Human Health and Environmental Impact Assessment

Based on four regional workshops held between March 1989 and March 1990

Canadian Public Health Association

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EXECUTIVE SUMMARY

This report is based on discussion at four regional workshops held between March, 1989 and March, 1990, in Toronto, Edmonton, Halifax and Montreal. The objective was the same in each of the four workshops: to explore how effectively human health is considered in Canadian environmental assessment (EA) processes. Subsequently, a fifth workshop was held on northern issues, and a separate report on that workshop together with a background paper prepared for the session is available from The Canadian Environmental Assessment Research Council.

After each of the first three workshops, a report was prepared summarizing the discussion to date. That synthesis was provided to participants prior to the next event. The organizers hoped that these interim reports would enable the workshops to build on each other, and that, in fact, did occur. This final report, then, is a synthesis of discussion at all four workshops.

At each workshop participants were asked to consider the inclusion of human health in EA from four perspectives: scientific and technical, procedural, institutional/jurisdictional, and socio-political. The following summarizes the rich discussion in each of these areas.

Scientific and Technical Considerations. The effective inclusion of human health in EA is constrained firstly by scientific complexity and technical uncertainty. Increasingly, concerns are with the effects of low level, long-term exposure to multiple agents, through multiple pathways. Linear cause/effect relationships are generally impossible to demonstrate using conventional science, (suggesting a need for multi-disciplinary research taking a systems approach), but psychological and community stress arising out of perceived risk is often apparent.

The usual tools for tracking public health effects, toxicology and epidemiology have proven less than adequate. The tracking of exposure at and below the cellular level, through molecular epidemiology, appears promising.

But at present, the issues in EA and human health are basic and numerous. When we refer to human health, do we mean only physical health, or do we include psychological and community health as well? What risk to health does a given level of exposure imply? What level of risk will we tolerate? When we refer to risk, how do we weigh perceived risk, considering that psychological stress effects in many cases appear to be more significant than physical toxicity?

Clearly, science should work toward better measures of exposure and estimates of toxicity, and it should develop a more understandable (and perhaps relative) language of risk communication. But ultimately, acceptable levels of risk will not be scientifically determined.

Scientists can contribute to risk communication by ensuring ready access to data; by ensuring data reliability; by providing understandable data interpretation; and by continuously updating the standards that the EA process depends upon as measures of acceptability. The scientific community should also respond to the evident need for a steady stream of understandable public information, while acknowledging that subjective and experiential community knowledge is legitimate as well.

Additional recommended scientific initiatives include:

- better techniques for the assessment of psychosocial, cultural and cross-cultural effects;
- better techniques in small scale epidemiology that would be applicable in community health studies to establish baseline conditions or assess effects;
- guidelines for critical review of the EA process itself, and the environmental impact statement (EIS) that it generates;
- protocols for applied ("problem-oriented") researchintothe human health effects of environmental stressors;
- research on effects seen only in offspring (generational effects);
- research on environmental hypersensitivity;
- linkage of databases potentially of value in epidemiological studies; and
- development of regulations and standards based on actual or suspected human health effects.

Procedural mechanisms. Reviews of EA procedure in various parts of Canada indicate increasing acceptance of human health issues in environmental assessments, but a requirement to consider effects on human health is rarely explicit in legislation. Many jurisdictions have adopted broad definitions of human health, but few appear to have recognized the implications of their action.

Some participants argued that explicit legislative requirements are not necessary because human health issues come to the fore when concern is high. However, confidence that the EA process protects human health, when health is addressed, depends upon the adequacy of the regulations and standards that development must meet, and this was held in some doubt.

Other participants, from various jurisdictions, report that human health rarely surfaces in EAs, and that arguments for the assessment of just physical health effects face continuing opposition. Other factors inhibiting the inclusion of human health in environmental assessments are the lack of detailed guidelines both for the assessment of human health effects and for determining the feasibility of community health studies; limited access to data and data interpretation; scientific and technical uncertainty; the relatively small penalties in place for polluters; the limited resources available to health professionals and community groups; jurisdictional problems that allow the issue to "fall between the cracks"; and disagreements about the definition of human health.

Public participation in determining whether health issues need to be addressed, and what concept of health is to be used, is strongly recommended. Public involvement from the outset of an EA is vital. But constmctive involvement will only occur with public confidence in the process, good communications, and the availability of resources enabling community groups to participate fully. Mediation may prove a valuable addition to EA procedure, but only if mediators can be found who are both skilful and credible.

It is also recommended that EA processes apply to a broader range of development activity in both the public and private sectors. However, if development at the small and medium scale is to be addressed, the role and resources of local and regional governments, and of public health units, must be expanded.

The role of local health units is problematic. As protectors of public health they logically have a role, but they are understandably constrained when the proponent is the municipality; by training, mandate, and limited resources; and by their traditional orientation to infectious disease control.

One further and highly significant procedural issue is the role of environmental health professionals and the EA process in shaping policy and reviewing standards. It is recommended that some formal procedure link EAs and environmental health professionals to broader reviews.

Institutional/Jurisdictional Issues. Discussion at every workshop made it quite evident that better coordination is needed between levels of government, sectors and disciplines if environment-related human health issues are to be managed well. The role of municipal and regional governments should be strengthened in EA. Linkages between environmental and health professionals should be enhanced, and both would benefit from cross-training and shared databases.

Within government, responsibility for environment-related health issues is highly fragmented. In several regions, it appears that this has been largely overcome through informal cooperation among technical staff, but ongoing collaborative institutional arrangements were strongly recommended.

At the provincial or regional level, organizations should be established that are devoted to the protection of human health from environmental hazards. These organizations should be mandated and operated in such a way that they attain wide credibility as centres of community-oriented information, expertise, and research. While their primary function would be to serve public health units, they would also serve individuals, community groups, and policy makers. A national library devoted to the relationship between human health and the environment should be considered to support such organisations.

So&-political issues. The central so&-political issue identified in the workshops is the **degree** to which **EA procedure institutionalizes** the **stakeholder** principle. The **consensus** was that all **stakeholders** should be accepted as **responsible partners** in the **EA** process. A level playing field is essential to full participation: communities and public interest groups should have access to **adequate** financial and technical **resources.**

Another socio-political issue is the role of the media and media **relations.** Participants recommended that local health units develop media strategies, while building ongoing relations with the media to promote informed, balanced journalism. Canada's schools of journalism should expand their programs in human health, the environment and science.

Lastly, particularly in the less **prosperous** parts of Canada, the search must continue for ways to meet environment-related human health concerns, while minimizing **threats** to the local economy.

INTRODUCTION

In May 1987, a national workshop was held on "Health Aspects of Environmental Assessment". The workshop was initiated by the Canadian Environmental Assessment Research Council (CEARC) as part of its multi-year research program on human health and environmental assessment (EA). The workshop was co-sponsored by seven other national and international agencies. Over 40 professionals in the health, environment and social fields, as well as representatives from consumer groups, were invited to participate.

One of the recommendations from the workshop was that continued and, in some cases, improved communication is necessary between health and environmental professionals if the problems associated with including human health in EA are to be resolved. To this end, a series of four regional, interdisciplinary workshops was initiated by CEARC. It was felt that, given Canada's diversity, the most effective national discussion would be based on discussions in the regions.

