is a trainee campaigner with Greenpeace India.
Email: r_divya@hotmail.com

26.Madhumita Dutta
Toxics Link Delhi, New Delhi.
mdutta@vsnl.com

27.Manu Gopalan
Manu is a toxics campaigner with Greenpeace India.
Email: manu.gopalan@dialb.greenpeace.org

28. Nidhi Jamwal
The Centre for Science and Environment 41, Tughlakabad Institutional Area, New Delhi-110062.
Ph: 011-6081110,011-6083699,fax:011-6085879

email:cse@sdalt.ernet.in

29.Nirmala Karunan
Nirmala is the Administration Manager of Greenpeace in India.
Email: nirmala.karunan@dialb.greenpeace.org

30. Ravi Agarwal
Senior Environmentalist and Director, Srishti, New Delhi
Email: srishtidel@vsnl.net.in

31.Sanjiv Gopal
Sanjiv is currently a trainee campaigner with Greenpeace India.
Email: sanjiv.gopal@dialb.greenpeace.org

Dodbalapur :

32. Dayanand Gowda
A Youth group trying to respond / protest against Bangalore mysore Infrastucture corridor project. They have been active against cutting trees; they have also performed a cycle yatra. Fighting pollution due to the Goggo Factory in Doddebalapur, near Bangalore, Karnataka.
Janadhwari Yuva Vedika, Opp. Masjid Kumbarpet,
Doddebalapur-561203 # 080-7626450 ®

33. Prakash R.
Fighting pollution due to the Goggo Factory. Prakash is from the affected village near Gogo factory; a village panchayat member
Doddebalapur, near Bangalore, Karnataka.
Village : Aradeshhalli, Doddebalappur
080-8464251-®

34.Sadhana
Village : Aradeshhalli, Dodbalapur
Land owner, having 100 acres of land around the area of dodballapur. Most of the land , water source has been contaminated by Gogo factory.

Edayar :

35. Salim VA
Fighting pollution due to Binani Zinc's Jarosite Pond in Edayar, Kerala
Valiangadi, Binanipuram(PO),
Edayar, Ernakulam,-6835021
0484-555592

Eloor :

36. VJ Jose
Jose was working in Cochin spreading awareness about Road safety and First-Aid tips with Ernakulam Rural Action Force. Now he is an active volunteer of Greenpeace-India. Involved in mobilizing the local community using education material and films from the Greenpeace library. He has also been instrumental in environmental monitoring of the river Periyar.
Ph:0484--545314

37. VV Purushan
Purushan is the community leader of Periyar Malineekarana Virudha Samithi, a community based organization involved in pollution prevention through direct actions in Eloor, the largest industrial estate in Kerala.

38. Adv.Daisy Thampi
practices Environmental Law in Kerala.
Email:dait5@yahoo.com

39.Remya
A college student extremely keen to work on health issues in Eloor

40. Shakeer
A long-time activist with the Periyar Malineekarana Virudha Samiti, Shakeer has been instrumental in putting together the key actions of the group in Eloor.

Gudur :

41. Gangi Reddy V.
Rural reconstruction and development society, Gudur (A.P)
The organization is fighting for the rights of dalits/adivasis. The struggle os also against illegal mining and pollution due to mica mining. RRDS went to the court against a industrialist, who took lease of tribal village and tried evacuate it.
Sydapuram 524407
Nellore Dist. (A.P)
#08621-87096

Gujarat :

42. Michael Mazgaonkar
Besides being a long-time activist with the *Paryavaran Suraksha Samiti*, he has been working on a wide variety of environmental and other social problems in Gujarat.
Email:pss@narmada

43.Swati Desai

Swati desai's work involves trying to mobilize affected communities along a 200km stretch from Vapi to Mehsana in Gujarat on issues of ground and surface water contamination, hazardous solid waste, air pollution, health effects and TNCs. pss@narmada.net.in

Harihar Polyfibres :

44.Mr. Hiremath
Samaj Parivartana samudaya
Ranibennur, Karnataka (HPF)
SPS is a voluntary organization working on the issue of environment with presence in Karnataka, MP and Orissa.SPS and reputed national institutes have conducted studies on pollution of Tungabhadra river due to release of effluents of Harihar PF. Facilitated the formation of Tungabhadra parisar Samiti, a local group of 20 villages; actively encouraged fisherwoman/man to file cases, against HPF; filed PIL in the High Court, which resulted in a order asking HPF to take corrective measures to control pollution.
sr_hiremath@hotmail.com
sr_hiremath@rediffmail.com

45.Shahnaz
Samaj Parivartan Samudaya

Hazaribagh:

46.Dr.Jemma
She works with the Tribal population in the mining area on the issue of their failing health system. Runs a clinic in the area.
Ph: 06546-32476/ 31128

Hyderabad :

47. A . Kishan Rao
President , Patancheru Anti Pollution Committee
He was formerly a lecturer and also a medical and health officer. He is a resident of Patancheru and has observed the ill-effects of pollution very closely. He says, now I can see the effects of pollution on my family members.Author of book called "A hell on earth ", and was also involved in a health survey around the area. Medical environmentalist and activist Dr.Rao has been taking up the cause of the victim of pollution at patancheru for more than a decade to different fora's.
Yashodhara hospital, 12-5, srinagar colony,
Patancheru - 502319, Medak Dist. (A.P.)

48. Narasimha Reddy
Executive director, Centre for Resource Education
A voluntary organization based in Hyderabad working on issues related to agriculture, sustainable development, environment protection and other related rural and urban issues. Narasimha reddy is a person committed to struggle on the issue of pollution due to industries around Hyderabad . Passion to bring people and organization together with

strong networking capacity.
email: creind@hd2.dot.net.in

49. Dr. Sagari Ramdas

50.Ashalatha / Satheesh - Anthara
Anthra is an NGO started by women veterinarians and works primarily with poor farmers, dalits, adivasis, particularly women. It works to strengthen people's livelihoods by improving the health & production of livestock and poulry in the wider context of natural resource management and sustainable development.
Anthra works in AP & Maharastra and in AP the major work areas are the districts of East Godavari, Visakhapatnam and Medak and also several other districts. Dr.Sagari Ramdas is the Director of Anthra in Andhra Pradesh.
Major Components of work:

- Action research on indigenous knowledge of rural communities on livestock rearing
- Participatory planning, Evaluation, and monitoring for development interventions
- Training of village level animal health workers
- Policy advocacy

Publication of educational materials
Email: anthra@hd2.vsnl.net.in
040-7113167/7110977

Jadugoda :

51.Ajitha Susan George:
She has been instrumental in performing a health survey focusing on women's health in Jadugoda. In Naomundi she is working on indigenous systems of medicine. Email: jsr_ajithasg@sancharnet.in
Ph: 06596-33501
O657-220266

Kaiga-Bangalore:

52. Vishnu Kamath
Citizens for Alternatives to Nuclear energy (CANE), Bangalore.

53.Y.B Ramakrishna

Kalpakkam :

54. Dr.Ramesh

Kodaikanal :

55 .Daniel Francis
Daniel is a machine orperator in the Mercury Thermometer Plant of Hindustan Lever Ltd. in Kodaikanal.

56.Kanan, Palani Hills Conservation Council
Kodaikanal.
Email: kanan@vsnl.com

57. S.A. Mahindrababu
One of the members of the Ex Mercury Employees Association and are fighting for cleanup of the mercury and better compensation for the workers in Kodai.

58. Navroz Mody

Toxics Campaigner of Greenpeace fighting Mercury Pollution in Kodaikanal and PVC in Cudallore and Mettur.
Email: navroz.mody@dialb.greenpeace.org

Mangalore :

59.Professor Mohan
Roshini Nilaya School of Social Work Mangalore-575002
sswroshni@vasnet.co.in
He teaches Social Work at Roshni Nilaya School of Social work, Mangalore.

60. Student
Roshini Nilaya

61.Student
Roshini Nilaya

62.Upendra Hosbet

Runs a computer institute, actively working on the issue of environment since a decade. He says that they are against any Mega projects . Has organised protests against Cogentrix
#478499/478488
upendra_hosbet@hotmail.com

63.Organic farmer

Mumbai :

64.Deepika D'souza, Coordinator, Human rights law network.

65.Dr. Murlidhar V

Activist working on the issue of Industrial pollution in Angul, NALCO area. Was part of a study which was undertaken to know the impact Industrial pollution on Human health, Animal health, Crop and Vegetation in Angul talcher region.

Raichur :

75. Somshekhar
Samuha
08536-668213/14

Thiruvananthapuram :

76. Jayakumar C.
Jayakumar is the coordinator of Thanal Conservation Action and Information Network.
thanal@vsnl.com

77.Dr. R. Sukanya
She is a faculty member in Achutha Menon Center for Health Science Studies, Trivandrum and teaches epidemiology for the Masters in Public Health Students.
Address: AMCHSS, Sree Chitra Institute for Medical Sciences and Technology,Trivandrum
Phone:0471-524240
Email: sukanya@sctimst.ac.in

78.Usha S. is involved in environmental education among students and studies and campaigns among farming communities on chemicals in agriculture.
thanal@vsnl.com

Vellore :

79.Dr. Rakhal Gaitonde and Dr. Subhasri Gaitonde
Dr. Rakhal is doing his post graduation in Community Medicine in CMC, Vellore. He has a special interest in peoples movements and using epidemiological skills in activism. Dr.Subhashri is an obstretician and gynaecologist in CMC, Vellore.

Address: 636-B, PG Quarters, CHAD, Bagayam, Vellore
Phone: 0416-260988
Email: subharakhal@yahoo.com

Warangal :

80. Sarvodaya Youth Organisation

81. Dr.

List of organizations participating in CHESS-2

1. **Alternative Law Forum,** Infantry Road, Bangalore.

He is a Mumbai based doctor with experience and interest in community health surveys and environmental health issues.
E mail: murlidharv@vsnl.com

66.Saba Khan
Nirmala Niketan, School of Social Work,
Mumbai

67.One more representative from Nirmala Niketan

68. One representative from TISS

Orissa :

69.Anjana:
Nari Surakhya Samiti, Angul
Involved in issues relating to women's empowerment, displacement due to mining and organising the mining workers to fight for their rights.
she is a part of the women and mining network, working as coordinator of Nari Surakya Samiti.

70.Bhakto Mohanty
Convenor North Orissa,OMAPAN
Working as a development worker and activist since 15 years in mining area of north orissa in kendujhar district. He is active member of the people's movement in Gandhamardan Iron ore mining area in kendujhar.

71.Kailash nayak
Mayurbhanj, OMAPAN.

72.Manas Jena
OMAPAN, Bhubaneshwar, Orissa
Network of people's action group; has presence in all the mining areas in orissa. Their main focus is to organize small groups of affected people to put up a fight against the injustice due to mining. This is done through education awareness, building on the campaign to right to information
#0674-555797
deveini@rediffmail.com

73.Raimani Devi
Sukhinda
From a village in Sukhinda mining area. A primary school teacher,activist also volunteers her time with a local voluntary organization working in the area.

74.Sisir tripathy

Angul, Direct Action Group

Represented by Chitra.
Email: alforum@

2. **Anumukti**
Sourendra Gadekar, Sanghamitra Gadekar <anumukti@gmx.net>

3. **Association of Consumer Action on Safety and Health** (ACASH), Mumbai.
Servants of India Society, SVP Road, Gurgaum, Mumbai.
Ph: 022-3886556 ??

4. **Ban Asbestos Network India**
Dr. TK Joshi<tkjoshi@vsnl.com>

5. **Campaign for Nuclear Disarmament and Peace (CNDP),**
Achin Vanaik.

6. **Center for Environmental Communications (CEC)**
Mr. J. John/REP

7. **Center for Indian Trade Unions- CITU**
Mr. PK Ganguly<citu@vsnl.com>

8. **Centre for Resource Education**
Hyderabad,
Mr.Narasimha Reddy.

9. **Centre for Science and Environment**
Nidhi Jamwal,
Tughlakabad Institutional Area, New Delhi-110062.
Ph: 011-6081110,011-6083699,fax:011-6085879
email:cse@sdalt.ernet.in

10. **Chintan Environmental Research and Action Group, Delhi**
In: Bharathi Chaturvedi
Chintan is a Delhi based NGO working on environmental issues, particularly waste and toxics.
Address: No. 17, Jangpura Market,
2nd floor, above Om Hotel, New Delhi 110 013
Phone: 011-3381627/ 4314478

11. **Citizens for Alternatives to Nuclear energy (CANE), Bangalore**
In: Vishnu Kamath,
CANE is a Bangalore based NGO working aganist radioactive pollution.
Address: #390, 5th main, 12th cross, West of Chord Road, 2nd stage, Mahalakshmipura, Bangalore-560 086
Phone:080-3592059/ 3592060
E mail: kavayathri@yahoo.com , aravinda@cisco.com

12. **Community Health Cell, Bangalore**

In: Dr. Ravi Narayan, Dr. Thelma Narayan, Dr. Rajan Patil,
CHC is volulntary health organisation and community health resource and policy centre working closely with the governments and communities to improve health and access to health care. Also involved in training health workers to empower communities at grass root level.
Address: 367, Jakkasandra 1st Main, 1st Block, Koramangala, Bangalore-560 034
Phone: 080-5531518/ 5525372
Telefax: 080-5525372
Email: sochara@vsnl.com

13. Consumer Action Group
In: Shoba Iyer
No.7, 4th Street, Venkateshwara Nagar, Adyar, Chennai-600020.

14. Consumer Voice
F-71,Lajpat Nagar-II, New Delhi-110024
ph:011-6918969,011-6315375
fax:011-4620455
In: Bejon Misra: 9811044424
Email: bejonm@hotmail.com

15. Endosulfan Spray Protest Action Commitee, Kerala
ESPAC was formed at Perla, Kasergod by local farmers and the affected people to fight the aerial spraying of endosulfan and they have been very sucessful in bringing this issue to a larger media and people's attention.
Address: c/o Kajampady Nursing Home, P.O. Perla-671 552, Kasargod District, Kerala
Phone: 895088
E-mail: shreepadre@sancharnet.in

16. Greenpeace India
In: Nirmala Karunan, Navroz Mody, Ananthapadmanabhan, Divya Raghunandan, Bidhan Chandra Singh, Manu Gopalan, Sanjiv Gopal.
Address: J- 15, Saket, New Delhi- 110 017
Phone: 011-6962932/ 6536716
Telefax: 011-6563716
Email: manu.gopalan@dialb.greenpeace.org

17.Human Rights Law Network,
In: Deepika D'souza, Sunita Dubey,SHWETA AND SUNIL SCARIA
Engineer House, 4 Floor, 86,Bombay Samachar MArg, Mumbai-400023.
Ph: 022-2217078/2204948
Fax: 022-2220822/2227233

18.Indian Doctors for Peace and Democracy (IDPD)
The Indian affiliate of the International Physicians forPrevention of Nuclear War
In: Dr.Arun Mitraidpd2001@yahoo.com

19. Indian Scientists Against Nuclear Weapons (ISANW)
Vishwambhar Pati

20. Janadhwari Yuva Vedika
opp. Masjid, Kumbarpet, Doddeballapur-561203.
Mr. Dayanand Gowda.

21. Mines, Minerals and People(MMP)
MMP is a national network of mining- affected communities and community groups and working with mining affected communities in any manner.
Address: 1249/A, Road No. 62, Jubilee Hills, Hyderabad- 500 033
Phone: 040-6505974
Telefax: 040-3542975
Email:mm_p@satyam.net.in

22.Nirmala Niketan
School Of Social Work
Mumbai

23.Occupational Health and Safety Centre, Mumbai
In: Vijay Kanhere, Dr. Murlidhar V. and Dr.Veena Murlidhar.
Address: 6, Neelkant Apartments, Gokuldas Pasta Road, Dadar(E), Mumbai-400 014
Phone: 022-766 0178
Email:_webmaster@ohscmumbai.org
Website: www.ohscmumbai.org

24.OXFAM
Dr. Unnikrishnan PV.

25.Palni Hills Conservation Council
In: Kanan.
A NGO based in Kodaikanal fighting for the cause of workers affected in Mercury factory of HLL.
Email: kanan@vsnl.com

26. Patancheru Anti Pollution Committee
A . Kishan Rao
President
Yashodhara hospital
12-5, srinagar colony, Patancheru-502319,Medak Dist. (A.P.)
Doctor at patancheru, was involved in health survey around the area

42. Fedcot

43.Exnora

44.Fair

Expected Outcomes from CHESS II

- "The " Manual on Lay Epidemiology " will be a good guide for NGO's to act upon locally and identify problems cuased by processes that are damaging to the health of the workers and the population. The POISON free Earth CD will be useful as well for those of us dealing with toxics issues . But again all these matters in the vernacular languages will have better effect on the affected workers and population. I do not know how much of the survey's can be carried out by NGO's themselves . As all of us have our own agenda and idiosyncracies - may be it is good to have the medics and para medics do the work.
What about setting up a lab that will also detect known toxics and
help any one with suspicion on various pollutants and toxics.
There was some talk about this some time early in the day of the Hg
issue but has been lost in the din of media exposure i guess."- **Kanan, Palni Hills Conservation Council**

-"The CD and the guide will be very useful. We may advertise the availability through all possible channels once it is ready. There will be many people who will be interested for the same.
ALF and training of lawyers: I personally believe that this is a good idea. It may be a good idea to explore the possibilities of "skillshare" for lawyers and law students, together or separately. The idea of a team (to move around) is interesting, but will require lot of efforts, energy and management. Needless to say, we are NOT into soft and easy work." - **Dr. Unnikrishnan PV Oxfam**

- "Well right after the skillshare I did the Sukhinda trip (the report of which I have sent to you/Hex Chrome) attending the skillshare did guide me thru it.. Here can I add that it would be a good idea to have a focus meeting on the effects of toxics on children, (exposure routes, effects) it would be of help as we have been witness to child labour in the mines/quarries . How about also adding on a veterinary perspective because most of the mining areas have come to understand that the livestock to is invariably effected/it would be of help if we understand this better. Here would like to mention an organisation Anthra /Yakshi It would be good if they too are included in the next skillshare. It was a shared concern at the last skillshare that we include workers groups too in the next one, who are concerned about their own health in the context of polluting processes and

34.Samvada

303, II Floor,Rams Infantry Manor, Infantry Road, Bangalore.
Ph:080-5580585
In: Benson Isaac
Email: samvada@vsnl.net

35. Srishti,New Delhi.

Ravi Agarwal

36.Thanal Conservation Action and Information Network, Thiruvananthapuram:

In: Usha S., Sridhar R. and Rajasree V.V.and Jayakumar C.
Thanal is a community oriented organisation working on conservation issues and toxic related issues. Currently engaged in a community Right to Know campaign in Eloor, Kerala and a proposal to move Kovalam toward a zero waste model.
Address: Post Box No: 815, Kawdiar, Thiruvanthapuram, 695 003, Kerala
Phone: 0471- 311896
Email: thanal@md4.vsnl.net.in , shreepadre@sancharnet.in

37.TISS

Mumbai

38.Toxics Link, Chennai/Delhi

In: Rajesh Rangarajan, Madhumita Dutta
Address: 8, 4th Street, Venkateshwara Adayar, Chennai- 600 020
Phone: 044-4460387
Telefax: 044-4914358
Email: tlchennai@vsnl.net/tldelhi@vsnl.com

39. Vikasana / REP

Verghese Cleatas, Project Director
An organisation working on the environmental issues. They are closely working with the community around Terikere (mysore paper and pulp industry); mainly focussing on awareness in the locality
P.B. No. 23
Tarekere-577228
Chikmangalore; Karnataka
0826-422500
422570/423739
vikasana_ngo@sify.com

40. Institute of miners health, nagpur

Dr. SK DAVE,

41.Pasumai Thayagam

27. Paryavaran Suraksha Samiti, Gujarat

In: Swati Desai and Michael Mazgaonkar

PSS is a voluntary self help organisation working primarily in South Gujarat on a variety of issues, including Industrial Pollution and Right To Know.

Address: 37/1, Narayan Nagar, Chandni Chowk,
Rajpipla-393145, Gujarat
Phone: 02640-20629
Email: pss@narmada.net.in

28.Periyar Malineekarana Virudha Samiti(PMVS) ,Kerala

Purushan Eloor

PMVS is a local group of activists fighting the pollution issue in the Eloor and Edayar belts of the River Periyar, where there are about 250 industries of all sorts mainly chemical.

Address: Periyar Malineekarana Virdha Samiti, Eloor Depot, Udyogmandal P.O., Kochi, Kerala.
Phone: 98460-13483
E-mail: thanal@vsnl.com

29. Roshni Nilaya School of Social Work

Social Work Department

30. Rural Reconstruction and Development Society

Gangi reddy. V
Sydapuram 524407
Nellore Dist. (A.P)
#08621-87096

31. Samaj Parivartan Samudaya

Mr. Hiremath
sr_hiremath@hotmail.com
sr_hiremath@rediffmail.com
Has been working on the issue of industrial pollution since a decade

32. Sambhavna

In: Satinath Sarangi

Sambhavna is a Bhopal based voluntary organisation engaged in delivering holistic medical services to gas affected people. It has undertaken several pioneering initiatives in the field of community health, particularly in the context of communities affected by industrial pollution.