The regional workshops were organized by The Canadian Public Health Association (CPHA) under contract to CEARC. The workshop series was co-sponsored by The Federal Environmental Assessment Review Office, Environment Canada, Health and Welfare Canada, and CPHA.

The objectives of the regional workshops were:

- to identify the scientific and technical needs, including research needs, to improve the consideration of human health in environmental assessment;
- to explore procedural mechanisms for improving the consideration of human health in environmental assessment;
- to discuss the institutional and jurisdictional mechanisms that encourage or discourage the consideration of human health in environmental assessment; and
- to examine the so&-political conditions that encourage or discourage the consideration of human health in environmental assessment.

The four sessions were held over a twelve-month period, from March, 1989 to March, 1990. In every case, discussion was active and thoughtful, and, by providing participants with a report on the prior discussions, the sessions were able to build upon one another. The hope was that a truly national discussion would result, deepening over time, and this did in fact occur

This report combines the thinking of all four workshops. Where regional differences are apparent, they are identified. otherwise, the workshop notes have been used to create a report that explores the issues in a way that reflects the full texture of discussion.

The report will be used directly by CEARC in the development of its *Research Prospectus and Background Paper on Human Health and EA,* and by the co-sponsors in policy and program development. CEARC reports are expected to influence research, thinking, practice and policy- making in the environmental assessment of human health issues across the country.

The workshops have also proven to be valuable opportunities for face-to-face, interdisciplinary and interjurisdictional discussion within each region. As well, they have laid the foundation for a national network on human health and EA.

Each of the workshops was organized as a loosely structured "round-table" discussion involving participants drawn from a wide range of professional backgrounds and institutional affiliations, including government agencies, academic institutions, the private sector, and non-governmental organizations (NGOs). The participants and staff at each workshop are listed in Appendices A through D.

The workshop design in each case involved an exploration of the four central themes that affect the inclusion of human health in environmental assessment: scientific and technical considerations, procedural mechanisms, institutional and jurisdictional issues, and socio-political factors.

These four themes were discussed in four separate sessions at each workshop. The exploration of each theme was composed of a presentation and plenary discussion. However, discussion inevitably escaped the bounds of structure. In each case the workshops proved to be exciting and creative "brainstorming" events, with all of the four central themes woven into the fabric of every discussion.

In order to prepare this final document and each of the interim reports, the rich but complex discussion has required careful thematic analysis. This was done as follows. During each workshop, a detailed record was generated on microcomputer. Subsequently, the commentary was sorted, on computer, by the four central themes, and by the subthemes that emerged. The report is based directly on the sorted data. The sections and subsections are in each case a synthesis of the presentations and discussions on each theme and subtheme, regardless of when or in which workshop a particular comment was made.

1 SCIENTIFIC AND TECHNICAL CONSIDERATIONS

1.1 Overview

The study of environment-related human health issues is clearly a complex matter. Nearly any environmental risk factor can be seen to have multiple effects, and risk factors can combine to have additive as well as synergistic or antagonistic effects. Increasingly, public and scientific concerns are with the effects of low level, long-term exposure to a "toxic soup" of agents that reach the human population through multiple media, including air, water and food.

Moreover, the psychological and community stresses that arise out of perceived risk, even when the actual risk is relatively low or zero, are now recognized as a real cause for concern.

In the words of a participant at the Ontario workshop, this level of complexity demands work "at the margin- of contemporary science. Participants at both the Ontario and Western workshops questioned whether environment-related health issues issues will ever be resolved on a scientific and technical level alone.

Public and scientific concern is now focused on the effects of low level, long-term exposure to a "toxic soup" of multiple agents. The complexity of that problem cannot be underestimated.

In any case, the linear cause/effect approach of traditional science is plainly inadequate for research on environmental-related health issues. This is as true in the applicable biophysical sciences (such as toxicology and epidemiology), as it is in the social sciences. In both cases, most education embodies the 19th century notion of linear causation, in which a specific cause is responsible for a specific effect. Even legal thinking is locked into 19th century notions of cause and effect. While some legal work has been done in the area of "scientific uncertainty", little has involved environment-related health issues. From a re-

search perspective, this implies a shift to systems (or pattern) research, and to integrative or holistic methodologies that can deal with multiple causes, multiple effects, and association, rather than causality.

A further complication is spatial and temporal displacement. When can we be confident that what is found in one place, at a particular time, applies to another place and another time? And how can we know, in the short term, what effects may accrue over the span of a human lifetime?

Toxicology and epidemiology are the two main tools in environment-related health research, but neither were intended to answer the questions posed in environmental assessment. Toxicology was developed to predict the results of drugs and poisons. Testing is done on animals, typically with large doses of a single chemical, and the results arc then extrapolated to humans.

The linear cause/effect approach of traditional science is plainly inadequate.

Epidemiology studies human populations directly, but was developed to study communicable diseases. It usually focuses upon human health effects resulting from exposure to a single causative agent. It is a diagnostic instrument to be used with exposed populations. However, it is now being applied in situations where there may be multiple causative agents and where the exposed population is poorly defined.

Other methods used to predict the human health effects of potentially hazardous substances include clinical studies, animal studies, in vitro work (for example, mutagenicity tests), and extrapolation procedures (whether extrapolation of dose response in humans, or extrapolation from animals to humans).

In every case, these studies provide very gross measures. Obviously, there is a need for predictive tools that can deal with low level exposures to multiple agents in human populations. As several participants pointed out, molecular epidemiology-a fusion of epidemiology and toxicology-offers that promise This new discipline focuses on "biomarkers", markers of biochemical changes intermediate between gross (clinical) effects and tissue-level effects. Biochemical changes may not often prove to be direct indicators of human health effects, and often they may not be agent specific, but nevertheless they will likely prove useful as an early warning system, as an indicator of exposure prior to the development of any adverse human health effect. Where biomarkers are chemically non-specific, they may in some cases prove to be specific to an entire class of chemicals, and that would be particularly useful.

But always, the challenge will be interpretation. While a tremendous volume of epidemiological and toxicological data is available for some hazardous agents, we are not very good at interpreting implications for human health. In addition, in recent years analytical detection levels have fallen by several orders of magnitude,

in the area of parts per trillion and smaller. These minute detection levels are making interpretation ever more difficult. Nevertheless, the public demands understandable information. What are the implications of a certain level of contaminant in breast milk, for example? It is now apparent that scientific rigor, in the EA context, must include interpretation.

The root problem: the degree to which one can draw inference from information.

At the scientific and technical level, the problem of interpretation lodges in the divide between association and causality. The root issue is the degree to which one can draw inference from information. A given agent may be shown to be associated with a given tissue effect, or even a clinical health effect, but does it *cause* that effect?

In EA practice, science is often asked to determine the relative effect of several technological alternatives. The complexity of that problem cannot be underestimated.

1.2 The Nature of Risk

Environment-related health research ultimately is concerned about risk Are we at risk? How much risk can we tolerate? Can we afford to reduce the health risks from human activities to zero? Is that even a reasonable expectation?

At every workshop, there was consensus that we must broaden the definition of risk to include not only physical risk, but psychological and social risk as well. Also, there was general agreement that our notion of risk must also become relative: given the technical, economic and philosophical unreality of a world without risk, we must learn to live in a world where we see environment-related health risks in a relative context.