Address: Sambhavana, Berasia Road, Bhopal
Email: sambavna@bom6.vsnl.net.in

33.Samuha

Raichur.
Somshekhar

cancer.

The questionnaire survey was conducted by a group of Burnham residents called 'Parents Concerned About Hinkley' and analysed by Dr Chris Busby who, over the past two years, has found high cancer mortality in the town. This differs from all previous studies as it examines the number of people reporting cancer in a questionnaire.

The survey confirms Dr Busby's findings published two years ago (1) showing that breast cancer deaths in North Burnham electoral ward were double the national average. It also exposes other high cancer rates not available from the Office of National Statistics from which he drew his earlier conclusions.

Dr Busby said, "This is the first citizens' health survey of this sort in the UK and I applaud the group for their very hard work. They were forced to go down this road as the Health Authority refused to publish its figures. Now we see a picture confirming my fears that Hinkley discharges are responsible for severe health problems here. All the epidemiology points to that conclusion."

Dr Busby's work has been testing the hypothesis that radioactive particles discharged into the sea are deposited on the local mudbanks, blown downwind and inhaled by residents on a chronic basis, triggering the cancer. This theory is supported by the survey which shows over half of those diagnosed with cancer have hobbies involving the sea, eg water-sports or digging for bait on the beach. Out of ninety five people with cancer going back to 1989, forty-nine (52%) took part in sea connected activities.

Fourteen of the cancer group had outdoor jobs (15%) and twelve ate local fish or shell-fish regularly (thirteen per cent). Twenty per cent (20.7%) of the cancer sufferers were smokers, which is less than the twenty seven per cent average of smokers in the UK ('Action on Smoking' figures) or the 35 per cent of hospital cancer patients who are smokers.

The survey sponsors, Stop Hinkley, are currently campaigning against a new nuclear power station proposed for Hinkley and together with 'Parents Concerned About Hinkley' held an opinion poll in Burnham in January on the subject. Eighty three per cent of Burnham residents said they did not want another nuclear plant.

In a report from the DTI published in the New

- 11:00 to 1:30pm: Session 4: Final Session of Lay Epidemiology in small groups.
- 1:30 to 3:00pm: Lunch
- 3:00 to 4:30pm: Campaign Context and Strategy: Presentations on campaign background: "The Way Ahead": Campaign Ideas Brainstorm. A framework for a campaign strategy discussion
- 4:30 to 5:00pm: Tea and snacks.
- 5:00 to 7:30pm: Campaign Session –2: Small Groups interactions cum brainstorming on Toxics and Health campaign strategy with: ---- Surviving Radiation/Attacking UCIL-NPC----Pesticides and Health ---- Industrial Estates and Worker/ Community health---- Mining and community/worker health
- 7:30 pm onwards: Dinner
- 9:30 pm: Post Dinner Meetings in Small Groups.

28/7/2002

- 8:30am-10:30 am: Campaign Session-3: Back in the large forum: Sharing of small group learning of campaign strategy
- 10 am to 10:30:Tea & snacks
- 10:30 – 1:00 am: Campaign Session 4: Large Forum Campaign strategy discussion continues: "Common Objectives and Collective Action": Discussion on Draft Axn Plan of year-2 begins
- 1:30 –2:30pm: Lunch
- 2:30 –4:00pm: Axn plan and Roles and Responsibilities identified. Statement of Collective Concern read out. Budget and resource Raising discussed
- 4:00 - 4:15pm: Tea and Snakes!
- 4:15 to 4:45pm: Travel to Coles Park
- 4:45 to 6:30pm: Public activity... reaching out to Bangalore.

ANNEXURE 1

EMAIL CORRESPONDANCE ON UNIQUE HEALTH SURVEY IDEAS IN THE TOCHESSTWO DISCUSSION GROUP....

From: davey garland <thunderelf@yahoo.co.uk>
Subject: [DU-WATCH] Unique health survey implicates Hinkley Nuke power station
Date: 7/14/2002 12:18:17 AM
Unique health survey implicates Hinkley A group of committed parents has conducted a unique doorstep survey of its own community and discovered appalling levels of cancer just five miles from
Hinkley Point nuclear power station. A report analysing the responses of some 1,500 people shows cervical and kidney cancer at over five times the national average with four times the average leukaemia
diagnoses and double the national rate for breast

Scientist last week, the government has suggested compensating local communities for 'perceived disbenefits' of new nuclear build. Jim Duffy, the group's coordinator said, "We are certainly witnessing some severe disbenefits of living under a nuclear power station and the government should surely compensate these individuals and their families for shortening their lives. But a new power station must be completely off the agenda now. People prefer their health to any amount of money"

Jim is also concerned about the stance of local health officials. He had asked Somerset Health Authority at the start of the survey how many cases of leukaemia existed in Burnham and was told 'none' but the survey revealed four cases. He said, "Our distrust of the Health Authority cannot be overstated."

Dr Busby was recently shocked when, using the Data Protection Act, he uncovered internal health authority papers with Burnham cancer statistics. In an email, the health authority described a 'quick and dirty' study they had put together but had made a basic error leading to lower the apparent cancer risks. The population figures for the year 2000 were wrongly applied to a ten year study that ended in 1998. This according to Dr Busby falsely deflated the apparent cancer incidence due to the increase of both the general population and the elderly population giving a higher expectation of cancer.(2)"

He said, "The authorities now should meet with me and agree the terms of a study in which all parties can have confidence."

Dr Busby will announce the full findings of the survey and its implications in a public meeting at the Princess Hall in Burnham-on-Sea at 7.30pm on July 18th.

A demonstration will take place at 11am on the Saturdays either side of the public meeting on Burnham Beach to draw attention to health risks from the polluted shoreline.

Jim Duffy 01984 632109 M: 07968 975804 E: stophinkley@aol.com
Stop Hinkley Coordinator
Chris Busby 01970 639315 E: christo@cato5.demon.co.uk
Green Audit
Julie Gilfoyle 01278 794788 M: 07971 744372
Parents Concerned About Hinkley

Table 1: (correct on 11th July '02 in advance of the final report but subject to updating)
These preliminary results show cancer INCIDENCE not mortality. This gives a tighter correspondence to environmental causes and confirms the findings of local cancer mortality studies Dr Busby has undertaken over the past two years (1).

Cancer	*Findings*	*Nos expected*	*Relative Risk+*	*Significance**
Cancer incidence in a six year period from 1996-2001:				
Kidney cancer	*5 cases*	*1.26*	*3.96*	*poisson .01*
Cervical cancer	*3 cases*	*0.54*	*5.6*	*poisson .01*
Breast cancer	*16/17 cases*	*8.1*	*1.97 / 2.1*	*poisson .004*
Leukaemia	*4 cases*	*1.46*	*2.73*	*poisson .05*
Cancer incidence over four years: 1998-2001				
Kidney cancer	*5 cases*	*0.84*	*5.95*	*p .001*
Cervical cancer	*2 cases*	*0.36*	*5.6*	*p .01*
Breast cancer	*9 cases*	*5.4*	*1.7*	*p .08*
Leukaemia	*4 cases*	*0.96*	*4.09*	*p .02*

+ Relative risk or multiplier of national average, eg RR 5.6 means 5.6 times the national average or more accurately, times the expected number, weighted for age and other factors.
** Statistical significance is proportionally higher with a lower poisson factor, eg a poisson factor of .01 means 1 chance in 100 of this occurrence randomly. P .001 is one chance in a thousand.*
All the above figures are statistically significant.

Table 2:
Figures for All Cancer diagnoses: The 'doorstep survey' showed a reduction going back in time, probably due to the death of those diagnosed in earlier years or their commitment to in-patient health care. For this reason the study examines only the last six years in detail.

Year:	*2001*	*2000*	*1999*	*1998*	*1997*	*1996*	*1995*	*1994*	*1993*	*1992*	*1991*
Cases:	*15*	*12*	*8*	*8*	*10*						

7 6 4 2 4
3
1990 1989 1988 1987 1986 1996-1971
1 3 0 3 1
4

Expected cases per year: 11.

(1) Dr Chris Busby, Breast Cancer and Proximity to Hinkley Point Nuclear Power Station, April 2000. Green Audit, Aberystwyth.

(2) Call for fax copies of Health Authority internal email and regional press coverage.

€ 8A4.

The Community Health Environmental Survey Skillshare

(CHESS 2)

26-28th July, 2002.

The Background

C 8A 4.

Stone Crusher Creating Health Hazads and Environment Pollution in Dharmasala Tahasil Area of Jajpur District in Orissa, India,

REPORT AT A GLANCE FOR SEMINAR ORGANISED BY GREEN PEACE & CHESS AT A.S.F., HYDERABAD ON 03-01-2003

- 50 Black stone quarries where blasting is going on and Hundreds of stone crusher units in the area.
- Out of which 80% are under Dharmasala Tahasil area.
- Most affected villages and Crusher units around – 200.

AFFECTING HEALTH

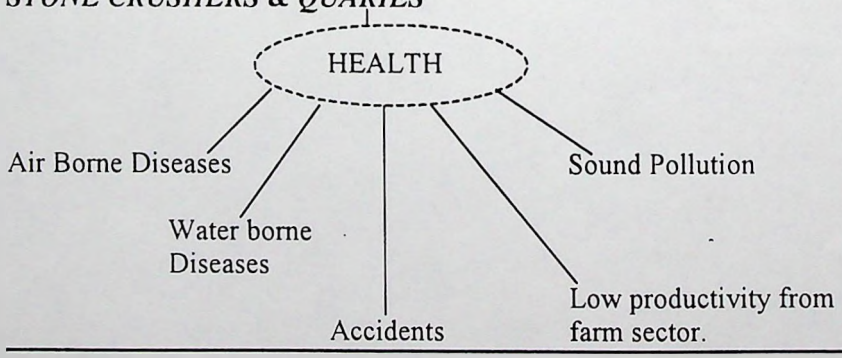
For mother and children & Older People.

Creating serious infectious diseases and people are suffering day by day.

MAN MADE DRAUGHT

Productivity of cultivable land is coming down day by day due to dust deposited on the land. In near future no production will come out and no solution for this - - -?

STONE CRUSHERS & QUARIES



Initiated by PREM in Association with Villages level sanghas and affected people.

Reported by – **Adv. R.C. Ray and Dr.P.K.Sahoo.**

PREM, At/Po.- Jaraka, 755050, Dist. – Jajpur, Orissa, India.

- **In the meanwhile a team of Green Peace Organization under the leadership of Manu Gopalan has visited and taken stock of the situation regarding the stone crusher units and granite quarries in Dharmasala and Badachana area on 21-12-2002.**

THE PREM, JARAKA'S CRUSHADE AGAINST STONE CRUSHER POLLUTIONS IN JAJPUR DISTRICT, ORISSA, INDIA

The magnitude of pollution emanating form stone crusher units has reached menacing height in Jajpur District. Most of the crusher units have been set up near the black stone quarries surrounded by villages and beside the N H 5 and Express high way. From **Chandikhole to Jarka beside the N H 5** and **Chandikhol to Duburi beside in express high way** one can see the cluster of stone crusher. Almost all the crusher units have been set up with the only intention of profit making at any cost sacrificing the environment protection act 1986, the norms stipulated by the state pollution control board and labour and employment department. These crusher units not only makes dust rain on the villages and other habitat ional areas making the total atmosphere of the locality hazy but also engender death, diseases like T. B, ASTHMA, COLD, and skin disease and crop loss. These units make fierce air, water, soil and sound pollution affecting human beings, animals and plants. Of the 5 hundred crusher units in Jajpur district, 80% these crusher units are under Dharmasala Tahsil and the rest 20% are in Darpan, Sukinda and Jajpur Tahasil.

(A) MOST AFFECTED VILLAGES DUE TO STONE CRUSHER UNITS

There are 28 crusher units set up beside N H 5 in Mouja Rathia surrounded by the villages Rathia , Jalsukha, Batmanda,Tikara sahi,Sankari Diha, Avaya pur, Utarasasana, Dakhina Sasana, Tara pur etc.

Air, water, soil and sound pollution have affected the life and property. Agriculture has been affected seriously. Almost all the children of the locality have been laid up with cold and cough. Five/six people have been affected by T.B. The dust has polluted the water of the wells and ponds. Approximately 200 acres of paddy field have been affected continuously and yielded less *which may cause manmade draught and which has no solution.*

Ten crusher units between Chandikhol to Rathia beside NH. 5 affecting the villages of Sarai, Sundaria of Jaraka G.P., Neulapur, Gopalpur and Sidipur of Neulapur G.P., Kadala of Haridaspur G.P. The effect of the pollution is same as above. Fifty acres of agricultural land have been affected seriously.

From Chandikhol to Mandia beside the express highway there are more than 150 crusher unit affecting village of Arhua, Kolha Bhadanga and Nanpur or Arhua G.P., Haridashpur, sribandhpur, Kadala of Haridaspur G.P., Pakhar, Mandia, Biribati, Solei, Telore, Nakua, etc., villages of Pakhar G.P. Two from the village Mandia, fifteen from the village Nanpur have been died of T.B. Most of the people affected by T.B., Asthma, U.R.T.I., cold and cough. Two hundred acres of agricultural land badly affected.

Thirty crusher units near Bajabati Hill with two mega crusher units by Agrawall and L&T Company affect Bajabati, Kanpur, Antamalia, Khunta, Muraripur, Thanual, Immamnagar & Gangadharpur affected. Two hundred acres of agriculture land water air polluted badly including infants and school going children.

One hundred crusher unit from Mandia to Baghua Hill beside the express highway affecting mahisara, Daulatapur of Mahisara G.P. Bhuban, Badamadhupur, Chadeidhara, Barada, Ragadiposi of Gadamadhupur, baulamar, Baramana, Ramachandrapur of Boulamala G.P., Samasunderpur, Balisahi, Anjira, Chakradharpur & Bounsadola of Chakradharpur G.P. In the village Bounsadhal four people have been died of T.B. and many others are affected. Air water highly polluted including house damaged by *blasting*.

(B) Agriculture predominately paddy is badly affected due to dust rain on the paddy field and also during flowering season the dust particles remaining inside make rice inedible. Families' depending solely on agriculture suffer badly.

(C) Fatal diseases like T.B. Asthama and other U.R.T.I. are growing among the children mothers and older people in the area including the poor silent observers in the area.

(D) Labourers employed by the crusher units are almost all from the district of Keonjhar, Mayorbhanja & Bhadrak. Labourers are preferred from distant places to be exploited by employing day and night for more than 12 hours in inhuman and unhygienic condition without giving heed to labour laws and norms. Child labourers are also seen employed. Filthy shades in the vicinity of the crusher units are provided to those innocent stocks. Fifty percent of labour force are affected by U.R.T.I., G.I.T.I. and its allied diseases and are inclemently driven back to their homes with their on certain living condition. Crusher units neither use sprinklers nor other pollution control measures to arrest dust as a result the labourers, their children are seen bathed in dust. Fifty percent of the labour force being women are also affected by immoral trafficking.

(E) In these crusher concentrated areas wine and other narcotic business is growing by leaps and bounds which affect the social relations and moral standards.

(F) The people rights environmental movement **(PREM)** is the one and only organization in Jajpur District which have been tirelessly endeavoring, awaring and fighting against these crusher units in the district under the leadership of **Adv. Ramachandra Ray**, the **President of the organization**.

From the year 1990 the members of the organizations have been looking into affected villages and drawing the attention of both the administration and the department of environment and have met oddities and hardships created by the crusher owners and their goons. Delegates consisting of the members of **PREM** and other important personalities have met Chief Ministers, Environment Ministers successfully and also written to Governors and Chief Justice of Orissa High Court. The *marathan effords yielded no results.* Seminars, public meetings, dharanas, road blockade have been variously organized by PREM, Jaraka. High dignitaries like former Justice Lingaraj Rath and M.L.A. Dharmasala have also joined our moment in one occasion by attending the public meeting organized in the premises of Dharmasala Mahavidalaya.

Ultimately the President of **PREM**, Adv. Ray sought the intervention of the Hon'ble Lokpal and Hon'ble Lokpal in his historic order in Lokpal case No. 35G/2000 directed Collector, Jajpur to take action against the illegal crusher units. But the district Administration defied the order of the Hon'ble Lokpal. Finding no way out the president, **PREM** also filed a PIL bearing No. OJC 5749/2000 in Orissa High Court under the pioneer ship of Adovate Ray a number of PILs also have been filed in Orissa High Court to save the affected people and take action against illegal and unauthorized crusher units. Justice delayed is much felt vis-à-vis our knocking at the door Orissa High Court. In the meanwhile crusher owners have also filed a number of cases in Orissa High Court and stayed any anticipated action by the Government.

An appeal is made to *OXFAM, Orissa* on behalf of the members of the **PREM**, Jaraka to join us in our noble tasks and responsibility to save life and laws – the endangered life and law due to illegal and polluting stone crusher units in Jajpur District of Orissa State.

AN APPEAL

An appeal to all intellectuals, funding agencies, local bodies, individuals, environmentalists to be a part of a burden till date with us------- towards a pollution free society.

PREM
At/po- Jaraka-755050
Dist-Jajpur
Orissa, India
Phone. 06725- 273006, 273448

Adv. R.C.Ray
President

DR. P. K. SAHOO
Secretary

Initiated by Prem in association with Village level organizations and community people.

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More than debates

My heartiest congratulations to the *Down To Earth* (DTE) team that brought up the important issue of the 'War over city lakes' (June 30, 2002; Vol 11, No 3) to the fore. Being a lawyer by profession, I can appreciate how right interpretation and administration of law is absolutely crucial in addressing this issue.

I believe that encroachment of water bodies is at the heart of the problem in Ahmedabad. While the story in DTE successfully brings out this point in very clear terms, some more words can be said about a phenomenon that is common to rural areas as well. It is imperative that this question is addressed in its entirety. This was brought home strongly when I had occasion to speak to villagers from Chitrakoot, who are steadfastly opposing the district administration's order to clear constructions over 'water bodies'.

While you rightly point out that "we need to devise strategies for each specific water body", it should not preclude efforts to arrive at an agreed policy position on the larger question of encroachment of natural resources, including water bodies. I also feel that policy framers and lawmakers should not see the Ahmedabad case as an overarching conservationists vs builders, or even an environment vs development issue.

Here, taking a cue from what you said, we need specific approaches for each water body that requires protection. In fact the High Court of Allahabad, in one of its decisions last year (the decision is now overruled by the Supreme Court), suggested that water bodies which have been irreversibly altered by duly authorised constructions, by changes in land use under lawfully given permits, and by time, could be seen differently from other occupied water bodies.

VIDEH UPADHYAY
Partner, Enviro Legal Defence Firm
NOIDA, Uttar Pradesh

Ignorance or misinformation?

I found your article on endosulfan comprehensive and well-investigated. Since you mentioned the visit of S Ganesan, member of the pesticides association, to Community Health Cell (CHC), I would like to add something more. The conversation with Ganesan was basically around the industries' concern about 'misinformed activists' campaign against endosulfan, which they say is a 'relatively safe pesticide alternative' today. As a health training and policy action group committed to community health concerns and action initiatives, I informed him that we were neither anti-industry nor anti-pesticide per se, but pro people's health. Our concerns and interests are around any evidence of dangers to community health. Also, as an occupational health consultant, I have been interested in this issue ever since I conducted an extensive study for the Indian Council for Medical Research (ICMR) on occupational health hazards of tea plantation workers, including pesticide hazards. I requested Ganesan to provide us with all the information the association/industry had about endosulfan, which he promptly gave me in a note.

Over the last few months two of our younger team members, Anur Praveen and Rajkumar Natarajan, have done a detailed literature review, which revealed either the ignorance of the industry or a deliberate misinformation campaign by them.

At the end of the last month, we facilitated a very interesting three-day 'community health environment skill share'. Over 100 professionals and activists got together from all over the country to share their concerns about pesticides, mines, industrial hazards and other environmental hazards, and explore ways and means of studying them and collecting health evidence. We had the unique privilege of a presentation by H N Saiyed, director of the National Institute of Occupational Health (NIOH), who summarised the findings of their study on endosulfan in Kasaragod. They have submitted their findings to the National Human Rights Commission (NHRC). The findings not only substantiate the literature review we have compiled in CHC, but is also a sound,

PICK OF THE POSTBAG

Why this farce?

With regard to in-use vehicle emission inspection and the issue of 'pollution under control' certificates, the government and other concerned agencies have been ignoring the central issues:

- Is every vehicle being inspected at the specified frequency?
- Are the equipments calibrated? What is the quality of emission measurement?
- Who is ensuring the above two?
- What happens to failed vehicles? How it is ensured that these vehicles come for re-inspection after necessary repairs? Is it left to chance apprehension of offenders? What is the role of the transport department in this regard?