A conversation at the Western workshop brought this notion sharply into focus. A participant recounted the history of malaria on a large sub-tropical island in the years just before and just after DDT was banned in the United States. Before DDT came into use, the island experienced annual deaths from malaria in the millions. The heavy use of DDT had virtually eliminated that death toll, but wanting to be part of the modem world, when the U.S. banned DDT, so did the island. Unable to afford the expensive alternatives, the annual malaria death count rapidly returned to what it had been before

A less dramatic but Canadian parallel is a daily reality in the far north. Hunting, gathering and eating wild foods offers considerable nutritive, social and spiritual benefits to aboriginal peoples. Which entails more risk eating wild foods contaminated with trace levels of some contaminant or switching to a southern diet? At what point do "trace levels" of contaminants become a real risk?

Risk perception is risk reality, as far as those involved are concerned.

In North America., we have about 70,000 chemicals in common use. Most are wholly untested for environment-related health effects, but there are many that we know, at some level of exposure, pose a risk We know almost nothing about their effects in combination. As another participant at the Western workshop put it, science is suffering "epidemics of uncertainty in trying to trace causality." Clearly, any swing toward scientific secrecy and turf protection-sometimes cloaked as reticence due to "scientific uncertainty"-will exacerbate this problem.

The question of risk management becomes more difficult as we expand our definition. A participant at the Ontario workshop suggested there are at least three types of risk:

- Actual risk This will not be known with certainty until some time in the future.
- Statistical or calculated risk. This is where we try to estimate risks quantitatively and compare them
- Perceived risk This is the risk most often confronted in the environmental assessment process Even when actual risk is likely to be zero, perceived risk may be significant.

Considerable discussion focused on perceived risk. As a participant at the Atlantic workshop put it, "Risk perception is risk reality, as far as those involved are concerned." Perceived risk can generate individual and community stress, which in turn may generate psychological, physiological and social problems. In a significant parallel, Ontario's Workers' Compensation Board recently awarded compensation for stress-induced injury.

This is by no means a simple issue. From a scientific point of view, the human health effects of long-term, low level exposure-the area of greatest public concern in most of Canada-are very difficult to isolate and measure. *where* community members or employees report effects, they are often such irritations as colds and headaches. These may or may not be insignificant in the long run, but given the level of scientific uncertainty about environment-related health effects, they are easy to trivialize. Language and culture further complicate the issue. For example, one professional from Labrador who has worked in the North for years commented that he really doesn't know what an Inuit means when he says he is "stressed" by low level flying. It is unlikely the term stress means the same thing in such-different cultures, but no better vocabulary exists.

We need to be able to talk about risk in terms people understand. Some agencies are trying tobacco equivalency.

Perceptions of risk also differ by individual and by population. Generally, when voluntary (eg. among employees), the risks accepted are about ten times greater than the risks that are accepted when the exposure is involuntary ("bystander risk"). A participant at the Western workshop with over ten years experience in the field of occupational health and safety recounted a case that occurred some years ago in a Quebec asbestos mining town. The workers actually switched

unions after their former union began providing health risk information. They didn't want to know: "All their equity was tied up in their houses. Leaving would break up families, it would break up the community, and it would be hard to find work. So they were faced with an odd paradox. They had to threaten their own lives for the well-being of their families."

In a broader sense, it is clear that different stakeholders perceive the same activity or event as having different "risk values". The same health event will be accorded a different risk value by a multinational, a worker, the worker's family, the community, politicians, and environmental organizations. Risk is also culturally defined, or "culturally constructed", as a medical anthropologist at one session phrased it.

Clearly, science will never provide definitive answers in this area. Science should work toward measures of exposure, and estimations of toxicity, but ultimately, government, industry and the public will have to make choices with less data than they would prefer. Another complicating factor is that risk "significance" is considerably different for biota and for people, and an EA must deal with both. For example, a 1% mortality level might be quite acceptable for fish, but obviously not for people.

So a key personal, social, political and scientific task is to develop a better understanding of risk itself. For the health professional, a vital task is to develop a better language for risk communication. Obviously, there is need for a common risk language. Several participants observed that specialists (in both the biophysical and social sciences) all have different ways of expressing risk, none of which mean a great deal to the public. This is significant when one considers that a high level of perceived-but misinformed-risk can draw attention away from actual risks that arc poorly understood. For example, a media focus on the PCB-cancer link can undermine public education on the greater and proven link between tobacco and cancer.

To provide even a relative answer to the desperate question, "Is my breast milk safe for my baby?", we may find it necessary to develop a risk language based on the known: for example, that the risk, at a particular level of exposure, is equivalent to smoking so many cigarettes a day. A participant at the Atlantic workshop reported that her agency is already using tobacco equivalency, and is finding it effective.

In the North, perhaps the risk of eating traditional food should be compared to the risk of not eating traditional food.

Good risk communication will not be developed easily. It will require research, better access to existing toxicity data, education of both the public and health professionals in relative risk and risk communication, and community involvement in determining acceptable levels of risk

1.3 Concepts and Definitions of Health

The nature of risk is obviously related to our concept of human health. On a number of occasions participants expressed a need for a "general index of societal health", a "baseline" of health status But they questioned whether we have defined the state of "health" sufficiently for a health problem to be identified when it exists.

In the Quebec workshop, the health definition problem surfaced in the context of community health studies. It was argued that such studies are desperately needed, both to determine baselines and to assess effects. But the same questions remain: what are we trying to measure, and what level of each measure is deemed "healthy"?

The definition of human health proved to be a complex and difficult issue. In one participant's opinion, while there have been many indices of human health, they are often of little value: 'Why define health if you can't measure it?" Another added, "We don't even have good data on mortality and morbidity."

Health is much more than the absence of disease. Health protection is often defined too narrowly.

Arguments about the highly inclusive World Health Organization (WHO) definition of health are revealing as well. In some discussions, the definition was discounted *because* it was "too inclusive to apply". In others, the definition was embraced because it was inclusive.

At the Ontario workshop, it was concluded that a simple definition is in fact not a realistic goal. It was felt that we need some practical, feasible method for discussing human health, if possible in quantitative terms. Perhaps, one participant suggested, health must be self-defined by individuals and communities in a participatory process.

This prompted a suggestion that we define human health in terms of a continuum: from mortality, to morbidity, to disability... to stress, lifestyle effects, and aesthetic considerations. As we move along this spectrum, effects become more subtle, harder to measure, and more subject to cultural definition.

In the practice of environmental assessment, then, the policy might be to move along the spectrum as far as possible. Ideally, all stakeholders in a particular environmental assessment would agree on the definition of health-the portion of the continuum-to be considered. For example, do our concerns run from mortality to stress, or are we also concerned about lifestyle and aesthetic considerations? In this approach, mortality and morbidity remain the highest priorities, but clearly they are not the only priorities, just the most measurable.

This suggests that the task at hand from a scientific and technical point of view is to explore the spectrum's middle ground, with the admonishment that the understanding of human health should not be allowed to remain in the disease/treatment mode. Attention to the prevention/wellness orientation of public health will lead in a very different direction.

"Wellness" and holistic views of human health figured increasingly in discussion as the series progressed. At the closing Quebec session, the need to address social effects was emphasized repeatedly.

A related issue is the tendency to assume that existing environmental standards and regulations provide a de facto definition of health. While there is a tendency to assume that if regulations are met, health needs are met, this is not the case. See Sections 2.1 and 2.5 for further discussion on this subject.

1.4 Communications Issues

The problem of defining and measuring good health, the nature of risk, scientific complexity, and the practical realities of environmental assessment all emphasize the importance of improved communications in all matters related to the human health effects of environmental factors Communications issues will also be discussed in chapters 2, 3 and 4. The concern here is with the communication of scientific and technical information.

There are numerous examples of poor technical communication, from Grassy Narrows (where multi-national specialists could not talk effectively to each other or to the local population) to media misinterpretation of the actual risk of PCB contamination. On the other hand, as one participant noted, rural agriculture representatives demonstrate that good technical communication with the general public is quite possible.

The need to communicate research findings effectively has been emphasized repeatedly. This would involve peer review to ensure data reliability, and careful, understandable data interpretation. The resulting information should be targeted, not just to other professionals, but to all those involved in any environmental assessment process, including the general public.

It was also recommended that technical communication be an integral element in the process of setting and updating standards. Participants in the Quebec workshop emphasized the importance of making the research and rationale behind standards readily available. This will reduce needless replication, and improve our ability to be constructively critical.

At the Atlantic workshop, it was argued that a steady stream of reliable, detailed information is necessary to affect public attitudes. Continuity, detail and reliability were all considered vital, whether the goal is to raise appropriate concern, or to dampen inappropriate concern. While a "shorthand" approach to risk communication (eg. tobacco equivalency) is needed, it was felt that public information must go significantly further, especially since the media can have such impact. Reliable scientific information, with its lower "emotional charge", can only be expected to affect attitudes over time. Moreover, even with the best data review and information programs, science will be at a disadvantage, if only because scientific knowledge keeps changing and for that reason tends to be discounted by the public.

> ***"If you can't achieve absolute accuracy, you can at least have absolute honesty."***

In on-site, problem-oriented research, good communication is especially important. As one participant commented with reference to Grassy Narrows, "If you

can't achieve absolute accuracy, you can at least have absolute honesty". In Grassy Narrows, mercury levels were observed that had occurred elsewhere without adverse effects, suggesting that mercury was not a problem. While scientists cannot go beyond what the data will support, good communication would at least acknowledge the public reality, and observe that something must be happening to account for apparent individual and social effects.

On a more general level, scientific communication must recognize the power of language and symbolism. One of the most powerful images in ecology has been views of the planet from space. If scientists are to communicate in a way that promotes an ecological, sustainable, and healthful way of being on the planet, the art of communication must be embraced. New images, new language, new symbols must be found.

1.5 Science, Values and Politics

In several discussions at the Ontario workshop, a consensus emerged that science will not promote the consideration of human health in environmental assessment by acting in "scientific isolation". It was noted that the general public often has valid and valuable contributions to make on technical matters, and that "scientific" statements about matters such as risk cannot be ma& outside social and political values The search for "common ground" between the findings of specialists and the perceptions of lay observers may be an important consequence of this thinking. (The notion of common ground is discussed further in Section 2.4.)

At the Western workshop, the dominance of scientific evidence over subjective knowledge was directly confronted by one participant, and subsequently the matter received considerable attention. His position was that the scientific ego assumes that objectivity is possible, and that it is superior to subjectivity. Second, he argued that from a sociological perspective, the "objective" view inevitably reflects power and norms, certainly if it is instituted in some number (eg. a "safe" level of exposure) that is implemented in policy. Third, he noted that while public policy bemoans the "problem" of scientific evidence, it ultimately makes decisions by trade-offs that are independent of both scientific objectivity and social values. In that sense, public policy on environment-related human health issues, like agreements on occupational health and safety, is fundamentally utilitarian. As another participant put it, "Science gives you a fuzzy area, and then you need to negotiate an acceptable level of risk."

The problem, then, is power. Trade-offs must be made, but they should be made within a framework that embodies both social equity and the legitimacy of subjective community knowledge.

In different language, another participant at the Western workshop commented that the scientific and technical are inextricably intertwined with the social and political. He doubted that science would ever be able to predict outcomes effectively enough to allay concerns, and came to a similar decision about how scientific evidence is used in policy: "We need to appreciate who benefits at whose expense". Also, he presented a concrete suggestion for action within the environmental assessment process-why not incorporate the potential victim into decision-making structures? For example, community members could be involved in setting guidelines, and with some technical back-up, could be contracted to carry out on-going monitoring. This suggestion was picked up with enthusiasm in the group, and one other participant recalled a European exam-

> ***"Science gives you a fuzzy area, and then you negotiate an acceptable level of risk."***

ple where such an approach was used. This, of course, assumes that the potential victim can be identified. This may not always be possible, for example, as with exposure to a hazardous chemical with transgenerational effects.

The juncture of science, values and politics surfaced at the Atlantic workshop in a discussion of public education. The very term "education", it was agreed, implies that one person has the right and knowledge to inform and shape mother. If instead we think in terms of "information", a more values neutral term, learning is much more likely. The greatest learning occurs in two-way, mutually empowering processes.

A further, underlying problem is that the public's expectations of science often outstrip the ability of science to deliver. In fact, society fully expects scientific and technical goals to be met ("We can get to the moon..."), but has much lower expectations with respect to social goals ("but it's unlikely we'll ever eliminate poverty and crime."). The implication for EA is stmightforward: society is concerned about adverse health effects that may not be knowable in the short term. Even with the political will to fund adequate research, much would remain unknown, and decisions would remain as "political" as they are today.

This observation prompted suggestions that if we are truly wandering in the dark, unable in most cases to "prove" adverse effects, then perhaps general policy should be to work toward the reduction of exposure to all potentially hazardous substances.

1.6 Scientific and Technical Considerations and Recommendations

1. **Access** to data and data interpretation. Access to data, access to interpreted data (information), and access to methods and techniques useful in judging the validity, applicability, meaning of data, seem to be a universal issues.

Data needs include:

- both **toxicological and** epidemiological information;
- better baseline data and information on human health;
- **methods** for **priorizing** hazards;
- **risk communication terminology; and**
- **specific** methodologies for **dealing** with **different types of environmental hazards.**

In general, the database for environment-related human health issues and the library of interpreted data (information) need to be larger and more accessible, pulling in **knowledge from as many sources as** possible, including large industries. Industry representatives at the Western workshop suggested that corporate reception **to this** idea will, in most cases, be quite positive. Data and information must also be more reliable, and peer review was suggested to **ensure** this. One concrete suggestion is for some form of national library devoted to the **relationship between human health and the** environment.

Access to data and good data interpretation is a universal issue.

At the Atlantic workshop, the data access issue was closely linked to the short EA time horizon. It was **emphasized** that there is never time for original **research** within an EA. Instead, an EA **relies** on existing research and regulations.

The time factor is not likely to go away. Several participants reported that **legislation** in their provinces specifies maximum periods for each step in the EA process. In the Quebec workshop, it was suggested that long, drawn out assessment processes arc not in the public interest, and limiting the **time available for each stage was recommended.**

2. Ongoing review of health-related **standards.** In the **1970s,** the standards-setting process was often driven by biological and physical science, and by the available technology. Knowledge and technology have developed considerably since then, **and we are now much more attentive to human health implications. For** these reasons, an ongoing review of health-related standards is essential.