In the absence of any mechanism to ensure the above, the whole exercise is farcical, and ineffective in controlling pollution.

For a number of years, many experts and agencies have advocated establishment of centralised inspection centres, where most of these issues can be addressed.

If the whole exercise were done at a few central inspection centres, the inspection could be better supervised and the programme implemented in more meaningful ways.

There is no point in specifying new standards every other day when implementation continues to be shoddy. Why is that the government cannot establish these centres? Is the cost so huge that the Delhi government will collapse under the burden?

A number of the present procedures appear to be, at best, gimmicks. Especially practices like photographing number plates under inspection with hidden cameras. Why hidden cameras? Why not openly? At any rate, activity at the front of the vehicle is not of any import.

The question is: what is happening at the tailpipe end of the vehicle? How many

scientific evidence-based contribution to the controversy. As a contribution to people's science, I think *Down To Earth* should formally write to NHRC and NIOH (on behalf of your readers and the affected victims of the endosulfan disaster) to release this report, and make it a public document to support the right to information.

RAVI NARAYAN
Community Health Cell Advisor
CHC, Bangalore

Problems and solutions

I am a resident of MCD Colony in Delhi. This colony borders a marshy area, which in the past has acted as a valuable part of Delhi's ecology. In times of monsoons, it acts as a useful water run-off in case the water level in the Yamuna crosses the danger mark. The marsh also contains a diversity of birds, which are slowly declining in number.

Over the years, land-filling operations had reduced the size of the marsh, though not to any considerable extent. Lately, however, the land-filling operations have started again. This time, fly ash is being deposited barely 50 metres away from our colony. No precautions are being taken to cover it. As a result, even if the lightest of winds starts blowing, our house is filled with fly ash. It is a veritable nightmare

As you know well, fly ash chokes the lungs and depending on the duration of the winds, we are hard-pressed to breathe. It enters through closed doors and windows, and for the past six months, has made life hell for the residents of the colony. I subscribe to *Down To Earth* and have followed your stories with interest and admiration. I now request you to come to the aid of the residents of our colony. This operation endangers not only our well-being but that of all residents in Delhi.

ANIRUDH BURMAN
a_burman@rediffmail.com

There have been news reports stating that production of fly ash in our country is approximately 100 million tonnes per year. If this were better utilised, it could actually work to protect the environment. Cement companies who use fly ash do so to suit their convenience, usually only because they are close to power stations. A suitable form of subsidising transport would make it available to cement factories far away from power stations. Also, building codes should clearly specify that only fly ash is to be used for road making and in the making of bricks until all of supplies of fly ash used. Clay should not be used because it removes valuable soil required for agriculture. It should also be made mandatory to use fuel-efficient kilns, such as those used in China, the design of which is being popularised by Development Alternatives.

G SHANKAR RANGANATHAN
gs.ranganathan@ho.ionxchng.co.in

Cool down

It is very difficult to trace the origins of the Earth, but based on literature, one could say that the Earth originated about 4,600 million years ago. The Earth has taken all these years to attain a thickness of about 100 km of crust layer, about 1,900 km of mantle layer and about 3,000 km of core layer. Magma from the core layer finds its path to the surface of the earth through weak joints in the substrata (beds) of the mantle and crust layers. This process causes the material surrounding the region of magma eruption in the mantle region to resettle. This further causes the crust layer to adjust itself. The adjustment causes a movement that is felt on the surface of the Earth as an earthquake.

Annually, there are about 800–1,000 earthquakes in various parts of the world. As of today, the Pacific Ocean is one of the most earthquake-prone regions in the world. This region, in fact, is also referred to as the 'ring of fire'. Going by this logic, one could arrive at an approximation of the day when there will be no more earthquakes. Considering the time that it has take to form the present thickness of the upper crust and mantle region, the time

vehicles are coming in for inspection? How many of them get certificates without an inspection? How many vehicles are being tested correctly?

These are the questions that transport and environment control agencies should ask themselves. Asking questions would be, one hopes, a beginning of sorts.

B P PUNDIR
pundir@iitk.ac.in

Quick note

We are one of the largest manufacturers of earth moving machinery, such as bulldozers, excavators, mining shovels, walking draglines, to name a few. So far, we have been using an emulsion type water-soluble coolant in our machine tools, like lathes drilling machines, milling machines etc. This has to be replaced with fresh coolant once a fortnight since it gets contaminated with metal powder, dust and other shop-floor pollutants. If the machine is not used for more than 50 hours, the coolant disintegrates and gets infected with bacteria due to stagnation. At present, the used coolant is being thrown into the large open fields where our products are being tested. We have tried hard, though without success, to get information on how to dispose of this coolant in a better, more environment-friendly manner. Is there a method that is more practical and economical?

I M PRABHU KUMAR
Bharat Earth Movers Limited
Kolar Gold Fields, Karnataka

We publish this letter in the hope that our readers might have some information on this matter.

E 8A-7.

CHESS-II Prep-work Discussion Paper-IV

Date: 25-28th July, 2002. Venue: Vishar, Bangalore.

A. BACKGROUND:

A polluted environment will manifest itself in the form of health disorders amongst human and other living populations inhabiting it.

Based on numerous cases around the country, common sense evaluation clearly confirms that industrial pollution has damaged community health. However, the specific nature of the damage or its extent remains unknown. As a result, community health has hardly influenced pollution policy. The indications that this is the case is evident:

1.Pollution legislation aims at controlling pollution rather than preventing it.

2.Pollution legislation merely prescribes norms that legalise pollution.

3.What is legal is not healthy. Pollution norms are prescribed based on an assumption of assimilative capacity of nature rather than on facts that point to the cumulative nature of the most deadly kinds of pollutants and their risks to community health.

4.Polluters remain unpunished for their pollution and effects on community health.

Importance of Community Health Surveys:

Citizens and community groups need to be able to identify environmentally-caused health disorders, and the sources of environmental disturbance(s) that cause such disorders. This is important for several reasons:

1.)*Ensuring that the "Polluter Pays":* The Polluter Pays principle is important not merely as a deterrent for further or future pollution, but also in the context of recovering the ecological debt owed to the communities of living beings and their future generations. Ecological debt goes beyond the fiscal and requires a deep-rooted sense of apology by the polluter for the damage caused by its actions.

2. Mobilising the Community: Often health disorders within a community are seen at a family level, with people blaming the compromised health of their family members on fate or accident. Many of the subtler effects - learning disorders, immune system depression, reproductive or gynecological anomalies - are noticeable as trends only when seen at a community level. Mapping the health of a community brings home the fact that the fate of the community as a whole is linked to its environment.

3. Preventing Future Harm: Armed with the knowledge that certain kinds of industries and pollution can cause community wide health effects, communities can play a more active and informed role in deciding the course of their communities' development. Combined with an operational understanding of the Precautionary Principle, such knowledge can help in preventing the setting up of polluting industries.

4. Countering Government/Industry: Community health surveys need not be conclusive in establishing cause-effect relationship between environmental disturbance and health disorders. They need to sufficiently appeal to the common sense of the community members and the public to be able to challenge the baseless assertions by Government/industry that a community's ailments have nothing to do with the pollution they are subject to. Health surveys can help reverse the burden of proof, with communities demanding industries and governments to establish beyond doubt that their polluting activities/industries are not related to the community's health problems, or will not cause health disorders.

5. Health Care Needs: Health surveys also allows for better understanding of the health care needs of communities living in environmentally disturbed areas. Such an understanding is crucial to designing the health care interventions necessary for the community members.

Historical Context:

Keeping the above in mind, a small group of individuals and organizations met in Bangalore from the 13th to the 17th of August,2001. There has been some meaningful activity in the hotspots as a result of that interaction. We have had our fair share of problems too. But all of it has helped us to improve our understanding of how to handle the tense and desperate situations we encounter as we go about performing health surveys.

Ever since there has been a constant urge for us to get back together evolving a clear framework for action in the various pollution/radiation hotspots we work in.

B. AIM:

RN 3/7

b) their subsequent effective campaign application

C. OBJECTIVES:

To create a multidisciplinary resource base of medical practitioners, community activists and toxicologists capable of conducting community health surveys in communities subject to industrial and environmental pollution;

To promote interaction between community activists and community health experts to facilitate a discussion aimed at understanding the limitations and strengths of community health surveys;

To understand the role of community health surveys in campaigns against industrial pollution.

D. THE CHESS-II SKILLSHARE (A PROPOSED PLAN)

The skillshare would discuss *"Toxics/Radiation and Health"* issues along two streams of thought.

I. "Lay Epidemiology" in practise, in INDIA with campaign instances!

1. Pollution & Community Health

2. Design and Implementation of Health Surveys - Resource Implications (costs, personnel, time etc)

II. Campaign Stategy of Regional campaigns and a potential National campaign

1. Understanding the strengths and limitations of community health surveys

2. Using Community Health Surveys for campaigning.

3. Resources and resource sharing opportunities.

4. Case Studies

5. Action plans for regional and national work

6. Roles and Responsibilities

Participants:
Community activists, medical practitioners from affected communities, occupational health doctors/activists, community health professionals/ activists, toxicologists, lawyers, workers, trade-unions, consumer groups, farmers, farmer-cbo's and researchers.

PROPOSED AGENDA:

DAY ONE: 25/7/2002:
9 am- 10am: Registration and Tea.
10am to 1:30 pm: Sharing the work of individuals and groups and expectations out of the skillshare.
1:30 to 3:00pm: Lunch
3:00 to 5:00pm: Lay Epidemiology-one day skillshare-
session 1:
Small intro presentations:
1) Community Health Cell
2) Elizabeth Guillette
3) (Anyone else?)
5:00 to 5:30 pm Tea
5:30 to 7:30pm: Lay Epidemiology in 3 small-groups-workshop mode: Session 2
8:00pm: Cultural Evening + Welcome Dinner.

DAY TWO: 26/7/2002:
9am-10:30am: Lay Epidemiology: Session 3: in small groups
10:30-11:00am: Tea
11:00 to 1:30pm: Final Session of Lay Epidemiology in small groups
1:30 to 3:00pm: Lunch
3:00 to 4:30pm:
Campaign Context and Strategy +
"The Way Ahead": Campaign Ideas Presentations
4:30 to 5:00pm: Tea and snacks.
5:00 to 7:30pm: Campaign Session -2:
Small Groups interactions cum brainstorming on Toxics and Health campaign strategy with:
---- Surviving Radiation/Attacking UCIL-NPC

---- Pesticides and Health
---- Legal action to address Corporate Liability?
---- Womens' Health issues in hotspots
---- A Consumer Campaign (???)
---- Worker Health Remediation/Liability
---- Community Health Surveys
---- Media as an instrument of the Campaign.
---- Water and Public Health
---- and any other issues people want to work on..

7:30 pm onwards: Theatre in the WELL and songs with food!

DAY THREE:27/7/2002
9 am-10:30 am: Campaign Session-3: Work in Small groups continue...
10:30-11:00 am: Tea
11:00 - 1:30 am: Campaign Session 4: Small groups wind up their day-long strategy discussion
1:30 -3:00pm: Lunch
3:00 - 5:00pm: Small groups come in the larger forum.
Sharing of insights into the national campaigns.
5:00 - 5:30pm: Tea and Snacks
5:30 to 7:30pm:Group to group Meetings/consultations
7:30 to 8:30pm:Contemporary Dance in the Well!
Songs and Food!

DAY FOUR: 28/7/2002
9 am-10:30 am:
"Common Objectives and Collective Action"
10:30-11:00 am: Tea
11:00 - 1:30 am:
Action Plan for Year 2 of CHESS: Roles
1:30 -2:30pm: Lunch
2:30 - 3:30 pm: Statement of Collective Concern
3:30 - 4:00 pm:
Discussion on Budget and Resource-raising
4:00- 4:30 pm:
Individuals and Organisations taking key responsibilities.
4:30- 5:00 pm: Tea and Snacks
5:00 to 5:30pm: Travel to the City Centre.
5:30 to 7:00 pm: Launch of Raghu Rai's Exhibition on Bhopal: Public Activity and Press Briefing.
(Release the statement of collective concern)

Survivors,Community-based activists and individuals participating sorted according to base location and put in alphabetical order(being updated):

I Bangalore:

1.AS Mohammed (SJANMS)*
AS Mohammed is the Asst. Professor of statistics and demography in the Department of Community-Medicine, St. John's Medical College and has been involved in numerous studies and reports on health care and evaluation. He is a society member of CHC.
Address: Department of Community Health, St. John's Medical College, Bangalore- 560 034
Phone: 080-2065043
Email: as.stmc@vsnl.com

2.Gururaj Dudhya (ZIBD)
budhyag@hotmail.com
Mobile:0 9844069634
Phone: 080-3315656/3462032

3.Dr. Girish Rao*
Dr. Girish Rao is an Associate Professor of Community Medicine in M.S. Ramaiah Medical College, Bangalore with a longstanding interest in all aspects of hospital waste management. He is also an Associate of CHC.
Address: Faculty of Community Medicine, M.S. Ramaiah College, MSRIT Post, Bangalore- 560 054
Phone: 080-3600360
Email: girishrao@hotmail.com

4.Mohan*, Trade Union Movement Researcher, Bangalore.

5.Nagar Bobby*
Institute of Socio Economic Change(has been working on development issues in 124 villages for 13 years now)
Bangalore. Ph:080-3217083

6.Dr. Praveen Anur is an intern from Kempegouda Institute of Medical Sciences, Bangalore who was a special volunteer with CHC during his Community Medicine posting and was primarily responsible for all communications and facilitation of organisational dimensions of CHESS 1.
Email: anurpraveen@hotmail.com

7.Dr. Rajan Patil is an epidemiologist and is presently a Research/ Training Assistant in CHC with a special interest in vector bourne diseases. He has been involved with creating an interactive science teaching module on mosquitoes and their control.
Email: rajanpatil@yahoo.com

8.Dr. Ravi Narayan is the Community Health Advisor of CHC with professional interest and training in public health, industrial health and preventive and social medicine. Earlier as an Associate Professor of Community Health at St. John's Medical College he worked on occupational hazards of the tea industry and the health effects of agricultural development.
Email: [illegible]

9.Sachin D'souza

Sachin is a final year medical student at St. John's Medical College, Bangalore
Address: 203-F, Ranka Plaza, 117, Wheeler Road, Frazer Town, Bangalore- 560 005
Phone: 080-5090150
Email: sustainjustice@postmark.net

10.Dr. Tholma Narayan is the present coordinator of CHC. She is an epidemiologist with a doctorate in public health policy. She has been involved as a resource person for studies on the Bhopal health disaster and is currently a member of the Karnataka Government Task Force on Health and Family Welfare.
Email: tnarayan@vsnl.com

11. DR. Unnikrishnan PV.
OXFAM

12.Dr. T. Venkatesh
Dr. Venkatesh is the Professor of Biochemistry at St. John's Medical College and the Director of 'Project Lead Free' of the George Foundation. He is also the head of the National Referral Centre for Lead Poisoning in India.
Address: Department of Biochemistry and Biophysics, St. John's Medical College, Bangalore- 560 034
Phone: 080-5532146/ 2065050
Telefax: 080-6640293
Email: vanky_tv@hotmail.com

13. Viswambhar Pati* / Prof. Sanjay Biswas*
Indian Scientists against Nuclear Weapons, ISANW, Bangalore.

II BHOPAL:
14. Nishant:
As a community researcher Nishant has worked exhaustively in Bhopal doing a health survey of children born to exposed parents as opposed to unexposed ones to the gas tragedy.

15. Satinath Sarangi:
Sambhavna,
B 2 - 302, Sheetal Nagar,
Berasia Road, Bhopal: 462 022
An M Tech in Metallurgical Engineering, Satinath came to Bhopal a day after the disaster and has been involved with relief, rehabilitation and issues of justice for the Bhopal victims since then. He is one of the Founder Members of the Bhopal Group for Information and Action that carries out documentation, research and publications. He is also actively involved with legal actions as well as national and international campaigns.
Email:sambhavna@vsnl.com

III Bhubaneshwar:
16. Manas Jena
OMAPAN
#0674-556797
devsni@rediffmail.com

IV Chennai:

17.Adv.T Mohan* practices Environmental Law in Chennai.

18.Nityanand Jayaraman
Nityanand is an independent journalist working on toxic issues for over 5 years.
Address: 210, 6th Main, 6th Cross, Rajarajeshwari Nagar, Bangalore-560 098

Phone: 080-8601033
E mail: idp68@vsnl.com

19.Rajesh Rangarajan, Toxics Link Chennai, Chennai. tlchennai@vsnl.net

V Delhi:
20.Achin Vanaik
Campaign for Nuclear Disarmament and Peace (CNDP)

21.Ananthapadmanabhan
Ananth is the Executive Director of Greenpeace India. He had been teaching school-children for more than a decade. He also spent a few years in the Environment Division of a leading finantial institution.
Email: ananth@dialb.greenpeace.org

22. Dr.Arun Mitra*
Indian Doctors for Peace and Democracy (IDPD)
The Indian affiliate of the International Physicians for Prevention of Nuclear War idpd2001@yahoo.com

23.Adv.Ashok Aggarwal*

24.Bejon Mishra, Consumer Voice, New Delhi

25.Bharati Chaturvedi, coordinator of Chintan Environmental Research and Action Group.

26.Bidhan Chandra Singh

Sidhan is a trainee campaigner with Greenpeace India. Email: deogharpidgu@hotmail.com

27.Divya Raghunandan
Divya is a trainee campaigner with Greenpeace India.
Email: i_divya@hotmail.com,divya.raghunandan@dialb.greenpeace.org

28.J John*
John is the Director of Center for Environmental Communications-CEC, Delhi.

29. Dr. IK Joshi*
San Asbestos Network India
ikjoshi@vsnl.com

30.Madhumita Dutta, Toxics Link Delhi, New Delhi. mdutta@vsnl.com

31.Manu Gopalan
Manu is a toxics campaigner with Greenpeace India.
Email: manu.gopalan@dialb.greenpeace.org

32. Nidhi Jamwal/ Sunita Narain*
The Centre for Science and Environment,41,
Tughlakabad Institutional Area, New Delhi-110062.
Ph: 011-6081110,011-6083699,fax:011-6035879
email:cse@sdalt.ernet.in

33.Nirmala Karunan
Nirmala is the Administration Manager of Greenpeace in India.
Email: nirmala.karunan@dialb.greenpeace.org

34. Praful Bidwai
Campaign for Nuclear Disarmament and Peace CNDP)

35. PK Ganguly*
Secretary of the Center for Indian Trade Unions, CITU.
Email: citu@vsnl.com

36. Rahul Ram*
Toxicologist/Lead Singer- Indian Ocean.

37. Ravi Agarwal
Environmentalist and Director, Srishti, New Delhi
Email: srishtidel@vsnl.net.in

38.Sanjeev Gopal
Sanjeev is currently a trainee campaigner with Greenpeace India.
Email: sanjeev.gopal@dialb.greenpeace.org

39.Dr SD Seth*
AIIMS National Poison Information Cell.

Ph: off:011-6512880;hom:011-6893282;fax:011-6859391

VI Doddalapur:
40. Dayanand Gowda
A Youth group trying to respond / protest against Blore mysore Infrastucture corridor project. They have been active against cutting trees; they have also performed a cycle yatra. Fighting pollution due to the Goggo Factory in Doddebalapur, near Bangalore, Karnataka.
Janadhwani Yuva Vedike, Opp. Masjid Kumbarpet,
Doddebalapur-561203
#080-7626450-r

41. Prakash R.
Fighting pollution due to the Goggo Factory. Prakash is from the affected village near Gogo factory; a village panchayat member
Doddebalapur, near Bangalore, Karnataka.
Village Aradeshhalli, Doddebalappur
080-8161751-r

VII Edayar:
42. TM Saimuddeen
Fighting pollution due to Binani Zinc's Jarosite Pond in Edayar, Kerala
Thuttangil House, Edayar # 0484 540845.

43. Salim VA*
Fighting pollution due to Binani Zinc's Jarosite Pond in Edayar, Kerala
Vallarpadi, Binanipuram(PO), Edayar, Ernakulam,-6835021
0484-555592

VIII Eloor:
44.VO Jose, Jose was working in Cochin spreading awareness about Road safety and First-Aid tips with Ernakulam Rural Action Force. Now he is an active volunteer of Greenpeace-India. Involved in mobilizing the local community using education material and films from the Greenpeace library. He has also been instrumental in environmental monitoring of the river Periyar.

45.VV Purushan, Purushan is the community leader of Periyar Malinaekarana Virudha Samithi, a community based organization involved in pollution prevention through direct actions in Eloor, the largest industrial estate in Kerala.

46.Adv.Daisy Thampi, practices Environmental Law in Kerala.
Email:dait8@yahoo.com

IX Gudur:
47. Gangi reddy. V
Rural Reconstruction and Development Society
Sydapuram 524407
Nellore Dist. (A.P)
#08611-270946

X Gujarat:

48.Anand Mazgaonkar* 49.Michael Mazgaonkar*50 Rohit Prajapati* 51.Swati Desai*s work involves trying to mobilize affected communities along a 200km stretch from Vapi to Mehsana in Gujarat on issues of ground and surface water contamination, hazardous solid waste, air pollution, health effects and TNCs. pss@narmada.net.in
Paryavaran Suraksha Samiti,PSS, Gujarat. pss@narmada.net.in

XI Navihar Polyfibres
52. Mr. Hiremath
Samaj Parivartan Samudaya
sr_hiremath@hotmail.com
sr_hiremath@rediffmail.com
Has been working on the issue of industrial pollution since a decade

53. Dr. S.L. PAWAR
0836-86742
shivalp@hotmail.com

XII Hyderabad:
54. A . Kishan Rao
President
Patancheru Anti Pollution Committee
Yashodhara hospital
12-5, srinagar colony, Patancheru-502319,Medak Dist. (A.P.)
Local doctor at patancheru , has been involved in health survey around the area

55. Narasimha Reddy
Executive director
Centre for Resource Education
Hyderabad
email: groind@hd2.dot.net.in

56. Prof. K. Purusottam Reddy
President
Osmania university teachers association
#7616115
kumbhamar@rediffmail.com
activist and campaigner has done phd on related issue (toxics)

XIII Jadugoda:
54. Ghanshyam Birulee*
Jharkhandis Organisation Against Radiation (JOAR)
In: -(06e7) 730009

55. Sourendra Gadekar*,Sanghamitra Gadekar*
Anumukti
anumukti@gmx.net

XIV Kaiga-Bangalore:
56.Vishnu Kamath, Citizens for Alternatives to Nuclear energy (CANE), Bangalore.

XV Kodaikanal:
57.Daniel Francis* is a machine orperator in the Mercury Thermometer Plant of Hindustan Lever Ltd. in Kodaikanal.

58.Kanan*, Palani Hills Conservation Council, Kodaikanal.
Email: kanan@vsnl.com

59.S.A. Mahindrababu* and 16 K. Gopalakrishnan* are members of the Ex Mercury Employees Association and are fighting for cleanup of the mercury and better compensation for the workers in Kodai.

60.Navroz Mody
Toxics Campaigner of Greenpeace fighting Mercury Pollution in Kodaikanal and PVC in Cudallore and Meerut.
Email: navroz.mody@dialb.greenpeace.org

XVI Mangalore:

61. Rita Naronha*
Roshini Nilaya School of Social Work
Mangalore-575002
262421(R)
swsroshni@vasnet.com
Rita is teaching Social Work at Roshni Nilaya School of Social work, Mangalore. She has conducted a Community Medicine Conference recently and also coordinated a preliminary health survey in the region.

62.Sylvester m Dsouza
Activist , campaigner, mobiliser presently working with Tide
495046 @ 434803 (o)
tide@vsnl.com

63.Upendra Hosbet
Runs a computer institute, actively working on the issue of environment since a decade. He says that they are against any Mega projects . has organised protests against Cogentrix
#478499/478488
upendra_hosbet@hotmail.com

XVII Mumbai:
64.Deepika D'souza, Coordinator, Human rights law network.

65.Dr. Murlidhar V* is a Mumbai based doctor with experience and interest in community health surveys and environmental health issues.
E mail: murlidharv@vsnl.com

66.Dr. Veena Murlidhar* is a medical officer with Navi Mumbai Municipal Corporation. Her work involves control/ surveillance of epidemic diseases and campaigns such as Polio Eradication.
Email: murlidharv@vsnl.com

67.Vijay Kanhere* is a labour activist who has worked for the compensation of workers in industry.
Email: sujvij@vsnl.com

XVIII Mysore:
68.Dr. Narendra Babu
0945226678

69 Dr. Venkatesh Murthy
srisrikar@rediffmail.com
local doctors running their own clinic and nursing home at bhadravati (mysore paper and pulp mill) . Also involved in a study related tohealth impact in kudremukh mining area

70.Verghese Cleatas
Project Director
Vikasana
An organisation working on the issue of environment . they are closely working with th community around tarikere (mysore paper and pulp industry); mainly focussing on awareness in the locality
P.B. No. 23
Tarakere-577228
Chikmangalore; Karnataka
0826-422500
422570/422739
vikasana_nyo@sify.com

XIX Orissa:
71. Mahalakshmi Parthasarathy is working with mining struggle groups. She is also involved with legal and media advocacy and information documentation.
Email: pmahalakshmi@yahoo.com

72.Xavier Dias*/ 33.Ravi Rebbapragada*, Mines, Minerals and People
Email: mmmorth@vsnl.net

XX Philippines:
73. Dr. Romeo Quijano*,
Pesticide Action Network- Asia Pacific

XXI Raichur:
74. Somshekhar
Samuha
+08536-666213/14
2 more persons from raichur , depends upon how they call a meeting and what comes out of it. I will be calling them ; mainly representative of various group in Raichur

XXII Thiruvananthapuram:
75.Jayakumar C. is the coordinator of Thanal Conservation Action and Information Network. thanal@vsnl.com

76.Rajasree V.V. is involved in Thanal's activities on pollution and toxicity and is specifically working on hospital waste management. thanal@vsnl.com

77.Sridhar R. is involved in campaigns against industrial pollution in Eloor and Mavoor in Kerala. He

Newsprint and pulp industries. thanal@vsnl.com

78.Dr. Sukanya, Achyutha Menon Center for Public Health, Trivandrum.

79.Usha S. is involved in environmental education among students and studies and campaigns among farming communities on chemicals in agriculture. thanal@vsnl.com

XXIII Vellore:

80.Dr.Rakhal Gaitonde and Dr.Subhasri Gaitonde
Dr. Rakhal is doing his post graduation in Community Medicine in CMC, Vellore. He has a special interest in peoples movements and using epidemiological skills in activism. Dr.Subhashri is an obstretician and gynaecologist in CMC, Vellore.
Address: 636-B, PG Quarters, CMAD, Bagayam, Vellore
Phone: 0416-260988
Email: subharakhal@yahoo.com

XXIV Warangal:

81/82. Mr. Narasimha reddy' will be inviting two persons working on the issue of pesticides

82-105 Any person you feel may be important to invite?
(Biogan Gnamora Singh is traveling all the hotspots inviting community persons and community-based campaigners for the meeting)

LIST OF PARTICIPATING ORGANISATIONS

Arranged in alphabetical order(a proposal)

1. AIIMS National Poison Information Cell.
In: Dr SD Seth.
Ph: off:011-6512680;hom:011-6593282;fax:011-6859391

2. Alternative Law Forum, Infantry Road, Bangalore.
Represented by Chitra.
Email: altorum@

3. Anumukti
Sourendra Gadekar, Sanghamitra Gadekar <anumukti@gmx.net>

4. Association of Consumer Action on Safety and Health(ACASH), Mumbai.
Servants of India Society, SVP Road, Gurgaum, Mumbai.
Ph: 022-3926886

5. Ban Asbestos Network India
Dr. TK Joshi<tkjoshi@vsnl.com>

6. Campaign for Nuclear Disarmament and Peace (CNDP),
Praful Bidwai, Achin Vanaik.

7. Center for Environmental Communications (CEC)
Mr. J. John

8. Center for Indian Trade Unions- CITU
Mr. PK Ganguly<citu@vsnl.com>

9. Centre for Resource Education
Hyderabad,
Mr.Narasimha Reddy.

10. Centre for Science and Environment,41,
In: Nidhi Jamwal,Sunita Narain.
Tughlakabad Institutional Area, New Delhi-110062.
Ph: 011-6061110,011-6083699,fax:011-6085879
email:cse@sdalt.ernet.in

11. Chintan Environmental Research and Action Group, Delhi
In: Bharathi Chaturvedi
Chintan is a Delhi based NGO working on environmental issues, particularly waste and toxics.
Address: No. 77, Nanjpura Market, 2nd floor, above Om Hotel, New Delhi 110 013
Phone: 011-3361227, 4614478

12.Citizens for Alternatives to Nuclear energy (CANE), Bangalore
In: Vishnu Kasaih, Kavitha B.S.
CANE is a Bangalore Based NGO working against radioactive pollution.
Address: #390, 8th main, 12th cross, West of Chord Road, 2nd stage, Mahalakshmipura, Bangalore-560 086
Phone:080-3592010, 3592060
E mail: kavayatri@yahoo.com , aravinda@giasco.com

13. Community Health Cell, Bangalore
In: Dr. Ravi Narayan, Dr. Thelma Narayan, Dr. Rajan Patil, Dr. Praveen Anur and Lalit Narayan.
CHC is voluntary health organisation and community health resource and policy centre working closely with the governments and communities to improve health and access to health care. Also involved in training health workers to empower communities at grass root level.

Address: [illegible] Jakkasandra 1st Main, 1st Block, Koramangala, Bangalore-560 034
Phone: 080-55315[illegible] 5535372
Telefax: 080-5526479
Email: sachara@vsnl.com

14. Consumer Action Group
In: Shoba Iyer
No.7, 4th Street, Venkateshwara Nagar, Adyar, Chennai-600020.

15. Consumer Voice
B-71,Lajpat Nagar-II, New Delhi-110024
ph:011-[illegible]
fax:011-4630486
In: Rajan Misra: 9811044424
Email: Rajcom@hotmail.com

16. Endosulfan Spray Protest Action Committee, Kerala

ESPAC was formed at Perla, Kasargod by local farmers and the affected people to fight the aerial spraying of endosulfan and they have been very successful in bringing this issue to a larger media and people's attention.
Address: c/o Kajampady Nursing Home, P.O. Perla-671 552, Kasargod District, Kerala
Phone: 895088
E-mail: shreepadre@sancharnet.in

17. Greenpeace India
In: Nirmala Kannan, Mavroz Mody, Ananthapadmanabhan, Divya Raghunandan, Bidhan Chandra Singh, Manu Gopalan.
Address: F- 15, Saket, New Delhi- 110 017
Phone: 011-6960932/ 6856716
Telefax: 011-6563716
Email: manu.gopalan@diala.greenpeace.org

18.Human Rights Law Network,
In: Deepika D'souza, Sunita Dubey.
Engineer House, 4 Floor, 86,Bombay Samachar MArg, Mumbai-400023.
ph: 022-2217078/2204948
Fax: 022-2020822/2027283

19.Indian Doctors for Peace and Democracy (IDPD)
The Indian affiliate of the International Physicians for Prevention of Nuclear War
In: Dr.Arun Mitra[illegible]@yahoo.com

20. Indian Ocean, New Delhi.
In: Rahul Ram

21. Indian Scientists Against Nuclear Weapons (ISANW)
Vishwanbhar Pati, Prof. Sanjay Biswas

22. Institute of Socio-Economic Change
Bangalore
In: Mr Nagar Bobby.
Has been working on development issues in 124 villages for 13 years now.
Ph# 080-321/083

23. Janachetana,
Kishan Rao, Sancharam Hegde

24. Jharkhandis Organisation Against Radiation (JOAR)
In: Shanshyam Biruleo -(0657) 730009

25. Janadhwani Yuva Vedika
opp. Masjid, Kumbarpet, Doddeballapur-561203.
Mr. Dayanand Gowda.

26. Mines, Minerals and People(MMP)
In: Mahalakshmi Parthasarathy, Xavier Dias
MMP is a national network of mining affected communities and community groups and working with mining affected communities in any manner.
Address: 1249/A, Road No. 62, Jubilee Hills, Hyderabad- 500 033
Phone: 040-[illegible]
Telefax: 040-3542975
Email: [illegible]

27. National Law School of India- University
Babu Mathew.

28.Occupational Health and Safety Centre, Mumbai
In: Vijay Kanhere, Dr. Murlidhar V. and Dr.Veena Murlidhar.
Address: 4, Neelkamal Apartments, Gokuldas Pasta Road, Dadar(E), Mumbai-400 014
Phone: 022-[illegible]
Email: webmaster@ohscmumbai.org
Website: www.ohscmumbai.org

29. OKFAM,
DR. Unnikrishnan PV.

30.Osmania university teachers association
Prof. Purushottam Reddy

31.Palni Hills Conservation Council
In: Kanan.
A NGO based in Kodaikanal fighting for the cause of workers affected in Mercury factory of HLL.

Email: kanan@vsnl.com

32. Patancheru Anti Pollution Committee
A . Kishan Rao
President
Yashodhara hospital
12-5, srinagar colony, Patancheru-502319,Medak Dist. (A.P.)
Local doctor at patancheru, has been involved in health survey around the area

33. Paryavaran Suraksha Samiti, Gujarat
In: Anand Mazgaonkar, Swati Desai and Michael Mazgaonkar
PSS is a Voluntary self help organisation working primarily in South Gujarat on a variety of issues, including Industrial Pollution and Right To Know.
Address: 37/1, Narayan Nagar, Chandni Chowk, Rajpipla-393145, Gujarat
Phone: 02640-20629
Email: pss@narmada.net.in

34.Periyar Malinookarana Virudha Samiti(PMVS) ,Kerala
In: Purushan Eloor
PMVS is a local group of activists fighting the pollution issue in the Eloor and Edayar belts of the River Periyar, where there are about 250 industries of all sorts mainly chemical.
Address: Periyar Malinookarana Virdha Samiti, Eloor Depot, Udyogmandal P.O., Kochi, Kerala.
Phone: 98460-13483
E-mail: thanal@vsnl.com

35. Pesticide Action Network- Asia Pacific
Dr. Romeo Quijano, Sarojeni Rengam

36. Roshni Nilaya School of Social Work
Social Work Department represented by Prof. Rita Narula

37. Rural Reconstruction and Development Society
Gangi reddy. V
Sydapuram 524407
Nellore Dist. (A.P)
#08621-87096

38. Samaj Parivartan Samudaya
Mr. Hiremath
sr_hiremath@hotmail.com
sr_hiremath@rediffmail.com
Has been working on the issue of industrial pollution since a decade

39. Sambhavna
In: V.T. Padmanabhan, Satinath Sarangi
Sambhavna is a Bhopal based voluntary organisation engaged in delivering holistic medical services to gas affected people. It has undertaken several pioneering initiatives in the field of community health, particularly in the context of communities affected by industrial pollution.
Address: Sambhavana, Berasia Road, Bhopal
Email: sambhavna@bom6.vsnl.net.in

40. Samuha,
Raichur.
Somshekha:

41.Samvada, 803, II Floor,Rama Infantry Manor, Infantry Road, Bangalore.
Ph:080 5860595
In: Benson Isaac
Email: samvada@vsnl.net

42. Srishti,New Delhi.
Ravi Agarwal

43. Thanal Conservation Action and Information Network, Thiruvananthapuram:
In: Usha S., Sridhar R. and Rajasree V.V.and Jayakumar C.
Thanal is a community oriented organisation working on conservation issues and toxic related issues. Currently engaged in a community Right to Know campaign in Eloor, Kerala and a proposal to move Kovalam toward a zero waste model.
Address: Post Box No: 660, Kawdiar, Thiruvanthapuram, 695 003, Kerala
Phone: 0471- 311896
Email: thanal@md4.vsnl.net.in , shreepadre@sancharnet.in

Address: 8, 4th Street, Venkateshwara Adayar, Chennai- 600 020
Phone: 044-4460387
Telefax: 044 4914358
Email: tlchennai@vsnl.net/tldelhi@vsnl.com

45. Vikasana
Verghese Cleatas, Project Director
An organisation working on the environmental issues. They are closely working with the community around Terikere (mysore paper and pulp industry); mainly focussing on awareness in the locality
P.B. No. 23
Terekere-577228
Chikmangalore, Karnataka
0826-422800
422570/423739
vikasana_ngo@eify.com

PUBLICATIONS:

DOCUMENT INPUT:

1. BROCHURE:
   - Summary of CHESS-1
   - List of Participants: CHESS-1
   - List of Participants: CHESS-2
   - Profiles of all organizations participating in CHESS-2
   - Expected Outcomes
   - Agenda of CHESS-2
2. MANUAL ON LAY EPIDEMIOLOGY
   Prepared by Community Health Cell, Bangalore.
3. POISON FREE EARTH
   A CD Compilation of all toxics-health literature Prepared by Greenpeace India for public use.
4. ELCOR TRI REPORT
   Prepared by Greenpeace India as part of the RTK/Health campaign: Contains global research on toxicity/health-effects and emergency response systems on all chemicals used and released by 7 large industrial units in Elcor and Edayar.
5. DOCTOR-INTEREST reading on toxics and health.
   Prepared by Greenpeace India as part of the RTK/ Health campaign
6. CONSUMER/GENERAL INTEREST reading on toxics and health.
   Prepared by Greenpeace India as part of the RTK/ Health campaign
7. Any Papers/Reports/Health-Surveys of relevance from skillshare participants are welcome.

DOCUMENT OUTPUT:

1) "THE MANUAL AT WORK":
   PROCEEDINGS OF THE LAY EPIDEMIOLOGY SKILLSHARE
   (DISTRIBUTION ONLY FOR PARTICIPANTS AND IPEN)

2) "A NATIONAL CAMPAIGN?"
   NOTES ON CAMPAIGN STRATEGY IN SMALL GROUP DISCUSSIONS
   (DISTRIBUTION ONLY FOR PARTICIPANTS)

3) POISON FREE EARTH- VERSION 2
   ADDITIONS ON INDIGENOUS RESEARCH IN THE EXISTING RESEARCH COMPILATION

Briefing Questionnaire:

1. What do you expect out of the skill-share personally, organisationally and in terms of your campaigns?

2.What toxic chemicals/products/processes are you dealing with in your campaign?
4. What experiences/ case studies / videos/ slides/ campaign material would likes to share with others during the Skill share?
5.Any other ideas / suggestions not covered by above?
6. Please provide your vital statistics!
Name of Individual/Organisation:
Name of representatives and your birthdays:
Current Postal Address:
Phone:
Fax:
Email:
Which mode of contact you prefer?

Excerpts from CHESS-2 Responses till date..:

The " Manual on Lay Epidemiology " will be a good guide for NGO's to act upon locally and identify problems cuased by processes that are damaging to the health of the workers and the population.

The POISON free Earth CD will be useful as well for those of us dealing with toxics issues . But again all these matters in the vernacular languages will have better effect on the affected workers and population. Availability of material on the web is also of limited use - many ISP's are shutting down - a sign of weakness for the wan media .

I do not know how much of the survey's can be carried out by NGO's themselves . As all of us have our own agenda and idiosyncracies - may be it is good to have the medics and para medics do the work.

With money taking precedence over merit in all spares of life there are not many from the medical field who would volunteer for the survey of health of population of those affected by toxics. After all it is the treatment of these disorders that brings the medics the money ....

What about setting up a lab that will also detect known toxics and help any one with suspicion on various pollutants and toxics. There was some talk about this some time early in the day of the Hg issue but has been lost in the din of media exposure i guess.

Manan
Email: manan@vsnl.com
Palni Hills Conservation Council
An extremely rooted organisation based in Kodaikanal fighting for various conservation issues amongst which one of the most important is the cause of workers affected in Mercury factory of HLL.

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Good to hear from you and about the progress. The CD and the guide will be very useful. We may advertise the availability through all possible channels once it is ready. There will be many people who will be interested for the same.

ALF and training of lawyers: I personally believe that this is a good idea. It may be a good idea to explore the possibilities of "skillshare" for lawyers and law students, together or separately.

The idea of a team (to move around) is interesting, but will require lot of efforts, energy and management. Needless to say, we are NOT into soft and easy work ! I will be happy to discuss this further when I am in Bangalore (April 3rd and 4th week), if it is not too late.

Dr. Unnikrishnan PV *(E-mail: unnikru@yahoo.com)*
Co-ordinator: Emergencies; OXFAM INDIA :
Dr. Unnikrishnan is currently a staff member of OXFAM India Trust and is working as a resource person on disaster response including psychosocial consequences and human rights issues. He was the editor of the India Disaster Report 2000 and earlier member of the Public Policy and Advocacy Unit of Voluntary Health Association of India. He is also an Associate of CHC.
Address: *Vijaya Shree, 4th A Main, near Baptist Hospital, off Bellary Road, Hebbal, Bangalore- 560 024*
Phone: *080-3632964*
CONTACT (FEB-APR 2002) UNIVERSITY OF GENEVA, GENEVA :(MOBILE: ++41 76 876 5457) FAX:+41 22 789 24 17
Email: *unnikru@vsnl.com*

****

Well right after the skillshare I did the Sukhinda trip (the report of which I have sent to you/Hex Chrome) attending the skillshare did guide me thru it..

5) awareness generation of the communities affected/NGO"s individuals working in the area.. can this be clubbed with the mobilisation bid

Here can I add that it would be a good idea to have a focus meeting on the effects of toxics on children, (exposure routes, effects) it would be of help/ as we have been witness to child labour in the mines/quarries

How about also adding on a veterinary perspective because most of the mining areas have come to understand that the livestock to is invariably effected/it would be of help if we understand this better. Here would like to mention an organisation Anthra /Yakshi am pasting their profile below it would be good if they too are included in the next skillshare.