3. Improved tools for exposure assessment and effect prediction. The lack of adequate tools for measuring and tracking exposure, and for predicting physical human health effects, was emphasized in every workshop. This obviously will not be fully addressed in the short term. For the moment, it was suggested that environmental assessment can try to build on existing information about human health effects, as much as it is possible to transfer knowledge from one stressor to another. For example, our knowledge of the effects of asbestos, and the history of environmental assessment and action in the case of asbestos, may prove useful with regard to other substances.

4. **Holistic assessment of health effects.** Needs in this area include techniques in assessing psychosocial, cultural and cross-cultural effects. Techniques must address both perceived and actual risk

Little work has been done in this area, and the development of appropriate indicators is at an early stage. One participant working in the field noted that there are fewer than one hundred articles on stress, human health and environmental assessment. Indeed, there are no clearly established behavioural indicators, and, more broadly, there is no conceptual framework for exploring the psych&al effects of development. Work is being done on the behavioural effects of environmental risk factors in birds, fish and experimental animals, but little has yet been done in human populations.

Work is being done on the behavioural impact of toxic exposure in birds, but little has yet been done in the human population.

Regarding the predictive value of existing studies of psychosocial effects, it was noted that there are inevitably problems related to transference. Frequently, there is an unwillingness by individuals and systems to consider that what has happened in one place may well happen in another.

5. Community health studies. The need for better methods for assessing health status at the community level was mentioned repeatedly, both to establish baselines, and in the follow-up phase of environmental assessment. This will require improved methodology in small scale epidemiology, and indicators of physical and non-physical health. Community health studies usually will be holistic in nature; a direct analogy would be ecosystem effects monitoring, in contrast to a program that monitors the levels of a few specific chemicals.

6. **Community partkipation.** Public participation in several activities usually regarded as strictly scientific and technical was recommended on a number of occasions. Specifically, it was recommended that members of a community potentially affected by a development be invited to contribute their knowledge to technical assessments, and to participate in:

- determining the range of health parameters to be considered during an EA;
- research design and data collection; and
- monitoring design and data collection.

7. Post-EA audits. Better procedures for auditing or evaluating the effects of environmental stressors on human health need to be developed and utilized. Both the projects subject to EA and the EA process itself should be evaluated.

The need for effects studies to determine actual risk once a project is complete was underlined in the Quebec workshop, together with strong suggestions that such studies be designed and conducted with community input and participation

The importance of evaluating the EA process itself was noted in every session. Few examples of such reviews were identified, and none of those reviews focused explicitly on predictions of human health effects. General guidelines for post-assessment reviews are currently being prepared by Environment Canada.

8. **Recommendations for Research**

1. More basic research, particularly in molecular epidemiology.

   Such work would seek to relate specific exposures (especially at low levels) to biochemical changes, and ultimately, to identifiable adverse human health effects. It might also uncover basic mechanisms of toxicity. However, great care must be taken to distinguish between association and causation.

2. Systems (or pattern) research, and integrative/holistic research.

   These approaches are vital in dealing with multiple causation-what has been referred to as "toxic soup". An element in holistic research design may be multi-party participation. This would help reduce tendencies for the EA process to be adversarial; research results may still prove ambiguous, but at least there would be agreement on process.

   Holistic community health studies would go far beyond the monitoring of a few specific chemicals. An analogy in environmental research is ecosystem effects monitoring.

3. Methods for physical exposure assessment.

   As one participant bluntly phrased it, "You can't be killed by something you aren't exposed to, so at least we can start with methodology for expo-

sure assessment." There may also be a need to develop model protocols for different types of concerns. This must be **accompanied** by research to establish "natural", ambient levels of exposure.

4. Multi-media studies.

   Research **on toxic pathways tends to be determined by existing regulatory structures,** in which exposure routes (eg. air, water, food) are dealt with by entirely separate **agencies.** A multi-media study that identifies one pathway over another will permit much more useful statements about risk

5. Methods for risk assessment and risk communication.

   This should generate better ways of addressing public anxiety about both acute exposure incidents and long-term, low level exposure. Protocols for evaluating the effect of innovations in risk communications must be developed as well.

6. Review of "safe" exposure standards.

   Work in this area will likely yield more subtle assessments. For example, not only can we expect mote clearly demonstrated relationships between exposure and effect, but the nature of that relationship should become clearer as well. In some cases, the exposure-effect relationship will be linear, in others it will be curvilinear, and in some cases, there may be a "cut off point after which increases in exposure have no effect.

Research in molecular epidemiology is trying to relate specific chemical exposures to specific biochemical effects, and ultimately, to identifiable adverse health impacts.

7. General protocols to guide "problem-oriented" ("applied" rather than "basic") research into the human health effects of environmental stressors.

   One scientist suggested the following sequence:

   a. *Chemical structure studies. This* he described as a necessary but not sufficient step, unlikely to give the whole answer, but potentially valuable. For example, such studies might indicate where a particular agent is stored in the body, how it is dispersed, and the mechanism of effect. The usefulness of data from chemical structure studies will depend on many factors, including the particular chemical, whether a single chemical is involved, levels of exposure, and the accepted level of risk

b. *In vitro studies. These* studies are useful when studying short-term effects such as mutagenicity under high dose exposure, but low level, long-term exposures will show negative results.

c. *In vivo toxicology studies (eg.* in laboratory rats and mice). Great care must be taken in extrapolating from animals to humans. Species differentiation in response to specific agents is known to be considerable.

d. *Human epidemiology studies.*

8. Small scale epidemiological studies.

> ***"You can't be killed by something you aren't exposed to, so at least we can start with methodology for exposure assessment."***

Very few localized studies link chemical exposure to human physical health, and these generally involve a few critical subpopulations such as freshwater fish eaters. Small scale epidemiological studies will be very useful to local health professionals in the EA process as reference data, and may be needed to establish ambient and post-development conditions. However, useful and feasible studies will depend on further work in developing methodologies in small scale epidemiology.

9. Community health studies.

Community health studies would utilize small scale epidemiological methodology, but would track non-biological stressors as well. Their success will likely depend upon community input and participation, to accurately target the study to community concerns, and to reduce costs.

10. Measurement and quantification of social and psychological effects.

There is tremendous need for standard social science methodologies for predicting the social and psychological effect of actual and perceived risk.

11. Research on reproductive effects, and on reproductive effects indicators.

Bird and animal studies are indicating that the population at greatest risk is often not adults, but offspring. Is this true in the human population? Which factors or combinations of factors pose the greatest risk, at what levels of exposure?

12. Exploration of environmental hypersensitivity.

This might be done by studying sensitive populations such as asthmatic children. Research on critical subpopulations such as this will also help track low level, long-term effects, and monitor the effectiveness of standards in protecting the most sensitive individuals.

13. Development and linkage of databases and registers of specific disorders; preparation of a catalogue of useful databases.

Often health and environmental professionals have little knowledge of each other's resources. Potential resources on the health side include the databases of provincial medical plans and workers' compensation systems, Health and Welfare Canada, and local hospitals. The Saskatchewan health care database is known to be particularly comprehensive, and given that the Saskatchewan environment has been relatively pristine (the notable exception being agricultural chemicals), it may be useful in baseline development.