Besides this we also discussed the possibility of working on our campaigns across the country understanding common concerns and unifying issues. We could at the least produce a Statement of Collective Concern
Ok this I liked .. for starters..the Sukhinda issue?? (am being verry focussed:-)

It was a shared concern at the last skillshare that we include workers groups too in the next one, who are concerned about their own health in the context of polluting processes and irresponsible and reckless practices of industry. We need to act on this.

For this I think the Xavier would be of help, I will check with him also..further for the mines minerals and People Convention there was one Dr Sugathan who had come from CEC Delhi, he too can be of help.

The target on corporate identity across various organisations this year, in the context of the WSSD(Rio+ 10 summit) needs attention. how would we tie in and add our key push to this process?
This is definitely a very serious issue what with the "Corporate Responsibility" being touted as the panacea for all the problems. (Check the recent (Human Face of Corporates) by TERI - I can send you a Times of India report)

I would like to be a part of this definitely but have to work it out..

Mahalakshmi Parthasarathy
Mines, Minerals and People(MMP)
MMP is a national network of mining- affected communities and community groups and working with mining affected communities in any manner.
Address: 1249/A, Road No. 62, Jubilee Hills, Hyderabad- 500 033
Phone: 040-6103874
Telefax: 040 3344375
Email: mm p@satyam.net.in

Mahalakshmi Parthasarathy is working with mining struggle groups. She is also involved with legal and media advocacy and information documentation.
Email: mmahalakshmi@yahoo.com

I am sorry that I could not attend the meeting. I met an interesting group of dedicated people working on slow poisons in our environment. Kindly get on to their website slowpoison.com. I will also get n in touch with them and pass on the information about the work going on at your place.
As on date I will be free in July 2002.

Dr. T. Venkatesh
Dr. Venkatesh is the Professor of Biochemistry at St. John's Medical College and the Director of 'Project Lead Free' of the George Foundation. He is also the Head of the National Referral Centre for Lead Poisoning in India.
Address: Department of Biochemistry and Biophysics, St. John's Medical College, Bangalore- 560 034
Phone: 080-5532146/ 2065058
Telefax: 080-6640293
Email: venky_tv@hotmail.com

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i think there are some good points coming up.

I could not discuss the matter with usha and sridhar so may be we will send you one mail with more ideas if we could spend some time on this

It may take some more time so i am sending this mail in between.

The focus is health and community issues so while we need to understand the legal aspects we should limit ourselves to one advocate or legal expert may be Mohan if every one agrees so that he can give us insight to the legal system than involve the networks

law or many people.
If the law groups has a focus as same as the workshop it will be good otherwise the discussion will go in to areas and loose focus.

Secondly reaching out on common issues is a area of concern we were just wondering to take up a travel to all cashew areas and network with workers and community on the endosulfan issue

may be we will have more to add when we discuss the mail later with other folks here

Expected Outcomes of CKTSS-I, 2001 as expressed by 5 participant organisations

C1-Thanal Conservation Action and information network

C2-Occupational Health and Safety Center, Mumbai

C3 Paryavaran Suraksha Samiti, Narmada

C4-Citizens for Alternatives to Nuclear Energy(CANE)

C5-Mines,Minerals and People(MMP)

1.What would you like us to cover in the Skill Share (general)?

C1- a)Basic human physiology and interactions of the various systems within for our general understanding,

b)The sequence that generally follows in the human body from the various routes of exposure to the health effects- acute and chronic and after(and also we need to understand their various forms like genotoxic, teratogenic, carcinogenic, etc.)

c) Multiple factors or sources are sometimes blamed for the same health problems seen. For e.g. In our informal health survey on endosulfan sprayed area in Kasargod we found a very high percentage of women having gynecology related problems- but many also revealed that they had Copper-T implants and they were relating their problems to that.

d) Synergistic effects of various chemicals/ chemicals and lifestyles made causative linking difficult- simultaneously making it easier for the polluters to blame some other thing for the effects (like chewing pan, cigarette smoking, vehicular pollution, malnutrition, lack of iodine etc as possible reasons also)

C2- a) Factory act and its occupational and environmental ramifications.
b) Workmen's compensation Act, ESI Act.
c) Disaster Management planning and antidotal treatment in case of chemical factory disaster, preparedness, training of local doctors and networking.

C3- a)Known impacts of air and water pollution.
b) Impacts of constant exposure .

C4- a)Methodology used for Health Survey.

C5- a)Mining and health
b)Industrial Pollution and impacts on community
c)Occupational Health

2.What would like us to cover in the Skill share (Specific to your campaign)?

C1 a) A community having health disorders may be due to a single external factor like endosulfan in Kasargod or due to multiple external factors like a mixture of pesticides like in Idukki or due to a waste dump and burning, How will it be possible to develop a tool or set of tools to link disorders to the factors, especially when we interact with the community directly with focus on women and children.

b)People in the surroundings of industrial area having a lit of all kinds of chemical industries like fertilizers, pesticides, chlorine and chlorine compound manufacturing units, paper industries, rare earth factory etc- their individual and synergistic actions is making this too complex a problem. How would one look at health of communities in such complex conditions.

c) Plantation workers exposed to agro-chemicals over many years and their families affected by the same- directly and indirectly.

d) Workers and community living around and exposed to chemical in pesticide manufacturing units like the Hindustan Insecticides Limited factory at Eloor which manufactures DDT, endosulfan, diclofol, and used manufacture BHC till 1997.

C2- a) Noise induced hearing loss.
b) Occupational lung diseases
c) Hospital waste hazards and management.

C3- a)Suspected cancer in an area downstream carrying effluents.
b) Impact of heavy metals, organic chemicals on health.

C4- a)How to calculate food and nutrition data in calories (food and nutrition data are collected in grams)
b)Any specific indexes that we need to calculate general health of the people.

C5- a)Health effects of mining(specific mining cases listed in Q4-C5a)
b)Effects of mining on workers
c)Effects on women workers(reproductive health)and community members

3.What toxic chemicals/products/processes are you dealing with in your campaign?

C1- a) Pesticides- especially organochlorines like endosulfan and organophosphates like phorate. The health issues due to direct intake by communities exposed to aerial spraying and otherwise, workers involved in spraying, and also indirect intake from contaminated water or food from the area sprayed.

b) Pollution due to effluent and emission from pesticides factory producing DDT, endosulfan, diclofol, and BEC (till 1997) The HIL factory lets out the effluents into a stream which contaminates large areas of wetlands before draining into the river Periyar. A Green peace study found 111 chemicals, 56 of which could be reliably identified, of which 30 were organochlorines including DDT and metabolites, endosulfan and breakdown products, HCH etc there are other highly polluting factories in the same area manufacturing phosphate fertilizers (FACT) rubber processing chemicals (Merchem) The study also found high levels of cadmium, chromium, zinc, copper and mercury in the same effluent stream. The stream is not being directly used for drinking water/ other purposes now, but at least 300 families live on its banks directly inhaling the pesticide smelling fumes emanating from the stream and consuming coconuts, ducks, eggs, which smell of the chemicals.

C2- a)Noise
b)Cotton dust and chemical exposures causing lung diseases.
c)HIV, Hepatitis B&C

C3- a) A cocktail of dyes, pharmaceuticals, intermediate chemicals etc.
b)Decentralized cottage level waste recycling of containers, drums, bags containing chemicals.

C4- a)Radioactive Pollution

C5- a)Coal, bauxite, uranium, mica, limestone, granite
b)Downstream industries (coalwasheries, smelters, refineries, crushers, etc,)

4. What experiences/ case studies / videos/ slides/ campaign material would likes to share with others during Skill share?

C1- a) We would like to share the aerial spraying of endosulfan issue in Kasargod and one of the study related to health a survey done in a village in Kasargod and findings collated out of a death register survey from three villages.

b) We would like to share the Right to Know campaign and the issue at the Industrial belt at Eloor, with slides on the pollution there..

C2- a) Compensation to workers for occupational lung diseases and noise induced hearing loss as per ESI Act

b) Compensation to workers with radiation injury, accidents as per workmen's compensation act..
c)Books on disability assessment, occupational diseases(in schedule III of WC Act)
d) Books on occupational HIV and hepatitis B&C . Antidotal treatment in case of chemical disaster, experience of struggle by Parivartan in chemical belt in Konkan.

C4- a)Presentation using slides on base lines health survey conducted around kaiga.
b) Nuclear Power Plants and Public Health.

C5- a)Videos: Jadugora uranium;Baplimalli bauxite (Orissa) ; Silicosis
b) Case studies: Mapoon story of Australia(indigenous people and Aluminium companies)Story of Orissa-chromite areas, Environmental Aspects of bauxite and aluminium production in Brazil and Indonesia: Rossing Uranium- revealing health and environmental risks, Mica in AP

5.Any other ideas / suggestion not covered by above?
C1- a) Can we think in terms of producing some fact sheets on health impacts due to the chemicals discussed in this Skill share. This could be one of the outcome of the skill share.

b)Could it be possible to develop an easy to understand note on the terms like genotoxic, teratogenic, carcinogenic and such other terms which are commonly used to depict the toxicity of these chemicals.
C2- a)Guidelines for impairment and disability assessment for compensation purposes.
b) Doctors' training and networking.
C5- a)How to do health surveys on occupational health.
b) How to monitor industrial pollution
c) Critique of our existing health survey questionnaire.

Strengths and Weaknesses of the CHESS Process
(as perceived by the CHESS-1 participants)

Here is the compilation of all the responses received from the participants in CHESS.

Strengths:

- *"Great rocking doctors, thorough, accessible and knowledgeable."*
- *"Good comprehensive program."*
- *"Concrete outcomes-ROHC-Kasargod, Kodaikanal."*
- *"Gained knowledge about toxics and its environmental impacts.Did justice to the phrase 'skillshare', a lot of information and material was shared."*
- *"Site sessions on strategy, toxics and input to planning commission were helpful."*

- "A brilliant mixture of smart, committed environmental activists as well as medicos, community health experts and scientists who made the 3-day skillshare very rich and worthWhile."
- "The workshop provided a platform to bring the different activists groups under one roof, which may give inspiration to our work."
- "Good learning process for first timers."
- "Created hope that we together can do a lot against toxic burdens on our body and environment."
- "Met a very nice set of very good activists and concerned persons."
- "Hope for future common action increased during the meeting."
- "Trusting, friendly atmosphere."
- "Expertise of each group in its own field."
- "Lots of resources, interaction."
- "Easy going nature of interaction."
- "Getting to know new, friendly groups on the same wave-length."
- "Strengthed groups in formulating and conducting their own surveys."
- "The unity and the commitment to a cause and to think locally and act globally."
- "Learned a lot in the medical field."
- "All the presentations were mind boggling and enriching."
- "Sharing of experiences was an obvious strength. Translating this into skills and action plans is the challenge."
- "This forum raised/brought out the deeper conflicts and larger issues that we are all dealing with and has left us with a quite a bit to think about."
- "Excellent sessions, good resource persons and information."

- "Sharing experiences in industrial toxicity were very useful."
- "Legal/medical opinions were also useful."
- "Gained much more confidence about the work I want to do and felt a support system I was unaware of."
- "Outstanding ideas implanted and really began to re-understand many issues."
- "Help to plan in maneging environmental disasters."

<u>Weakness:</u>

- "Several slow sessions."
- "Sometimes repetitive within the same session."
- "Wanted more interactions with some resource persons."
- "Case studies of actual surveys to outline the 'Dos & Don'ts' of surveys and studies would have been helpful."
- "Needed proper time management."
- "Didn't provide time to certain participants like CANE to share their experiences due to lack of time."

C 3A-7.

A 'peer review' of a study presented by HLL team at CHC, on workers in HLL Thermometer Factory in Kodaikanal

A. BACKGROUND

- In August 2001, CHC organised a skill share for a number of environmental health groups that were campaigning against certain environmental hazards in different parts of India. The purpose of the skill share was to help campaigning groups study the local health problems linked to the environmental hazard in a more scientific and systematic way. The skill share was entitled Community Health Environment Survey Skillshare (CHESS).

- One of the case studies presented by a group from Kodaikanal was the problem of Mercury related human and environmental hazards in and around Kodaikanal due to improper hazard control and waste disposal processes of a local mercury thermometer factory. As a preparation for the skill share a two member team from CHC (Dr. Mohan Isaac, Professor of Psychiatry, National Institute of Mental Health and Neuro Sciences (NIMHANS), Bangalore; and Dr. Anur Praveen, a young doctor volunteer of CHC visited Kodaikanal and interacted with some of the ex-workers to make a preliminary situation analysis. Their preliminary report was circulated which highlighted some of the findings and the need for a more rigorous scientific study.

- A few weeks later, the Medical Adviser of HLL, Dr. Rajagopal contacted CHC, and requested CHC to give them an opportunity to present the findings of a recent study done on over 250 workers at the HLL factory. As a professional resource group concerned about peoples and workers health, we welcomed this opportunity to dialogue with the industry. We appreciated this as a sign of greater accountability and transparency. This dialogue took place on 27th November 2001.

B. THE PRESENTATION

- Dr. T. Rajagopal - Corporate Medical Adviser; Dr. Premala Mascarenhas - Area Medical Officer; Dr. H.V. Ravi Mohan - Occupational Health Physician; Dr. Anil - South East Asia Business Manager; and Dr. Ashok - who deals with environmental issues formed the HLL team that visited CHC on 27th November 2001 to make the presentation.

- The CHC team included many of our associates who are also involved in occupational and environmental issues. The team consisted of Dr. Ravi Narayan, Community Health and Occupational Health Consultant, presently Community Health Adviser of CHC; Dr. C.M. Francis, a physiologist - endocrinologist, also the retired Dean of St. John's Medical College and presently Consultant of CHC; Dr. Mohan Isaac, Professor of Psychiatry at National Institute of Mental Health and Neuro Sciences, Bangalore, Dr. T. Venkatesh, Professor of Biochemistry, St. John's National Academy for Health Sciences and heavy metal toxicity expert for South Asia; Mr. As Mohamed, Asst. Professor of Statistics, Department of Community Medicine, St. John's Medical College; Dr. H.R. Rajmohan, Director of Regional Occupational Health Centre, Bangalore (branch of NIOH, Ahmedabad), Dr. Krishnamurthy, Senior Scientist of ROHC and Dr. Sampath Krishnan, Fellow-Community Health, CHC and Dr. Anur Praveen, a doctor volunteer, CHC.

- In spite of an earlier request, the HLL team did not send us a report of the study in advance as requested, but made a presentation at CHC, using overhead projection sheets, summarising the background, the objectives, the methodology and the findings and analysis of a survey of around 255 workers. These workers had showed up at the visit of a 3 member medical team, in response to a newspaper announcement requesting them to be present for a medical evaluation, a few months after the operations in the factory had been closed.

- The CHC team and associates raised queries and shared comments as the presentation progressed. We again requested for a report of the study, since peer review is not adequately effective if peers are just shown slides or OHPs in a presentation, which nearly always has a constraint of time. However, though it was mentioned that we would get a report, so far none has been received. We, therefore, invited all our team members and associates to put down in writing the key issues and comments that they have to make on the study. We hope to pass this on to the study organisers and to others, who wish to assess and tackle the problem of human and environmental health caused by the HLL factory.

C. PEER REVIEW AND COMMENTS

- Handicapped as we are with the absence of the copies of the OHP sheets presented at CHC by Dr. Rajagopal or any documented or printed report of the study - these comments listed below may be taken as issues of concern with the study design and process of analysis, that may have affected the assessment of the actual problem. A biological monitoring approach rather than an occupational health monitoring approach seems to have predominated in the study design. The HLL team's response to some of these points raised were:

  i) "we have that type of analysis" or
  ii) "we shall look into that matter",
  but in the absence of a printed, circulated report it is difficult to say whether the comment or criticism has been adequately responded to in the study or subsequent analysis thereof.

1. The Sample - 'Opportunistic'

Any sample of workers that are based on those who show up on invitation of a medical team visit - announced by letter or newspaper or whatever method is what in epidemiological terms is called an 'opportunistic' or 'grab' sample. Extreme caution has to be then taken to make any sort of judgement about the whole population of HLL workers, past and present because extrapolation from an 'opportunistic sample', which has self-selection bias, is usually invalid.

2. Occupational History - an important parameter not adequately considered

A more rigorous sampling method may have to be used or else using detailed occupational health history the available sample may need to be subdivided into 'internal controls' for enhancing the comparisons. The 'opportunistic sample' may have workers with different years of work experience in the factory and different jobs or sections as well and these differences can be used to evolve subgroups. Clubbing them together by age or any other parameter, disregarding the occupational history, especially when the exposure is occupational, is again not a rational method of analysis. Clubbing previous employees, recent current employees and temporary employees is also not a good procedure.

3. **Lack of clarity in study objectives:**

a) It was not clear whether the study was based on any hypothesis eg., exposed -vs- control or more exposed -vs- less exposed. All the data was clubbed together which seemed to confuse the situation.

b) There was no attempt to link the biochemical parameters with clinical examination. These were presented as different tables. So, whether there are correlations between clinical findings and investigations or between exposure and health effects were not clear.

4. **Inadequate use of data on health from Company records**

Too much emphasis was put on the study conducted without adequate use of supplementary information available with the industry, eg., Periodical monthly monitoring, annual medical check up. occupational data. The data from the periodical medical examination and the monthly urine examination for proteinurea. mercury level. etc., were presented but not correlated. These need to be reviewed in greater detail.

5. **Absence of Exit interviews**

Even though the 'turnover' of workers seemed to have been large, the management does not seem to have had 'exit interviews' which would have helped to determine whether 'health reasons' were an important component of the decision to leave the job.

6. **Averages highlighted without range**

The significance of the results especially values of urinary mercury were given without any indication of standard deviations or 95% confidence limits. The significance of the results could therefore have been assessed if standard deviations are also shown. Averages are important but range of data within averages is also crucial.

7. **a) Further analysis of individuals with higher urinary mercury levels needed**

The presentation highlighted the urinary of ex employees, present employees as well as other workers. Some levels did exceed the prescribed levels. Who were these? What was the exposure? What were the effects? What action was taken? This was not clear.

b) A close follow up of employees (who showed higher levels) and their levels analysed separately would have indicated pattern of reduction. A meaningful occupational break up like exposure versus urinary levels; or experience -vs- urinary concentrations of mercury, levels -Vs- sex distribution (male/female workers and distribution of Hg levels); age -Vs- Hg distributions; job processes -Vs- Hg urine distribution - would have provided clearer occupational health status of employers.

8. **Quality control of Lab Tests not undertaken**

The study does not seem to have followed external and internal quality control methods. All tests were done by the same laboratory.

9. **Data to be analysed against all guidelines**

The data should be looked at by existing recommended health based biological exposure limits like WHO/ACGIH, EPA and NIOSH on an individual and group basis. This study compared only WHO guidelines. The biological monitoring centred around urinary mercury level prescribed by WHO/OSHA Indian Factory Act adopting OSHA prescribed limit. Lower limits are nowadays used and this must be considered.

10. **Personal environmental monitoring rather than area sampling**

a) Finally, in the monitoring of work environment, rather than area sampling representing background mercury pollution, it would have been better to have attempted personal monitoring as a better indication of concentrations in the breathing zone of the workers. Also the details of job processes covered for air monitoring; levels existing at mercury / non mercury areas and / or environmental mercury at production / non production sections - would provide meaningful comparisons and facilitate understanding subjective concentration of air borne mercury levels at different job processes and / or sections of the factory.

b) Also, as factory involves glass-processing (which generally involves heat), a picture of work environmental heat parameters like DB, WB, WBGT would have provided not only the extent of heat stress (if present) but also would have given an idea of work environment air temperature which could be a critical factor for mercury to get airborne in the environment.

Finally, while there are many other minor points that can be included in a spirit of peer review and dialogue, we concluded that

- the study seems to have been undertaken in somewhat of a hurry; without adequate focus in planning and analysis to the occupational health principles involved in such a study.
- While it may have been a good beginning the analysis of the data must be done more carefully, perhaps with some involvement of external peers and advisers who can help this process - so that a more sound analysis of the problem can be made to help get further clarity on the situation.

- **To begin with a circulation of detailed report of the study including objectives, materials and methods, efforts at standardisation, findings and analysis and discussion of findings should be done immediately in a true spirit of transparency and accountability.**

- Occupational health hazards are not uncommon even with the best of efforts. The only way forward to improve and protect workers health is to begin to look at the evidence in a more interactive, participatory and holistic way so that there is:

  - clarity of the problem,
  - careful monitoring of evidence, and
  - evidence based evolution of solutions.
  - HLL needs to set an example of corporate social responsibility in this matter.

- HLL needs to set an example of corporate social responsibility in this matter.

[A summary based on notes provided by Dr. T, Venkatesh, Dr. H.R. Rajamohan, Dr. Krishna Murthy and Dr. Ravi Narayan and Dr. C.M. Francis]
Community Health Cell, 367, Srinivasa Nilaya, Jakkasandra Ist Main, Koramangala Ist Block, Bangalore – 560 034.

C 8A-3.