Such databases could yield valuable health effects information, particularly of an epidemiological nature. Ideally, indicators of reliability such as peer review, and some degree of interpretation for use in public information, would be included.

However, in many cases existing data will not prove suitable. What can be taken out relates to what is put in, and those who input data generally do not appreciate the needs of research into the effects of environmental stressors. For example, these databases will not include information on low dose exposure. This suggests that a vital first step is the education of physicians and others who input data about environmental effects and epidemiology in general, and about the importance of data quality for exploring causation and patterns of effect in particular. The broader research significance of health data is barely touched on in current medical training.

2 PROCEDURAL MECHANISMS

2.1 Overview

How well is human health protect& under current environmental assessment procedures? What elements of procedure need improvement? The previous chapter looked at health and EA from a scientific and technical point of view; this chapter will look at the problem from a pragmatic, procedural perspective.

Procedures for the inclusion of human health in environmental assessment vary considerably across the country, and in many jurisdictions, procedures are presently under review. According to workshop participants, human health and public participation are receiving increased attention in many of these reviews.

Generally, we may be seeing some movement toward more all-encompassing procedures that better meet public concerns, that go beyond protection of the natural environment to include not only human physical health, but psychological and community health as well. A more comprehensive approach is revealed in the evolution of EA language; phrases like "post project analysis", "risk communication", and "cumulative effects" are relatively new and spreading rapidly. The sustainable development concept, which calls for the integration of social, ecological, health and economic considerations, may be the ultimate end point in this line of thinking.

"EAs in my province are only concerned with the natural environment. Inclusion of even the illness model is resisted. More subtle measures are considered vague, not measurable, a Pandora's box."

A requirement to consider effects on human health is rarely explicit in legislation, and in most of the workshops this fact raised the question, *'Should the assessment of effects on human health be an explicit requirement? " This* section reviews the arguments offered, pro and con.

Some participants felt that explicit inclusion is not necessary, and therefore is a major political hurdle that can be avoided. Three rationales were offered for this position.

First, it was argued that EAs are driven by public concern, and public concern is hottest over possible effects on human health.

Second, some participants felt that the broad language of EA legislation is enough; where necessary, the issue of human health effects can be raised.

Third, if the EA process is to ensure that **regulations and standards** are met, then perhaps the real issue is the adequacy of those regulations and standards. Many participants felt that while inclusion has been informal, physiological health issues have indeed been considered-to the point that they are protected by existing standards. One participant, frequently a proponent in EAs, commented that he has never had need for a health expert; existing standards are assumed valid, so normally only engineering studies are required to ensure that project effects fall within those standards. A participant in the Quebec session said much the same thing when he noted that, in his experience, proponents are much more motivated by explicit standards and regulations than by guidelines.

Most provinces lack a systematic process for evaluating the quality of an EIS.

However, many participants were less than confident that human health concerns are indeed being addressed by present EA legislation ***and*** procedure. Atlantic workshop participants were particularly concerned about inadequate regulations and standards. They argued that health practitioners, community concern, and the EA process should in some way be connected to the process of setting standards.

Also in the Atlantic workshop, participants reported that human health has rarely surfaced directly in EAs, with the focus generally on bio-physical effects.

A health officer from Manitoba reported that in the previous week alone he had attended three meetings to justify why health-defined conventionally-should be included. The concern in Manitoba, he asserted, is with the natural environment. Inclusion of the illness model is resisted, and more subtle measures are considered "vague, not measurable, a Pandora's box."

Other factors identified as inhibiting the inclusion of human health in EA are:

- scientific and technical uncertainty;
- the relatively small penalties in place for polluters;
- the limited resources available to health professionals and community groups;
- jurisdictional problems;

- the lack of public participation at the scoping stage; and
- the absence of procedures to assess the quality of the EA process itself and the resulting Environmental Impact Statement (EIS).

Participants at both the Atlantic and Quebec workshops pointed to jurisdictional problems. Unclear or narrowly defined responsibilities and the lack of multi-party coordinating mechanisms, they suggested, result in too much buck passing between departments and levels of government. At times, the management of human health effects "falls between the cracks". This matter is taken up again in Section 3.

The role of public participation in determining whether health issues need to be addressed, and what definition of health is to be used, was emphasized at several sessions. At the Quebec workshop, participants suggested stakeholder participation to identify and rank the key issues at the initial scoping stage. This would direct attention to real needs, to human health issues where necessary, and it would ensure that the public knows which health issues will be considered.

EA legislation rarely deals with small and medium scale, private sector development. A simpler local process should.

The need to critically evaluate the quality of both the EA process, and the resulting Environmental Impact Statement was raised in several sessions as well. At the Quebec workshop, a question revealed that the province has no systematic process for evaluating quality and acceptability. This seems to be a failing in most jurisdictions.

A separate issue, and one that varies across jurisdictions, is whether the EA process considers an adequately broad range of development activity. In most of Canada, EA legislation applies to projects funded in whole or in part by municipal, provincial and federal governments, but only in some circumstances and jurisdictions does it apply to private developments. Several individuals at the Quebec workshop expressed concern that present regulations in that province exempt certain types of large projects from the EA process altogether. In many of these cases, the province could be seen as giving economic competitiveness priority over environmental and human health concerns.

The Rafferty-Alameda and Old Man court decisions, which state that the federal EA process is a law of general application, in force any time a federal regulation applies or federal land or funding is involved, suggest that applicability is widening. On the other hand, in many jurisdictions a public project is included unless exempted, while a private project is excluded unless and until designated.

But evidently, even in the public sector loopholes are many. According to a representative of the Cree Regional Government at the Quebec session, the James Hay and Northern Quebec Agreement exempts Hydro Quebec from any obligation to study the so&-cultural effects of its projects.

In any case, environmental assessment processes rarely include small and medium scale private development, if not for lack of legislation, for reasons of cost. This was mentioned as a concern in each workshop. It was suggested that a remedy may lie in the expanding role of local health officers, municipalities and regional governments. (The role of the local health officer is discussed in Section 2.3.) At the Quebec session, it was agreed that the full EA process is too complex for small projects. Instead, early stakeholder involvement and the use of a mediator were proposed. (Mediation is discussed further in Section 2.4.)

Two national reviews of EA procedures have been conducted to date.

Environmental Assessment in Canada: A Summary of Current Practice, (Couch, 1988), was prepared for The Federal Environmental Assessment Review Office (FEARO) and is available from that office.

Health Aspects of Environmental Effect Assessment, (Simon, 1988), was completed for The Canadian Environmental Assessment Research Council (CEARC).

The Table on the following pages is taken from the CEARC study. It provides an overview of EA practice, with emphasis on the inclusion of human health.