CHESS-II Prep-work Discussion Paper-IV

Date: 25-28th July, 2002. Venue: Visthar, Bangalore.

A. BACKGROUND:

A polluted environment will manifest itself in the form of health disorders amongst human and other living populations inhabiting it.

Based on numerous cases around the country, common sense evaluation clearly confirms that industrial pollution has damaged community health. However, the specific nature of the damage or its extent remains unknown. As a result, community health has hardly influenced pollution policy. The indications that this is the case is evident:

1. Pollution legislation aims at controlling pollution rather than preventing it.

2. Pollution legislation merely prescribes norms that legalise pollution.

3. What is legal is not healthy. Pollution norms are prescribed based on an assumption of assimilative capacity of nature rather than on facts that point to the cumulative nature of the most deadly kinds of pollutants and their risks to community health.

4. Polluters remain unpunished for their pollution and effects on community health.

Importance of Community Health Surveys:

Citizens and community groups need to be able to identify environmentally-caused health disorders, and the sources of environmental disturbance(s) that cause such disorders. This is important for several reasons:

1. *Ensuring that the "Polluter Pays":* The Polluter Pays principle is important not merely as a deterrent for further or future pollution, but also in the context of recovering the ecological debt owed to the communities of living beings and their future generations. Ecological debt goes beyond the fiscal and requires a deep-rooted sense of apology by the polluter for the damage caused by its actions.

2. *Mobilising the Community:* Often health disorders within a community are seen at a family level, with people blaming the compromised health of their family members on fate or accident. Many of the subtler effects - learning disorders, immune system depression, reproductive or gynecological anomalies

are noticeable as trends only when seen at a community level. Mapping the health of a community brings home the fact that the fate of the community as a whole is linked to its environment.

4. *Preventing Future Harm:* Armed with the knowledge that certain kinds of industries and pollution can cause community wide health effects, communities can play a more active and informed role in deciding the course of their communities' development. Combined with an operational understanding of the Precautionary Principle, such knowledge can help in preventing the setting up of polluting industries.

4. *Countering Government/Industry:* Community health surveys need not be conclusive in establishing cause-effect relationship between environmental disturbance and health disorders. They need to sufficiently appeal to the common sense of the community members and the public to be able to challenge the baseless assertions by Government/industry that a community's ailments have nothing to do with the pollution they are subject to. Health surveys can help reverse the burden of proof, with communities demanding industries and governments to establish beyond doubt that their polluting activities/industries are not related to the community's health problems, or will not cause health disorders.

5. *Health Care Needs:* Health surveys also allows for better understanding of the health care needs of communities living in environmentally disturbed areas. Such an understanding is crucial to designing the health care interventions necessary for the community members.

Historical Context:

Keeping the above in mind, a small group of individuals and organizations met in Bangalore from the 13th to the 17th of August,2001. There has been some meaningful activity in the hotspots as a result of that interaction. We have had our fair share of problems too. But all of it has helped us to improve our understanding of how to handle the tense and desperate situations we encounter as we go about performing health surveys.

Ever since there has been a constant urge for us to get back together evolving a clear framework for action in the various pollution/radiation hotspots we work in.

3. AIM:

Equipping Communities and campaigners to deal with
a) performing Community Health Surveys and
b) their subsequent effective campaign application

C. OBJECTIVES:

To create a multidisciplinary resource base of medical practitioners, community activists and toxicologists capable of conducting community health surveys in communities subject to industrial and environmental pollution;

To promote interaction between community activists and community health experts to facilitate a discussion aimed at understanding the limitations and strengths of community health surveys;

To understand the role of community health surveys in campaigns against industrial pollution.

D. THE CHESS-II SKILLSHARE (A PROPOSED PLAN)

The skillshare would discuss *"Toxics/Radiation and Health"* issues along two streams of thought:

I. "Lay Epidemiology" in practise, in INDIA with campaign instances!

1. Pollution & Community Health

2. Design and Implementation of Health Surveys - Resource Implications (costs, personnel, time etc)

II. Campaign Stategy of Regional campaigns and a potential National campaign

1. Understanding the strengths and limitations of community health surveys

2. Using Community Health Surveys for campaigning.

3. Resources and resource sharing opportunities.

4. Case Studies

5. Action plans for regional and national work

6. Roles and Responsibilities

Participants:

Community activists, medical practitioners from affected communities, occupational health doctors/activists, community health professionals/ activists, toxicologists, lawyers, workers, trade-unions, consumer groups, farmers, farmer-cbo's and researchers.

PROPOSED AGENDA:

DAY ONE: 25/7/2002:

9 am- 10am: Registration and Tea.
10am to 1:30 pm: Sharing the work of individuals and groups and expectations out of the skillshare.
1:30 to 3:00pm: Lunch
3:00 to 5:00pm: Lay Epidemiology-one day skillshare-
session 1:
Small intro presentations:
1) Community Health Cell
2) Elizabeth Guillette
3) (Anyone else?)
5:00 to 5:30 pm Tea
5:30 to 7:30pm: Lay Epidemiology in 3 small-groups-workshop mode: Session 2
8:00pm: Cultural Evening + Welcome Dinner.

DAY TWO: 26/7/2002:

9am-10:30am: Lay Epidemiology: Session 3: in small groups
10:30-11:00am: Tea
11:00 to 1:30pm: Final Session of Lay Epidemiology in small groups
1:30 to 3:00pm: Lunch
3:00 to 4:30pm:
Campaign Context and Strategy +
"The Way Ahead": Campaign Ideas Presentations
4:30 to 5:00pm: Tea and snacks.
5:00 to 7:30pm: Campaign Session -2:
Small Groups interactions cum brainstorming on Toxics and Health campaign strategy with:
---- Surviving Radiation/Attacking UCIL-NPC
---- Pesticides and Health
---- Legal action to address Corporate Liability?
---- Womens' Health issues in hotspots
---- A Consumer Campaign (???)
---- Worker Health Remediation/Liability
---- Community Health Surveys
---- Media as an instrument of the Campaign.
---- Water and Public Health
---- and any other issues people want to work on..

7:30 pm onwards: Theatre in the WELL and songs with food!

DAY THREE: 27/7/2002

9 am-10:30 am: Campaign Session-3: Work in Small groups continue...
10:30-11:00 am: Tea

11:00 - 1:30 am: Campaign Session 4: Small groups wind up their day-long strategy discussion
1:30 -3:00pm: Lunch
3:00 - 5:00pm: Small groups come in the larger forum.
Sharing of insights into the national campaigns.
5:00 - 5:30pm: Tea and Snacks
5:30 to 7:30pm:Group to group Meetings/consultations
7:30 to 8:30pm:Contemporary Dance in the Well!
Songs and Food!

DAY FOUR: 28/7/2002

9 am-10:30 am:
"Common Objectives and Collective Action"
10:30-11:00 am: Tea
11:00 - 1:30 am:
Action Plan for Year 2 of CHESS: Roles
1:30 -2:30pm: Lunch
2:30 - 3:30 pm: Statement of Collective Concern
3:30 - 4:00 pm:
Discussion on Budget and Resource-raising
4:00- 4:30 pm:
- Individuals and Organisations taking key responsibilities.

4:30- 5:00 pm: Tea and Snacks
5:00 to 5:30pm: Travel to the City Centre.
5:30 to 7:00 pm: Launch of Raghu Rai's Exhibition on Bhopal: Public Activity and Press Briefing.
(Release the statement of collective concern)

1=
2=
3=

Survivors, Community-based activists and individuals participating sorted according to base location and put in alphabetical order(being updated):

I Bangalore:

1.AS Mohammed (SJANMS)*
AS Mohammed is the Asst. Professor of statistics and demography in the Department of Community-Medicine, St. John's Medical College and has been involved in numerous studies and reports on health care and evaluation. He is a society member of CHC.
Address: Department of Community Health, St. John's Medical College, Bangalore- 560 034
Phone: 080-2065043
Email: aa.sjmc@vsnl.com

2.Gururaj Budhya (TIED) (1)
budhyag@hotmail.com
Mobile:0-9844069634
Activist Researcher/Involved in the Peoples Campaign

Phone: 080-3315656/3462032

3.Dr. Girish Rao*
Dr. Girish Rao is an Associate Professor of Community Medicine in M.S. Ramaiah Medical College, Bangalore with a longstanding interest in all aspects of hospital waste management. He is also an Associate of CHC.
Address: Faculty of Community Medicine, M.S. Ramaiah College, MSRIT Post, Bangalore- 560 054
Phone: 080-3600968
Email: girishrao@hotmail.com

4.Mohan*, Trade Union Movement Researcher, Bangalore.

5.Nagar Bobby*
Institute of Socio Economic Change(has been working on development issues in 124 villages for 13 years now)
Bangalore. Ph#080-3217083

6.Dr. Praveen Anur is an intern from Kempegouda Institute of Medical Sciences, Bangalore who was a special volunteer with CHC during his Community Medicine posting and was primarily responsible for all communications and facilitation of organisational dimensions of CHESS-1.
Email: anurpraveen@hotmail.com

7.Dr. Rajan Patil is an epidemiologist and is presently a Research/ Training Assistant in CHC with a special interest in vector bourne diseases. He has been involved with creating an interactive science teaching module on mosquitoes and their control.
Email: rajanpatil@yahoo.com

8.Dr. Ravi Narayan is the Community Health Advisor of CHC with professional interest and training in public health, industrial health and preventive and social medicine. Earlier as an Associate Professor of Community Health at St. John's Medical College he worked on occupational hazards of the tea industry and the health effects of agricultural development.
Email: tnarayan@vsnl.com

9.Sachin D'souza
Sachin is a final year medical student at St. John's Medical College, Bangalore
Address: 203-F, Ranka Plaza, 157, Wheeler Road, Frazer Town, Bangalore- 560 005
Phone: 080-5090150
Email: mustardjuice@postmark.net

2/3

10. Dr. Thelma Narayan is the present coordinator of CHC. She is an epidemiologist with a doctorate in public health policy. She has been involved as a resource person for studies on the Bhopal health disaster and is currently a member of the Karnataka Government Task Force on Health and Family Welfare.
Email: tnarayan@vsnl.com

(1)

11. DR. Unnikrishnan PV.
OXFAM

(1)

12. Dr. T. Venkatesh
Dr. Venkatesh is the Professor of Biochemistry at St. John's Medical College and the Director of 'Project Lead Free' of the George Foundation. He is also the head of the National Referral Centre for Lead Poisoning in India.
Address: Department of Biochemistry and Biophysics, St. John's Medical College, Bangalore- 560 034
Phone: 080-5532146/ 2065058
Telefax: 080-6640293
Email: venky_tv@hotmail.com

(2)

13. Viswambhar Pati* / Prof. Sanjay Biswas*
Indian Scientists against Nuclear Weapons, ISANW, Bangalore.

(1)

II BHOPAL:

14. Nishant:
As a community researcher Nishant has worked exhaustively in Bhopal doing a health survey of children born to exposed parents as opposed to unexposed ones to the gas tragedy.

15. Satinath Sarangi:
Sambhavana,
B 2 - 302, Sheetal Nagar,
Berasia Road, Bhopal; Ward
An M Tech in Metallurgical Engineering, Satinath came to Bhopal a day after the disaster and has been involved with relief, rehabilitation and issues of justice for the Bhopal victims since then. He is one of the Founder Members of the Bhopal Group for Information and Action that carries out documentation, research and publications. He is also actively involved with legal actions as well as national and international campaigns.
Email: sambhavana@vsnl.com

(1)

III Bhubaneshwar:

16. Manas Jena
OMAPAN

28.J John* — (1)
John is the Director of Center for Environmental Communications-CEC, Delhi. (1)

29. Dr. TK Joshi* (3)
Ban Asbestos Network India
tkjoshi@vsnl.com

30.Madhumita Dutta, Toxics Link Delhi, New Delhi. mdutta@vsnl.com (1)

31.Manu Gopalan (1)
Manu is a toxics campaigner with Greenpeace India.
Email: manu.gopalan@dialb.greenpeace.org

32. Nidhi Jamwal/ Sunita Narain* (1)
The Centre for Science and Environment,41,
Tughlakabad Institutional Area, New Delhi-110062.
Ph: 011-6081110,011-6083699,fax:011-6085879
email:cse@sdalt.ernet.in

33.Nirmala Karunan (1)
Nirmala is the Administration Manager of Greenpeace in India.
Email: nirmala.karunan@dialb.greenpeace.org

34. Praful Bidwai —
Campaign for Nuclear Disarmament and Peace CNDP)

35. PK Ganguly* (1) AITUC Mahadevan
Secretary of the Center for Indian Trade Unions, CITU.
Email: citu@vsnl.com

36. Rahul Ram* (3)
Toxicologist/Lead Singer- Indian Ocean.

37. Ravi Agarwal (1)
Environmentalist and Director, Srishti, New Delhi
Email: srishtidel@vsnl.net.in

38.Sanjeev Gopal
Sanjeev is currently a trainee campaigner with Greenpeace India.
Email: sanjeev.gopal@dialb.greenpeace.org

39.Dr SD Seth* (3) (1) Dr Halder
AIIMS National Poison Information Cell.
Ph: off:011-6512880;hom:011-6593282;fax:011-6859391

VI. Dodbalapur:

40. Dayanand Gowda

A Youth group trying to respond / protest against Blore mysore Infrastucture corridor project. They have been active against cutting trees; they have also performed a cycle yatra. Fighting pollution due to the Goggo Factory in Doddebalapur, near Bangalore, Karnataka.
Janadhwari Yuva Vedika, Opp. Masjid Kumbarpet,
Doddebalapur-561203
#080-7626450-r

41. Prakash R.
Fighting pollution due to the Goggo Factory. Prakash is from the affected village near Gogo factory; a village panchayat member Doddebalapur, near Bangalore, Karnataka.
Village Aradeshhalli, Doddebalappur
080-8464251-r

VII Edayar:

42. TM Sainuddeen
Fighting pollution due to Binani Zinc's Jarosite Pond in Edayar, Kerala
Thuttangil House, Edayar # 0484-540845.

43. Salim VA*
Fighting pollution due to Binani Zinc's Jarosite Pond in Edayar, Kerala
Valiangadi, Binanipuram(PO), Edayar, Ernakulam,-6835021
0484-555592

VIII Eloor:

44.VJ Jose, Jose was working in Cochin spreading awareness about Road safety and First-Aid tips with Ernakulam Rural Action Force. Now he is an active volunteer of Greenpeace-India. Involved in mobilizing the local community using education material and films from the Greenpeace library. He has also been instrumental in environmental monitoring of the river Periyar.

45.VV Purushan, Purushan is the community leader of Periyar Malineekarana Virudha Samithi, a community based organization involved in pollution prevention through direct actions in Eloor, the largest industrial estate in Kerala.

46.Adv.Daisy Thampi, practices Environmental Law in Kerala.
Email:dait5@yahoo.com

IX Gudur:

47. Gangi reddy. V
Rural Reconstruction and Development Society
Sydapuram 524407

Nellore Dist. (A.P)
#08621-87096

X Gujarat: (1)

48.Anand Mazgaonkar* 49.Michael Mazgaonkar*50 Rohit Prajapati*
51.Swati Desai*s work involves trying to mobilize affected communities along a 200km stretch from Vapi to Mehsana in Gujarat on issues of ground and surface water contamination, hazardous solid waste, air pollution, health effects and TNCs.
pss@narmada.net.in
Paryavaran Suraksha Samiti,PSS, Gujarat. pss@narmada.net.in

XI Haribar Polyfibres
52. Mr. Hiremath (1)
Samaj Parivartan Samudaya
sr_hiremath@hotmail.com
sr_hiremath@rediffmail.com
Has been working on the issue of industrial pollution since a decade

53. Dr. S.L. Pawar (1)
0830-86742
shiva[illegible]@hotmail.com

XII Hyderabad:
54. A. Kishan Rao (1)
President
Patancheru Anti Pollution Committee
Yashodhara hospital
12-5, srinagar colony, Patancheru-502319,Medak Dist. (A.P.)
Local doctor at patancheru , has been involved in health survey around the area

55. Narasimha Reddy (1)
Executive director
Centre for Resource Education
Hyderabad
email: creind@hd2.dot.net.in

56. Prof. K. Purusottam Reddy (2)
Prsident
Osmania university teachers association
#7616115
kumbhamsr@rediffmail.com
activist and campaigner has done phd on related issue (toxics)

XIII Jadugoda:
54. Ghanshyam Birulee*

Jharkhandis Organisation Against Radiation (JOAR)
In: -(0657) 730009

55. Sourendra Gadekar*,Sanghamitra Gadekar*
Anumukti
anumukti@gmx.net

XIV Kaiga-Bangalore:

56.Vishnu Kamath, Citizens for Alternatives to Nuclear energy (CANE), Bangalore.

XV Kodaikanal:

57.Daniel Francis* is a machine orperator in the Mercury Thermometer Plant of Hindustan Lever Ltd. in Kodaikanal.

58.Kanan*, Palani Hills Conservation Council, Kodaikanal.
Email: kanan@vsnl.com

59.S.A. Mahindrababu* and 16 K. Gopalakrishnan* are members of the Ex Mercury Employees Association and are fighting for cleanup of the mercury and better compensation for the workers in Kodai.

60.Navroz Mody
Toxics Campaigner of Greenpeace fighting Mercury Pollution in Kodaikanal and PVC in Cudallore and Mettur.
Email: navroz.mody@dialb.greenpeace.org

XVI Mangalore:

61. Rita Narona*
Roshini Nilaya School of Social Work
Mangalore-575002
262421(R)
sswroshni@vasnet.com
Rita is teaching Social Work at Roshni Nilaya School of Social work, Mangalore. She has conducted a Community Medicine Conference recently and also coordinated a preliminary health survey in the region.

62.Sylvester m Dsouza
Activist , campaigner, mobiliser prsently working with Tide
495046 ® 434803 (o)
tide@vsnl.com

63.Upendra Hosbet
Runs a computer institute, actively working on the issue of environment since a decade. He says that they are against any Mega projects . has organised protests against Cogentrix

#478499/478488
[illegible]_hosbet@hotmail.com

XVII Mumbai:

64.Deepika D'souza, Coordinator, Human rights law network.

65.Dr. Murlidhar V* is a Mumbai based doctor with experience and interest in community health surveys and environmental health issues.
E mail: murlidharv@vsnl.com

66.Dr. Veena Murlidhar* is a medical officer with Navi Mumbai Municipal Corporation. Her work involves control/ surveillance of epidemic diseases and campaigns such as Polio Eradication.
Email: murlidharv@vsnl.com

67.Vijay Kanhere* is a labour activist who has worked for the compensation of workers in industry.
Email: sujvij@vsnl.com

XVIII Mysore:

68.Dr. Narendra Babu
9845226678

69.Dr. Venkatesh Murthy
srisrikar@rediffmail.com
local doctors running their own clinic and nursing home at bhadravati (mysore paper and pulp mill) . Also involved in a study related tohealth impact in kudremukh mining area

70.Varghese Cleatas
Project Director
Vikasana
An organisation working on the issue of environment . they are closely working with th community around terikere (mysore paper and pulp industry); mainly focussing on awareness in the locality
P.B. No. 23
Tarekere-577228
Chikmangalore; Karnataka
0826-422500
422570/423739
vikasana_ngo@sify.com

XIX Orissa:

71 Mahalakshmi Parthasarathy is working with mining struggle groups. She is also involved with legal and media advocacy and information documentation.
Email: pmahalakshmi@yahoo.com

72.Xavier Dias*/ 33.Ravi Rebbapregada*, Mines, Minerals and People
Email: mmpnorth@vsnl.net

XX Philippines:
73. Dr. Romoeo Quijano*,
Pesticide Action Network- Asia Pacific

XXI Raichur:
74. Somshekhar
Samuha
#08536-668213/14
2 more persons from raichur , depends upon how they call a meeting and what comes out of it. I will be calling them ; mainly representative of various group in Raichur

XXII Thiruvananthapuram:
75.Jayakumar C. is the coordinator of Thanal Conservation Action and Information Network. thanal@vsnl.com

76.Rajasree V.V. is involved in Thanal's activities on pollution and toxicity and is specifically working on hospital waste management. thanal@vsnl.com

77.Sridhar R. is involved in campaigns against industrial pollution in Eloor and Mavoor in Kerala. He is also involved in the issue of waste management and has worked on the socio-economic impacts of the newsprint and pulp industries. thanal@vsnl.com

78.Dr. Sukanya, Achyutha Menon Center for Public Health, Trivandrum.

79.Usha S. is involved in environmental education among students and studies and campaigns among farming communities on chemicals in agriculture. thanal@vsnl.com

XXIII Vellore:
80.Dr.Rakhal Gaitonde and Dr.Subhasri Gaitonde
Dr. Rakhal is doing his post graduation in Community Medicine in CMC, Vellore. He has a special interest in peoples movements and using epidemiological skills in activism. Dr.Subhashri is an obstretician and gynaecologist in CMC, Vellore.
Address: 636-B, PG Quarters, CHAD, Bagayam, Vellore
Phone: 0416-260988
Email: subharakhal@yahoo.com

XXIV Warangal:
81/82. Mr. Narasimha reddy* will be inviting two persons working on the issue of pesticides

92-105 Any person you feel may be important to invite?
(Bidhan Chandra Singh is traveling all the hotspots inviting community persons and community-based campaigners for the meeting)

LIST OF PARTICIPATING ORGANISATIONS

Arranged in alphabetical order(a proposal)

1. AIIMS National Poison Information Cell.
In: Dr SD Seth.
Ph: off:011-6512880;hom:011-6593282;fax:011-6859391

2. Alternative Law Forum, Infantry Road, Bangalore.
Represented by Chitra.
Email: alforum@

3. Anumukti
Sourendra Gadekar, Sanghamitra Gadekar <anumukti@gmx.net>

4. Association of Consumer Action on Safety and Health(ACASH), Mumbai.
Servants of India Society, SVP Road, Gurgaum, Mumbai.
Ph: 022-3886556

5. Ban Asbestos Network India
Dr. TK Joshi<tkjoshi@vsnl.com>

6. Campaign for Nuclear Disarmament and Peace (CNDP),
Praful Bidwai, Achin Vanaik.

7. Center for Environmental Communications (CEC)
Mr. J. John

8. Center for Indian Trade Unions- CITU
Mr. PK Ganguly<citu@vsnl.com>

9. Centre for Resource Education
Hyderabad,
Mr.Narasimha Reddy.

10. Centre for Science and Environment,41,
In: Nidhi Jamwal,Sunita Narain.
Tughlakabad Institutional Area, New Delhi-110062.
Ph: 011-6081110,011-6083699,fax:011-6085879
email:cse@sdnl.ernet.in

11. Chintan Environmental Research and Action Group, Delhi

In: Bharathi Chaturvedi

Chintan is a Delhi based NGO working on environmental issues, particularly waste and toxics.

Address: No. 17, Jangpura Market, 2nd floor, above Om Hotel, New Delhi 110 013

Phone: 011-3381627/ 4314478

12.Citizens for Alternatives to Nuclear energy (CANE), Bangalore

In: Vishnu Kamath, Kavitha B.S.

CANE is a Bangalore based NGO working aganist radioactive pollution.

Address: #390, 5th main, 12th cross, West of Chord Road, 2nd stage, Mahalakshmipura, Bangalore-560 086

Phone:080-3592059/ 3592060

E mail: kavayathri@yahoo.com , aravinda@cisco.com

13. Community Health Cell, Bangalore

In: Dr. Ravi Narayan, Dr. Thelma Narayan, Dr. Rajan Patil, Dr. Praveen Anur and Lalit Narayan.

CHC is volulntary health organisation and community health resource and policy centre working closely with the governments and communities to improve health and access to health care. Also involved in training health workers to empower communities at grass root level.

Address: 367, Jakkasandra 1st Main, 1st Block, Koramangala, Bangalore-560 034

Phone: 080-5531518/ 5525372

Telefax: 080-5525372

Email: sochara@vsnl.com

14. Consumer Action Group

In: Shoba Iyer

No.7, 4th Street, Venkateshwara Nagar, Adyar, Chennai-600020.

15. Consumer Voice

F-71,Lajpat Nagar-II, New Delhi-110024

ph:011-6918969,011-6315375

fax:011-4620455

In: Bejon Misra: 9811044424

Email: bejonm@hotmail.com

16. Endosulfan Spray Protest Action Commitee, Kerala

ESPAC was formed at Perla, Kasergod by local farmers and the affected people to fight the aerial spraying of endosulfan and they have been very sucessful in bringing this issue to a larger media and people's attention.

Address: c/o Kajampady Nursing Home, P.O. Perla-671 552, Kasargod District, Kerala
Phone 595088
E-mail: shreepadre@sancharnet.in

17. Greenpeace India
In: Nirmala Karunan, Navroz Mody, Ananthapadmanabhan, Divya Raghunandan, Bidhan Chandra Singh, Manu Gopalan.
Address: J- 15, Saket, New Delhi- 110 017
Phone: 011-6962932/ 6536716
Telefax: 011-6563716
Email: manu.gopalan@dialb.greenpeace.org

18. Human Rights Law Network,
In: Deepika D'souza, Sunita Dubey.
Engineer House, 4 Floor, 86,Bombay Samachar MArg, Mumbai-400023.
Ph: 022-2217078/2204948
Fax: 022-2220822/2227233

19. Indian Doctors for Peace and Democracy (IDPD)
The Indian affiliate of the International Physicians for Prevention of Nuclear War
In: Dr.Arun Mitraidpd2001@yahoo.com

20. Indian Ocean, New Delhi.
In: Rahul Ram

21. Indian Scientists Against Nuclear Weapons (ISANW)
Vishwambhar Pati, Prof. Sanjay Biswas

22. Institiute of Socio-Economic Change
Bangalore
In: Mr Nagar Bobby.
Has been working on development issues in 124 villages for 13 years now.
Ph# 080-3217083

23. Janachetana,
Kishan Rao, Santharam Hegde

24. Jharkhandis Organisation Against Radiation (JOAR)
In: Ghanshyam Birulee -(0657) 730009

25. Janadhwani Yuva Vedika
opp. Masjid, Kumbarpet, Doddeballapur-561203.
Mr. Dayanand Gowda.

26. Mines, Minerals and People(MMP)

In: Mahalakshmi Parthasarathy,Xavier Dias
MMP is a national network of mining- affected communities and community groups and working with mining affected communities in any manner.
Address: 1249/A, Road No. 62, Jubilee Hills, Hyderabad- 500 033
Phone: 040-6505974
Telefax: 040-3542975
Email: mm_p@satyam.net.in

27. National Law School of India- University
Babu Mathew.

28.Occupational Health and Safety Centre, Mumbai
In: Vijay Kanhere, Dr. Murlidhar V. and Dr.Veena Murlidhar.
Address: 6, Neelkant Apartments, Gokuldas Pasta Road, Dadar(E), Mumbai-400 014
Phone: 022-766 0178
Email: webmaster@ohscmumbai.org
Website: www.ohscmumbai.org

29. OXFAM,
DR. Unnikrishnan PV.

30.Osmania university teachers association
Prof. Purushottam Reddy

31.Palni Hills Conservation Council
In: Kanan.
A NGO based in Kodaikanal fighting for the cause of workers affected in Mercury factory of HLL.
Email: kanan@vsnl.com

32. Patancheru Anti Pollution Committee
A . Kishan Rao
President
Yashodhara hospital
12-5, srinagar colony, Patancheru-502319,Medak Dist. (A.P.)
Local doctor at patancheru, has been involved in health survey around the area

33. Paryavaran Suraksha Samiti, Gujarat
In: Anand Mazgaonkar, Swati Desai and Michael Mazgaonkar
PSS is a voluntary self help organisation working primarily in South Gujarat on a variety of issues, including Industrial Pollution and Right To Know.
Address: 37/1, Narayan Nagar, Chandni Chowk, Rajpipla-393145, Gujarat
Phone: 02640-20629
Email: pss@narmada.net.in

34.Periyar Malineekarana Virudha Samiti(PMVS) ,Kerala
In: Purushan Eloor

PMVS is a local group of activists fighting the pollution issue in the Eloor and Kalyar belts of the River Periyar, where there are about 250 industries of all sorts mainly chemical.
Address: Periyar Malineekarana Virdha Samiti, Eloor Depot,
Udyogmandal P.O., Kochi, Kerala.
Phone: 98460-13483
E-mail: thanal@vsnl.com

35. Pesticide Action Network- Asia Pacific
Dr. Romoeo Quijano, Sarojeni Rengam

36. Roshni Nilaya School of Social Work
Social Work Department represented by Prof. Rita Narula

37. Rural Reconstruction and Development Society
Gangi reddy. V
Sydapuram 524407
Nellore Dist. (A.P)
#08621-87096

38. Samaj Parivartan Samudaya
Mr. Hiremath
sr_hiremath@hotmail.com
sr_hiremath@rediffmail.com
Has been working on the issue of industrial pollution since a decade

39. Sambhavna
In: V.T. Padmanabhan, Satinath Sarangi
Sambhavna is a Bhopal based voluntary organisation engaged in delivering holistic medical services to gas affected people. It has undertaken several pioneering initiatives in the field of community health, particularly in the context of communities affected by industrial pollution.
Address: Sambhavana, Berasia Road, Bhopal
Email: sambavna@bom6.vsnl.net.in

40. Samuha,
Raichur.
Somshekhar

41.Samvada, 303, II Floor,Rams Infantry Manor, Infantry Road, Bangalore.
Ph:080-5580585
In: Benson Isaac
Email: samvada@vsnl.net

42. Srishti,New Delhi.
Ravi Agarwal

43. Thanal Conservation Action and Information Network, Thiruvananthapuram:

In: Usha S., Sridhar R. and Rajasree V.V.and Jayakumar C.

Thanal is a community oriented organisation working on conservation issues and toxic related issues. Currently engaged in a community Right to Know campaign in Eloor, Kerala and a proposal to move Kovalam toward a zero waste model.

Address: Post Box No: 815, Kawdiar, Thiruvanthapuram, 695 003, Kerala
Phone: 0471- 311896
Email: thanal@md4.vsnl.net.in , shreepadre@sancharnet.in

44.Toxics Link, Chennai/Delhi

In: Rajesh Rangarajan, Madhumita Dutta
Address: 8, 4th Street, Venkateshwara Adayar, Chennai- 600 020
Phone: 044-4460387
Telefax: 044-4914358
Email: tlchennai@vsnl.net/tldelhi@vsnl.com

45. Vikasana

Verghese Cleatas, Project Director

An organisation working on the environmental issues. They are closely working with the community around Terikere (mysore paper and pulp industry); mainly focussing on awareness in the locality

P.B. No. 23
Tarekere-577228
Chikmangalore; Karnataka
0826-422500
422570/423739
vikasana_ngo@sify.com

PUBLICATIONS:

DOCUMENT INPUT:

1. BROCHURE:
   - Summary of CHESS-1
   - List of Participants: CHESS-1
   - List of Participants: CHESS-2
   - Profiles of all organizations participating in CHESS-2
   - Expected Outcomes
   - Agenda of CHESS-2

2. MANUAL ON LAY EPIDEMIOLOGY
   Prepared by Community Health Cell, Bangalore.

3. POISON FREE EARTH
   A CD Compilation of all toxics-health literature Prepared by Greenpeace India for public use.

4. ELOOR TRI REPORT
   Prepared by Greenpeace India as part of the RTK/Health campaign: Contains global research on toxicity/health-effects and emergency response systems on all chemicals used and released by 7 large industrial units in Eloor and Edayar.

5. DOCTOR-INTEREST reading on toxics and health.
   Prepared by Greenpeace India as part of the RTK/Health campaign

6. CONSUMER/GENERAL INTEREST reading on toxics and health.
   Prepared by Greenpeace India as part of the RTK/Health campaign

7. Any Papers/Reports/Health-Surveys of relevance from skillshare participants are welcome.

DOCUMENT OUTPUT:

1) "THE MANUAL AT WORK":
   PROCEEDINGS OF THE LAY EPIDEMIOLOGY SKILLSHARE
   (DISTRIBUTION ONLY FOR PARTICIPANTS AND IPEN)

2) "A NATIONAL CAMPAIGN?"
   NOTES ON CAMPAIGN STRATEGY IN SMALL GROUP DISCUSSIONS
   (DISTRIBUTION ONLY FOR PARTICIPANTS)

3). POISON FREE EARTH- VERSION 2
   ADDITIONS ON INDEGENOUS RESEARCH IN THE EXISTING RESEARCH COMPILATION

Briefing Questionnaire:

1. What do you expect out of the skill-share personally, organisationally and in terms of your campaigns?
2. What toxic chemicals/products/processes are you dealing with in your campaign?
4. What experiences/ case studies / videos/ slides/ campaign material would likes to share with others during the Skill share?
5. Any other ideas / suggestions not covered by above?
6. Please provide your vital statistics!
   Name of Individual/Organisation:
   Name of representatives and your birthdays:
   Current Postal Address:
   Phone:
   Fax:
   Email:
   Which mode of contact you prefer?

Excerpts from CHESS-2 Responses till date..:

The " Manual on Lay Epidemiology " will be a good guide for NGO's to act upon locally and identify problems cuased by processes that are damaging to the health of the workers and the population.

The POISON free Earth CD will be useful as well for those of us dealing with toxics issues . But again all these matters in the vernacular languages will have better effect on the affected workers and population. Availability of material on the web is also of limited use - many ISP's are shutting down - a sign of weakness for the web media .

I do not know how much of the survey's can be carried out by NGO's themselves . As all of us have our own agenda and idiosyncracies - may be it is good to have the medics and para medics do the work.

With money taking precedence over merit in all speres of life there are not many from the medical field who would volunteer for the survey of health of population of those affected by toxics. After all it is the treatment of these disorders that brings the medics the money ....

What about setting up a lab that will also detect known toxics and help any one with suspicion on various pollutants and toxics. There was some talk about this some time early in the day of the Hg Issue but has been lost in the din of media exposure i guess.

Kanan
Email: kanan@vsnl.com
Palni Hills Conservation Council
An extremely rooted organisation based in Kodaikanal fighting for various conservation issues amongst which one of the most important is the cause of workers affected in Mercury factory of HLL.

It was a shared concern at the last skillshare that we include workers groups too in the next one, who are concerned about their own health in the context of polluting processes and irresponsible and reckless practices of industry. We need to act on this.

For this I think the Xavier would be of help, I will check with him also further for the mines minerals and People Convention there was one Dr Sugathan who had come from CEC Delhi, he too can be of help.

The thrust on corporate liability across various organisations this year, in the context of the WSSD(Rio+ 10 summit) needs attention. How would we tie in and add our key push to this process?
This is definitely a very serious issue what with the "Corporate Responsibility" being touted as the panacea for all the problems. (Check the recent (Human Face of Corporates) by TERI - I can send you a Times of India report)

I would like to be a part of this definitely but have to work it ouat…

Mahalakshmi Parthasarathy
Mines, Minerals and People(MMP)
MMP is a national network of mining- affected communities and community groups and working with mining affected communities in any manner.
Address: 1249/A, Road No. 62, Jubilee Hills, Hyderabad- 500 033
Phone: 040-6505974
Telefax: 040-3542975
Email: mm p@satyam.net.in

Mahalakshmi Parthasarathy is working with mining struggle sroups. She is also involved with legal and media advocacy and information documentation.
Email: pmahalakshmi@yahoo.com

.....

I am sorry that I could not attend the meeting. I met an interesting group of dedicated people working on slow poisons in our environment. Kindly get on to their website slowpoison.com. I will also get n in touch with them and pass on the information about the work going on at your place.
As on date I will be free in July 2002.

Dr. T. Venkatesh
Dr. Venkatesh is the Professor of Biochemistry at St. John's Medical College and the Director of 'Project Lead Free' of the George Foundation. He is also the head of the National Referral Centre for Lead Poisoning in India.
Address: Department of Biochemistry and Biophysics, St. John's Medical College, Bangalore- 560 034
Phone: 080-5532146/ 2065058
Telefax: 080-6640293
Email: venky_tv@hotmail.com

****

I think there are some good points coming up.

I could not discuss the matter with usha and sridhar so may be we will send you one mail with more ideas if we could spend some time

****

Good to hear from you and about the progress. The CD and the guide will be very useful. We may advertise the availability through all possible channels once it is ready. There will be many people who will be interested for the same.

ADP and training of lawyers: I personally believe that this is a good idea. It may be a good idea to explore the possibilities of "skillshare" for lawyers and law students, together or separately.

The idea of a team (to move around) is interesting, but will require lot of efforts, energy and management. Needless to say, we are NOT into soft and easy work ! I will be happy to discuss this further when I am in Bangalore (April 3rd and 4th week), if it is not too late.

Dr. Unnikrishnan PV (E-mail: unnikru@yahoo.com)
Co-ordinator: Emergencies; OXFAM INDIA :
Dr. Unnikrishnan is currently a staff member of OXFAM India Trust and is working as a resource person on disaster response including psychosocial consequences and human rights issues. He was the editor of the India Disaster Report 2000 and earlier member of the Public Policy and Advocacy Unit of Voluntary Health Association of India. He is also an Associate of CHC.
Address: Vijaya Shree, 4th A Main, near Baptist Hospital, off Bellary Road, Hebbal, Bangalore- 560 024
Phone: 080-3632964
CONTACT (FEB-APR 2002) UNIVERSITY OF GENEVA, GENEVA :(MOBILE: ++41 78 876 5437) FAX:+41 22 789 24 17
Email: unnikru@vsnl.com

****

Well right after the skillshare I did the Sukhinda trip (the report of which I have sent to you/Hex Chrome) attending the skillshare did guide me thru it..

5) awareness generation of the communities affected/NGO"s individuals working in the area.. can this be clubbed with the mobilisation bid

Here can I add that it would be a good idea to have a focus meeting on the effects of toxics on children, (exposure routes, effects) it would be of help/ as we have been witness to child labour in the mines/quarries

How about also adding on a veterinary perspective because most of the mining areas have come to understand that the livestock to is invariably effected/it would be of help if we understand this better. Here would like to mention an organisation Anthra /Yakshi am pasting their profile below it would be good if they too are included in the next skillshare.

Besides this we also discussed the possibility of working on our campaigns across the country understanding common concerns and unifying issues. We could at the least produce a Statement of Collective Concern
Of this I liked .. for starters…the Sukhinda issue?? (am being verry focussed;-)

on this

It may take some more time so i am sending this mail in between.

The focus is health and community issues so while we need to understand the legal aspects we should limit ourselves to one advocate or legal expert may be Mohan if every one agrees so that he can give us insight to the legal system than involve the networks law or many people.
If the law groups has a focus as same as the workshop it will be good otherwise the discussion will go in to areas and loose focus.

Secondly reaching out on common issues is a area of concern we were just wondering to take up a travel to all cashew areas and network with workers and community on the endosulfan issue

may be we will have more to add when we discuss the mail later with other folks here

Jayakumar C.

Expected Outcomes of CHESS-1, 2001 as expressed by 5 participant organisations

C1-Thanal Conservation Action and Information network

C2-Occupational Health and Safety Center, Mumbai

C3-Paryavaran Suraksha Samiti, Narmada

C4-Citizens for Alternatives to Nuclear Energy(CANE)

C5-Mines,Minerals and People(MMP)

1.What would you like us to cover in the Skill Share (general)?

C1- a)Basic human physiology and interactions of the various systems within for our general understanding,

b)The sequence that generally follows in the human body from the various routes of exposure to the health effects- acute and chronic and after(and also we need to understand their various forms like genotoxic, teratogenic, carcinogenic, etc.)

c) Multiple factors or sources are sometimes blamed for the same health problems seen, For e.g. In one informal health survey on endosulfan sprayed area in Kasargod we found a very high percentage of women having gynecology related problems- but many also revealed that

they had Copper-T implants and they were relating their problems to that.

d) Synergistic effects of various chemicals/ chemicals and lifestyles made causative linking difficult- simultaneously making it easier for the polluters to blame some other thing for the effects (like chewing pan, cigarette smoking, vehicular pollution, malnutrition, lack of iodine etc as possible reasons also)

C2- a) Factory act and its occupational and environmental ramifications.
b) Workmen's compensation Act, ESI Act.
c) Disaster Management planning and antidotal treatment in case of chemical factory disaster, preparedness, training of local doctors and networking.

C3- a) Known impacts of air and water pollution.
b) Impacts of constant exposure .

C4- a) Methodology used for Health Survey.

C5- a) Mining and health
b) Industrial Pollution and impacts on community
c) Occupational Health

2.What would like us to cover in the Skill share (Specific to your campaign)?

C1 a) A community having health disorders may be due to a single external factor like endosulfan in Kasargod or due to multiple external factors like a mixture of pesticides like in Idukki or due to a waste dump and burning, How will it be possible to develop a tool or set of tools to link disorders to the factors, especially when we interact with the community directly with focus on women and children.
b) People in the surroundings of industrial area having a lit of all kinds of chemical industries like fertilizers, pesticides, chlorine and chlorine compound manufacturing units, paper industries, rare earth factory etc- their individual and synergistic actions is making this too complex a problem. How would one look at health of communities in such complex conditions.
c) Plantation workers exposed to agro-chemicals over many years and their families affected by the same- directly and indirectly.
d) Workers and community living around and exposed to chemical in pesticide manufacturing units like the Hindustan Insecticides Limited factory at Eloor which manufactures DDT, endosulfan, diclofol, and used manufacture BHC till 1997.

C2- a) Noise induced hearing loss.
b) Occupational lung diseases
c) Hospital waste hazards and management.

C3- a) Suspected cancer in an area downstream carrying effluents.
b) Impact of heavy metals, organic chemicals on health.

C4- a) How to calculate food and nutrition data in calories (food and nutrition data are collected in grams)
b) Any specific indexes that we need to calculate general health of the people.