TABLE 4.1 Overview of Current Practice In Canada

	EIA contained In:[1]	Is health explicitly considered In screening phase?[2]	Project-specific terms of reference are developed by:[3]	Health professionals involved In EIA by:[4]	# of health components addressed In at least one EIA:[5]	Health-based environmental standards/objectives used In EIA as:[6]	Public participates In:[7]
British Columbia	S,P,R	No, but initiating department reviews applications and determines if any issues (i.e., health) exist which may be of concern to other agencies	Initiating department In consultation with the Ministry of Environment and Parks; other agencies may have input	Reviewing applications. suggesting terms of reference, giving opinions	8/19	Screening criteria, targets for performance	Preparation and review of documents. hearings:
Saskatchewan: S		No, Interdepartmental Review Board reviews applications. No health representative sits on Board	Saskatchewan Environment and Public Safety's Environmental Assessment Branch In consultation with proponent and initiating department	Not involved In EIA but may be involved In licensing procedurss, special inquiries	10/19	Determinants of EIS'acceptability	Review of documents
Manitoba	S,P	Yes, screening criteria include health: Issues (generic guidelines include health)	Technical Advisory Committee (TAC, an ad hoc committee which may include a health representative) In conrultation with proponent and initiating department	Establishing terms of reference, sitting on TAC, participating In special studies	11/19	Targets for performance	Review of documents, meetings and surveys
Ontario	S,R	No, but to consider health is a standard component of Ontario's EIA process (generic guidelines include health)	Ministry of Environment's Environmental Assessment Branch (EAB) In consultation with proponent, initiating department, and other agencies	Reviewing applications, giving opinions	17/19	Criteria for evaluating alternatives, conditions for approval	Review of documents, hearings:
Quebec	S,R	No, but initiating department recommends addressing health if it is a concern	Ministry of Environment in consultation with proponent and other government agencies (such as Ministry of Health)	Providing advice. providing Input Into final decision	16/19	Targets for performance	public meetings, review of documents
Newfoundland: S,R		No, although a seat for Ministry of Health exists on screening committee; health representative rarely comes to meetings	Proponent In consultation with screening committee and Department of Environment	Sitting on screening committee, reviewing EISs	5/19	Development of mitigation measures	public meetings, review of documents

TABLE 4.1 Overview of Current Practice In Canada (continued)

	EIA contained in:[1]	Is health explicitly considered in screening phase?[2]	Project-specific terms of reference are developed by:[3]	Health professionals involved in EIA by:[4]	# of health components addressed in at least one EIA:[5]	Health-based environmental standards/objectives used in EIA as:[6]	Public participates in:[7]
New Brunswick	S,R	No, projects are screened by a multidisciplinary team; health representative may sit on team at initiating department's discretion	Ministry of Municipal Affairs and Environment with input from public, other agencies, proponent, initiating department	Reviewing terms of reference, guidelines, reviewing studies, screening proposals	15/19	Basis for preliminary design objectives, basis for establishing emission limits	public meetings, review of draft terms of reference, guidelines, and documents
Nova Scotia	–	No; person reviewing application may or may not identify health as an issue	Ministry of Environment in consultation with proponent and other agencies; to date, terms of reference regarding health have not been established	Sitting on Ministry of Environment's Environment Control Council	5/19	Targets for performance	hearings
Prince Edward Island	P	No, PEI relies more heavily on enforcement of health and environmental regulation than on compliance with EIA policy	Ministry of Community and Cultural Affairs in consultation with proponent, initiating department	Providing advice	6/19	Criteria for evaluating projects	Review of documents, meetings, hearings
Federal government, Yukon and Northwest Territories	S,P	Yes. some agencies include health as a screening criterion; some do not	Initiating department in consultation with other agencies or, upon referral to: the Federal Environmental Assessment Review Office, an Environmental Assessment Panel	Providing opinions, reviewing documents, giving testimony	17/19	Targets for performance	meetings, hearings, review of documents

Footnotes to Tables 4.1

1 EIA may be contained in statute(s) = S. policy = P. and/or regulations = R, or EIA may be informally implemented through a licsnaing or permitting procedure in which case a dash ("-") is designated. For further explanation, please refer to the description for each Drovince, state, or country in this aection or in Volume II of this report. Volume I icontains a more detailed summary of current practice.

2 Screening refers to a process ussd to review projectapplications to determine if an initial environmental evaluation (IEE) or environmbntal impact statement (EIS) should be reuuired. Each government may have its own procedures or screening criteria to make this decirion.

3 Terms of reference list issues which are required subjects to be addressed in the IEE or EIS. Generic terms of reference may exist in regulations or guidelines and apply to designated casa5. Project-specificterms of reference may be developed and usually arise out of a scoping process during which the proponent, initiating department, other agencies, and/or the public may be consulted. Each government may have its own procedures.

4 Health Drofessionals may be involved in EIA in a variety of ways, such as screening applications, suggesting terms of reference, Droviding advice, reviewing draft EISs, and assisting in other activities. The extent to which they are involved depends on the particular government's procedures.

5 Nineteen health components were identified in the survey:

a) exposure per lod
b) area of impingement
c) baseline health study
d) impacts to critical subpopulations
e) impacts to future generations
f) impacts to residents dur ing construct ion
g) impacts to workers during construct ion
h) impacts to residents during plant operation
i) impacts to workers during plant operation
j) acute, short-term impacts
k) chronic, long-term impacts
l) positive health impacts
m) cumulative health exposures/effects
n) impacts to health care facilities
o) review of existing literature
p) methods to mitigate health impacts
q) accidentscenarios and emergency response procedures
r) waste disposal methods
s) on-going monitoring of health status

Each component is defined in Volume III, Appendix C, of this report. The numbers in the table represent the number of health components which have *been* addressed in at least one (but not necessarily the same) EIA.

6 All provinces, states, and federal governments use environmental standards and/or objectives which are in part health-based. The manner in which they are used in EIA var les. The descriptions in the table are some, if not all. of the possible uses employed by the governments.

7 All provinces, states, and federal governments involve the public at some Doint in the EIA process. The public I5 provided with at least one opportunity to raise health, environmental, social and economic concerns. The methods of public involvement listed in the table are some, if not all, of the Dossible methods employed by the governments.

2.2 Guidelines for the Assessment of Human Health Effects

Whether the assessment of health effects is formally required or not, a separate issue is the need for &tailed guidelines, Would human health be addressed more effectively in EAs if detailed guidelines for asses&g health effects were available? This question arose repeatedly in the Ontario, Western and Eastern workshops. Many participants were doubtful about the value or feasibility of such guidelines, but many others felt that useful guidelines could indeed be prepared if they were revised as the knowledge base develops.

A number of participants argued that the real problem is resources and expertise, not procedure. They suggested that increased participation by the departments concerned, together with expanded environmental toxicology and epidemiology staff in provincial health departments, would significantly increase the degree to which health concerns are addressed in EA.

At the Eastern workshop, discussion established that in some cases agencies concerned with environment-related health issues are not receiving notification of developments that may be subject to EA review. The Department of Health and Welfare's Health Protection Branch Regional Office, and some local public health offices, for example, routinely scan the press for such information. Evidently, a better referral system is required, at least in the East.

Two related problems arc the ability of health professionals to access the information and expertise they require in order to participate effectively in environmental assessments, and the need for the political will to provide the necessary resources.

Would human health be addressed more effectively in EA if detailed guidelines for health impact assessment were available?

There was also some doubt about the practicality of general guidelines for assessing health effects. Some participants have suggested that guidelines might be seen as an imposition. However, others observed that guidelines on many other issues exist and people make use of whatever elements they feel are appropriate. Moreover, if human health were explicitly included in EA legislation, then an early decision would have to be made as to whether health expertise should be involved, and guidelines would be useful in making that decision.