C5- a) Health effects of mining (specific mining cases listed in Q4-C5a)
b) Effects of mining on workers
c) Effects on women workers (reproductive health) and community members

3. What toxic chemicals/products/processes are you dealing with in your campaign?

C1- a) Pesticide- especially organochlorines like endosulfan and organophosphates like phorate. The health issues due to direct intake by communities exposed to aerial spraying and otherwise, workers involved in spraying, and also indirect intake from contaminated water or food from the area sprayed.

b) Pollution due to effluent and emission from pesticides factory producing DDT, endosulfan, diclofol, and BHC (till 1997) The HIL factory lets out the effluents into a stream which contaminates large areas of wetlands before draining into the river Periyar. A Green peace study found 111 chemicals, 56 of which could be reliably identified, of which 39 were organochlorines including DDT and metabolites, endosulfan and breakdown products, HCH etc There are other highly polluting factories in the same area manufacturing phosphate fertilizers (FACT) rubber processing chemicals (Merchem) The study also found high levels of cadmium, chromium, zinc, copper and mercury in the same effluent stream. The stream is not being directly used for drinking water/ other purposes now, but at least 300 families live on its banks directly inhaling the pesticide smelling fumes emanating from the stream and consuming coconuts, ducks, eggs, which smell of the chemicals.

C2- a) Noise
b) Cotton dust and chemical exposures causing lung diseases.
c) HIV, Hepatitis B&C

C3- a) A cocktail of dyes, pharmaceuticals, intermediate chemicals etc.
b) Decentralized cottage level waste recycling of containers, drums, bags containing chemicals.

C4- a) Radioactive Pollution

C5- a) Coal, bauxite, uranium, mica, limestone, granite

b) Downstream industries (coalwasheries, smelters, refineries, crushers, etc,)

4. What experiences/ case studies / videos/ slides/ campaign material would likes to share with others during Skill share?

C1- a) We would like to share the aerial spraying of endosulfan issue in Kasargod and one of the study related to health a survey done in a village in Kasargod and findings collated out of a death register survey from three villages.

b) We would like to share the Right to Know campaign and the issue at the Industrial belt at Eloor, with slides on the pollution there..

C2- a) Compensation to workers for occupational lung diseases and noise induced hearing loss as per ESI Act

b) Compensation to workers with radiation injury, accidents as per workmen's compensation act..

c) Books on disability assessment, occupational diseases(in schedule III of WC Act)

d) Books on occupational HIV and hepatitis B&C . Antidotal treatment in case of chemical disaster, experience of struggle by Parivartan in chemical belt in Konkan.

C4- a) Presentation using slides on Base lines health survey conducted around kaiga.

b) Nuclear Power Plants and Public Health.

C5- a) Videos: Jadugora uranium; Baplimalli bauxite (Orissa) ; Silicosis

b) Case studies: Mapoon story of Australia(indigenous people and Aluminium companies) Story of Orissa-chromite areas, Environmental Aspects of bauxite and aluminium production in Brazil and Indonesia: Kossing Uranium- revealing health and environmental risks, Mica in AP

5. Any other ideas / suggestion not covered by above?

C1- a) Can we think in terms of producing some fact sheets on health impacts due to the chemicals discussed in this Skill share. This could be one of the outcome of the skill share.

b) Could it be possible to develop an easy to understand note on the terms like genotoxic, teratogenic, carcinogenic and such other terms which are commonly used to depict the toxicity of these chemicals.

C2- a) Guidelines for impairment and disability assessment for compensation purposes.

b) Doctors' training and networking.

C5- a) How to do health surveys on occupational health.

b) How to monitor industrial pollution

c) Critique of our existing health survey questionnaire.

Strengths and Weaknesses of the CHESS Process

(as perceived by the CHESS-1 participants)

Here is the compilation of all the responses received from the participants in CHESS.

Strengths:

- *"Great rocking doctors, thorough, accessible and knowledgeable."*
- *"Good comprehensive program."*
- *"Concrete outcomes-ROHC-Kasargod, Kodaikanal."*
- *"Gained knowledge about toxics and its environmental impacts.Did justice to the phrase 'skillshare', a lot of information and material was shared."*
- *"Side sessions on strategy, toxics and input to planning commission were helpful."*
- *"A brilliant mixture of eager, committed environmental activists as well as medicos, community health experts and scientists who made the 3-day skillshare very rich and worthwhile."*
- *"The workshop provided a platform to bring the different activists groups under one roof, which may give inspiration to our work."*
- *"Good learning process for first timers."*
- *"Created hope that we together can do a lot against toxic burdens on our body and environment."*
- *"Met a very nice set of very good activists and concerned persons."*
- *"Hope for future common action increased during the meeting."*
- *"Trusting, friendly atmosphere."*
- *"Expertise of each group in its own field."*
- *"Lots of resources, interaction."*
- *"Easy going nature of interaction."*
- *"Getting to know new, friendly groups on the same wave-length."*
- *"Strengthed groups in formulating and conducting their own surveys."*
- *"The unity and the commitment to a cause and to think locally and act globally."*
- *"Learned a lot in the medical field."*
- *"All the presentations were mind boggling and enriching."*
- *"Sharing of experiences was an obvious strength. Translating this into skills and action plans is the challenge."*
- *"This forum raised/brought out the deeper conflicts and larger issues that we are all dealing with and has left us with a quite a bit to think about."*
- *"Excellent sessions, good resource persons and information."*
- *"Sharing experiences in industrial toxicity were very useful."*
- *"Legal/medical opinions were also useful."*
- *"Gained much more confidence about the work I want to do and felt a support system I was unaware of."*
- *"Outstanding ideas implanted and really began to re-understand many issues."*
- *"Help to plan in managing environmental disasters."*

Weakness:

- *"Several slow sessions."*
- *"Sometimes repetitive within the same session."*
- *"Wanted more interactions with some resource persons."*
- *"Case studies of actual surveys to outline the 'Dos & Don'ts' of surveys and studies would have been helpful."*
- *"Needed proper time management."*
- *"Didn't provide time to certain participants like CANE to share their experiences due to lack of time. "*
- *"Some participants needed more time to speak about their actions."*
- *"Time allocation for subjects could have been done better."*
- *"Should have taken a particular case for survey and done more practical work together with the theory."*
- *"Too little time for so much."*
- *"Less number of groups so less experiences shared."*
- *"Too little time."*
- *"More political and ideological discourses would have been good."*
- *"More affected community representation would have made it richer."*
- *"Question of time? "*

अन्तर्देशीय पत्र कार्ड
INLAND LETTER CARD

To
Dr. Rani Narayanan & Dr. Thelma Narayan & Friends
'367' Srinivasa Nilaya, Jakasandra
1st Main, Koramangala I Block
Bangalore - 34
PINCODE 560034

Third Fold तीसरा मोड

भेजनेवाले का नाम और पता Sender's Name and Address

Dr. Sripathy Kajampady, M.B; B.S.
Medical Officer:
KAJAMPADY NURSING HOME
PERLA - 671 552

PINCODE

NO ENCLOSURES ALLOWED

First Fold पहला मोड

Dear Sir/Madam,

We invite you to a

SKILLSHARE PROGRAMME

on Sunday, 20th January 2002.

Subject : **" Pesticide and Health with special reference to chronic exposure."**

Venue : **Sri Shankara Sadana, Perla**

Time : **7-00 Pm**

Keynote Address : **Dr. Romeo F. Quijano**

Professor of Pharmacology & Toxicology College of Medicine, University of the Phils. Manila, Philippines.
Member, Forum Standing Committee, Intergovernmental Forum on Chemical Safety (IFCS)

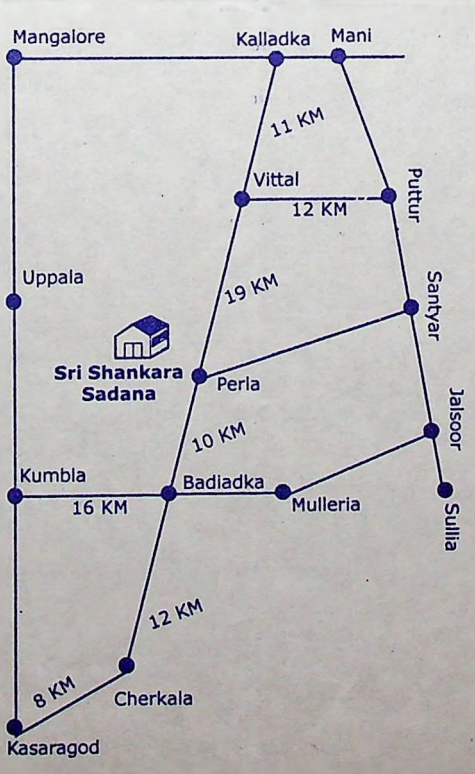
Yours Sincerely,

Dr. Shripathy Kajampady M.B.B.S.
Kajampady Nursing Home, Perla
Ph : (0499) 895088 (O)

Dr. Y. S. Mohana Kumar M.B.B.S.
Kumar Clinic, P. O. Vaninagar
Ph : (0499) 866133 (Off) 860233 (Resi)

You are also invited to join us for dinner at 8-45 pm.

The function will start on time. Kindly co-operate.



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18/1/02

E 8A 4 -

Endosulfan Spray Protest Action Committee (ESPAC)

C/O Kajampady Nursing Home , Post : Perla , 671552

January 14 , 2002

Dr Ravi Narayan
Community Health Cell
367 , Srinivas Nilaya
Jakkasandra , I Main ,
Koramangala , I Block ,
Bangalore- 560 034

Dear Sir ,

Jayakumar, Co-ordinator, Thanal, we understand, had discussed and requested your co-operation to us in identifying the victims, damage assessment and for giving us guidance as to how to proceed in the issue further.

We would be grateful if you could kindly help us in the above matters and oblige. As a first step, we invite yourself and your colleagues to our village on 20th and 21st of January when Dr. Romeo F. Quijano, Professor of Toxicology and Pharmacology at University of Philippines.

Invitation for a talk by Dr Romeo to be held at Perla on 20th Sunday at & PM is being sent by separate mail . We herewith extend a invitation to you all for the function also .

Wishing to have your continued co-operation and valuable guidance to do whatever little we can to reduce the pains of the hapless victims ,

Yours Sincerely ,

Aravinda Yedamale

Chairman

RKN 437 15/1/02

LM 21/1 TN/CMF for information

19/1 RKN and Praveen left on 18th night to join Jayan and Dr Romy on the field trip in Kasaragod before the meetings Dr Venkatesh (SJMC) and Dr Raj Mohan (ROHC) will also attend the meetings RN 21.1.02

October 10th:

8.45 - 09.15 am
Beginning of the Day: Introduction to the groundwork done so far from CHESS, follow up meetings and some of the thoughts brought out from such discussions, for consideration of this group

Session III : Group Task in three or four smaller groups
09.30 am to 11.30 am [incl. Tea Break]
"What collective strategies to identify health problems, assess the damage, communicate the same to the affected and the policy makers, and to launch a national campaign as a coalition - who are the key targets?"

Session IV: Sharing of group work
11.30 to 1.00 pm
Sharing of group work in the plenary; Panel to respond to the discussions [Romy and Sarojeni]

1.00 pm - 2.00 pm : LUNCH

Session V: Way Forward
2.00 - 3.00 pm
Way Forward: Broad National Strategy and Action Plans [incl. Roles and responsibilities]
3.00 - 3.30 pm
Any discussions required on organisational mechanisms, name for the coalition and so on

Last Session: Acknowledgements and winding up
3.30 - 4.00 pm
Acknowledgements and winding up of work done in the workshop

9th October 2002: Public Meeting in the form of a Panel Discussion
Theme: Pesticides and Health
Main Speaker: Dr Romy Quijano
Panelists: Shri Muralidharan, Shri Mohan, Shri Narayan Reddy, Dr Prakash, Dr Ravi Narayan Dr Renee Borges, Dr Gururaj

6 - 9.15

INDIA - PESTICIDES AND HEALTH MEETING : 8TH - 10TH OCTOBER 2002
INDIAN SOCIAL INSTITUTE, #24, BENSON ROAD, BANGALORE 46
PROGRAMME SCHEDULE

October 8th:
Arrivals and Registration in the morning - Registration starts at 10 am
Informal interactions and discussions upto lunch

2.00 - 4.00 pm
Introductions - all participants introduce themselves and their work briefly and highlight any work / conditions related to pesticides and health in their area

4.15 - 5.00 pm: Three presentations of case studies - 15 mts each
* Kasargod Endosulfan by ESPAC/Thanal
* Warangal Poisonings by Warangal
* Bhatinda by Kheti Viraasat, Punjab

DINNER: 7.30 PM to 8.15 PM

8.15 pm - 10.00 pm: Video Screening
Videos to be screened: Showers of Misery/In God's own country/Living Dead on Endosulfan; Elizabeth's Guillette's film from Mexico; Toxic Trail and so on

October 9th:

Session I : Introduction to the subject and setting the tone:Three Presentations
8.30 - 9.00 am : Welcome and Introduction to the workshop
9.00 - 10.30 am : Global Campaigns against Pesticides: SAROJENI RENGAM
10.30 - 10.45 am: TEA
10.45 - 11.30 am: India - campaigns [past and present] : JAYAN
11.30 - 01.00 pm: Pesticides and health - ROMY QUIJANO
01.00 - 02.00 pm: LUNCH
02.00 - 02.45 pm: Response to the Presentations in the morning

Session II : Moving into the details - the Indian Scenario
03.00 - 04.00 pm: Indian Regulatory Mechanisms and how the industry operates: KHUSHAL YADAV, CSE
04.15 - 04.45 pm: Three Short Presentations, 15 minutes each
* Cardamon case study : USHA
* Pesticides and Public Health [DDT - Karnataka experience]: Dr RAVI NARAYAN
* "Pesticides handling" [transporation, containers, household level use etc]: RAJESH

05.00 - 05.30 pm : "Why have we not been able to eliminate pesticides in India so far?"

PUBLIC MEETING: 6 TO 9 PM; DINNER - AFTER 9 PM

worker collective against the management. Hindustan Lever Limited has a thermometer plant in Kodai (now de-funct after demonstrations from ex-workers and Greenpeace) which is 100% EOU. The issue primarily raised was the health problems related to their work , the lack of information regarding the ill-effects of handling mercury, and lack of protective gear for workers.

- One of the interesting events of Chess I, was the incidental participation of Anibel F. Comelo, a student doing her PhD in London on Electronic wastes and their management in developing and developed countries. She provided and interesting insight into the electronic and recycling industry in US , which was informative as well as myth shattering with respect to the USA being a model country for occupational safety.
- Anand of Paryananam Suraksha Samiti, Gujarat informed in about the industrial pollution in Gujarat especially the Vapi to Baroda - 200 km stretch with about 275 industrial estates and 1800 small scale and medium scale industries. The main problem in the region was the effluents from the industrial plants and its effect on the general health of the people. The effluents were being drained into river and other water bodies like the lakes, streams...
- Mr. Joe, a volunteer with Greenpeace from Kerala spoke on the industrial pollution in Udyogmandal - Eloor district in Kerala. This industrial area has about 250 factories, chief among them being HLL & FACT fertiliser factories. The effluents from these plants were let out openly into the surrounding backwaters. People in and around this area suffered from a wide variety of medical problems and cancer was a common phenomenon in almost every household.
- P. Mahalakshmi represented MMP. MMP is an association of individuals, instituions and communities working for people affected by mining. They support rural struggles, give technical and scientific expertisee and develop campaign strategies. Rajulamma represented Samata from Andhra Pradesh is working with tribals for their health and human rights.
- Dr. Ravi Narayan, made a detailed presentation on Epidemiology – and it's aspects for the campaigns and common understanding.
- Dr. Mohan Isaac's, a Professor of Psychiatry in NIMHANS and Vice President of SOCHARA, discourse on COMMUNITY HEALTH AND PSYCHIATRY Dr. Mohan Issac, shared the experience of his Kodaikanal visit. His experiences and talk on mental health scenario in India was an eye opener to most. Dr. Mohan also outlined the importance to do an health survey with perspective of mental health.
- Dr. Girish, Asst. Professor of Community Medicine from M.S.Ramaiah Medical College held a panel decisions on Hospital Waste Management. In this a number of interesting points were raised like- the heriarchy in health care industry like between doctors and cleaning class, the neglect of occupational safety of lower grade workers in hospitals, ignorance about the hazards of hospital wastes amongst the nursing staff , etc. He also shared his experience in starting the Malleshwaram Health Care Waste Management process involving all private practioners and nursing homes in that area.
- A panel chairman on another important aspect of community health namely "Women's Health" was also conducted. This session was chaired by Dr. Thelma Narayan and Dr. Subha Rakhal. It turned out to be interesting and interactive and

various issues were discussed including irregularities of menstrual cycles, miscarriages, and abortions were discussed with relevance to their environment and occupation. The problem of gender bias in surveys and studies was also highlighted with a reason to look into the reason in such future studies.

- The last and one of the most important sessions involving the whole group was the "What next session"

Subject: CHESS
Date: Thu, 31 Oct 2002 12:54:33 +0530
From: Community Health Cell <sochara@vsnl.com>
To: Sunil Kaul <scowlie@yahoo.co.in>, Abhay Shukla <abaysema@pn3.vsnl.net.in>, Sukanya <sukana@sctimst.ac.in>, Ramakrishnan <r-ramakrishnan@mailcity.com>, murlidharv@vsnl.com
CC: Ananthpadmanabhan <ananth@dialb.greenpeace.org>, Manu Gopalan <mangoforu@vsnl.net>, Nityanand <nity68@vsnl.com>, Jayan <thanal@md4.vsnl.net.in>, sujvij@vsnl.com

Dear CHESS manual contributors,

Greetings from Community Health Cell-CHESS, Bangalore and apology for the delay in following up about the CHESS manual. We were waiting for comments from different members.

1. CHC became quite involved with the endosulphan issue (Rajkumar completed a video documentary on the endosulphan affected area and we evolved a comparison table on what the industry says about endosulphan and what the medical literature says).Look out for it in the next issue of Down to Earth (CSE)

We were also involved in the Pesticide group meeting that took place in ISI, Bangalore from 8-10 October (Rajan, Praveen and Rajkumar attended) including the public hearing on the 9th, the press conference on the 11nth and a visit by Dr Romy Quijano from Philippines at CHC on the 11nth.

2. Having waited long enough we have now put the following together:
1) Feedback from Sunil Kaul, Murali, Sukhanya and Dr Ramakrishnan and others.
2) Rajan's original unedited draft-beyond CHESS 2
3) Rajkumar's summary (For CHESS 2)
These attachments are sent to all of you.

3. We now suggest following action to take this collective process forward:

i) Sunil is being requested to be the chief editor of the manual because his suggestions are the best blend of science, pragmatism and field reality.

ii) All of you should send contributions of chapters or additional sections. The rule will be
a) simple language
b) Point wise or step by step presentation
c) Case studies or relevant examples of environmental health as box items wherever possible preferably focussed on Indian experiences or occupational health (Jayan, Nitty, Manu)and perhaps even from the CHESS network itself.
d) Focussing on what NGO activists or campaigners can do to establish links, prima facie case, or preliminary situation analysis.

4. Remember we are not making them into epidemiologist's focussing on complicated issues, costly interventions or discoverers of scientific proof or causal relationships. This is for academic and research institutions like NIOH, ROHC, NEERI, Medical colleges and others to do at the request of NHRC, ICMR, Supreme court etc on the basis of Public Interest Litigation PIL.As campaigners they need to establish the "problem" and demand for use of precautionary principle.
5. Elizabeth's manual is a very good and practical one but very focussed on the pesticide type of problem. What we are evolving together is a supplementary one to that which will serves the plural needs of a group like CHESS and focuses on more than pesticides including mining situation, industrial estates, other environmental hazards. Also it will be a collective exercise building on plural experience as well. We have to focus on the field work innovations that we have all done and not on textbook or formal methodologies and descriptions. I am sure Sunil will manage to edit all the contributors with this perspective.

6. The time line is that all the pieces should come in by 30th Nov sent to sunil directly with a compy marked to CHC. A draft to be ready by 30th Dec.

7. We hope all of us will be able to meet at the Asia Social Forum in Hyderabad between the 2nd-6th Jan 2003 and find a little time to discuss the manual as well.
CHC, Greenpeace, CHESS and others will coordinate a seminar on environment and health at ASF which will have testimonies from 15-20 hotspots. This will be presented to a to a Peoples Health Movement commission.Hope you are planning to be their

More details later.

Regards,

CHC-CHESS mannual team,
Thelma,Rajkumar,Rajan,Ravi.

CC. Anant, Manu, Nitty,Jayan,Vijay.

CHESS Manual Dr Suneel Kaul.doc	**Name:** CHESS Manual Dr Suneel Kaul.doc **Type:** Winword File (application/msword) **Encoding:** base64

epi module.doc	**Name:** epi module.doc **Type:** Winword File (application/msword) **Encoding:** base64

Sent to all the CHESS Contributors.

Sir Dave – does not have E-mail. It will be sent by post.

RRP
31/10