Several participants commented that there seems to be political reluctance to include human health explicitly in legislation. A significant argument for both explicit inclusion and the development of guidelines is the contribution that public health could make to EA practice. Currently, the basic principle of public health, prevention, is hugely absent. For example, if this value were applied in the assessment of solid waste alternatives, the obvious solution would be waste reduction. Generally, it was felt that explicit inclusion, with guidelines, would improve communication and cooperation between health and environmental professionals.

Local health officers need guidelines for dealing with projects that don't go to a panel, and for smaller projects that the EA process doesn't touch.

Another argument for the development of guidelines came from local health officers. They felt that guidelines would be of direct assistance to front line community health officers, not only in their involvement with EAs, but on a daily basis. Many EAs are driven by concerns about human health effects, they pointed out, but only a very few large projects actually go to the panel stage. Local health officers need guidelines for dealing with those that don't, and for smaller scale development that the environmental assessment process doesn't touch.

Finally, some participants felt that this is a legal and ethical issue. Guidelines, with or without explicit inclusion, might ensure that responsibility is placed on the proponent to identify risk, involve stakeholders, and provide complete disclosure of health-related technical information.

So if guidelines were developed for the inclusion of human health in environmental assessments, what would they look like? There are many possibilities, including:

- a generic guide to health issues and how they may be addressed in the EA process;
- general criteria, which would guide the development of procedures and any institutional changes that may prove necessary; and
- some conceptual framework that integrates different concerns, needs and situations.

As a first step, a public health professional in the Western workshop suggested the following guestions:

1. What was the use, or is the planned use?
2. What are the agents of concern?
3. What are the possible health effects and exposure pathways?
4. What is the acceptable risk?
5. What is the management or remedial plan used to address that agent and make sure that acceptable risk is not exceeded?

Questions such as these, participants commented, would provide the health professional with a procedural protocol, a decision tree. In fact, they are much the same set of questions that arc asked in non-human environmental studies.

However, them is uncertainty about how much we actually know, especially around points 3 and 4. To this, one participant responded: "You have to learn to live with uncertainty. If people want to be fully informed, they too will have to live with uncertainty. That is the price of dispensing with paternalism. And because so little is known, we must involve and inform those who will have to live with the uncertainty."

This approach, others noted, may not be reassuring, and certainly it is not simple, given conflicting evidence, but at least information and decisions will be documented and communicated fully.

An associated issue that was discussed at some length is the role of guidelines in determining the feasibility of community health studies. As mentioned in the previous chapter, such studies could establish baseline health levels and assess the effects of developments. A number of practitioners reported public requests for local epidemiological studies to verify their sense that there was an environment-related health problem in their community. But in many cases, public requests have not been followed up because the likelihood of being able-to measure anything useful was small, given the characteristics of the community, the nature of the exposure, and the alleged effects. Also, many complaints involve low level health effects and concerns about the effects of low level, long-term, multiple exposures. These factors all present difficult problems for community health studies. Several studies of this type were described in the workshops, and none were able to identify an environment-related health problem, except possibly stress effects due to perceived risk.

Guidelines for the inclusion of health in EAs would provide the professional with a procedural protocol, a decision tree. But it won 't resolve uncertainties.

Guidelines for determining the feasibility of community health studies would also help the practitioner explain to the community why such a study is not worth doing, if that proves to be the case. An example was offered from Alberta, where a community requested a study exploring suspected health effects of sour gas exposure. Atmospheric dispersion tests showed stack emissions all fell within company land, while the community was twenty miles away. But of course, even if such tests are accurate, the problem of perceived effects remains, and could be an important subject for study.

If people want to be fully informed, they too will have to learn to live with uncertainty.

2.3 On the Front Line: The Role of Local Public Health Officials

The front line in public health defense is the local public health official. The fact that most environmental assessments are concluded short of a formal hearing, and the fact that most developments are never considered by an EA process, only emphasizes the need for active participation by local public health professionals. Their relationship with the community, and their ability to gain detailed., first hand knowledge of a local site, make them invaluable in environment-related health protection

The degree to which local public health officials and their staff are capable of effective participation in EA was discussed at length in all four workshops. A number of conclusions were drawn.

First, conflict of interest is a critical issue. As protector of public health, the public health official should speak out when the public is exposed to risks over which it has no control. But when dealing with au environmental assessment of a municipal project, the public health official may find he or she is at odds with their own employer, the municipality. On the other hand, the public health official is ultimately accountable for public health matters within her or his health unit. A possible solution is for the local public health official to respond, "If the community is the proponent I can't take a stand, but I have a duty to show where information and resources can be obtained." This, of course, presupposes the availability of information and resources.

Most public health professionals may not have the training or resources to independently evaluate environment-related health risks, or to participate in EAs, but at least they are oriented to prevention.

Second, most local public health offices are extremely limited in their resources for environment-related health protection. Most could not possibly become involved in the number of environmental assessments that could conceivably arise, and many would see such a role as outside their mandate. Only the City of Toronto has a well staffed Environmental Protection Office, and provincial health departments generally do not have the staff or programs to provide adequate technical assistance. However, the regional offices of the Health Protection Branch, Department of Health and Welfare does provide some assistance in this area.

Local health units which do examine local development applications from an environmental perspective quickly become so overwhelmed by sheer volume that they rarely become involved. Moreover, as a local Medical Officer of Health at the

Eastern workshop emphasized, his mandate is reactive, not proactive. Officially, his duty begins when a citizen requests information or when a significant clinical health effect (mortality, for example) has been observed, and even then his powers are limited. For example, he could instruct residents to stop using their wells, but would have neither the resources nor authority to find the source of contamination or close down an offending facility. Clearly, other models for consideration of environmental matters at the local level must be explored.

Third, most public health officials are not personally oriented to environment-related health issues. The traditional training, role and mind-set of a public health official is oriented to infectious disease control and public health education. Local Boards of Health have neither the expertise nor resources necessary to independently interpret environment-related health risks, nor to participate in environmental assessments. But, in contrast to other health professionals who tend to work within the illness/treatment model, public health practitioners are at least oriented to prevention.

Clearly, Canada needs to train mom professionals in environment-related health protection, with an emphasis on interdisciplinary approaches. This will involve finding interested health professionals and offering them environment-oriented development opportunities, and offering development opportunities in health issues to interested environmental professionals.

Lastly, several public health officials participating in the workshops have emphasized the pressure they are under to provide health information on possible environmental risks, and the difficulty they have in accessing and interpreting that information. Several on-line data sources were mentioned, and it was noted that these are improving, but the need for assistance with both access and interpretation remains. This suggests the need for a central resource available to decentralized public health units. This concept emerged at each of the workshops and is explored further in **Section** 3.2.

2.4 Public Involvement

Public involvement in the environmental assessment process is clearly an important but sensitive subject. There is consensus that the public should be involved early in tbe process, but how early? one argument is that prior technical assessment is sometimes appropriate, for example where no particular site is identified — as with the question of nuclear waste storage in the Canadian shield. But that line of thinking has been questioned on a values basis ("science itself is not value-free*), and because the general public often makes valid technical contributions.

A level ***playing field between giant developers and small communities is essential for fair and constructive public involvement.***

This highlights the entire issue of public confidence in the EA process. Early inclusion, good communication, full disclosure of technical data, and a well-founded faith that public concerns will be taken into consideration appear to be absolutely necessary for public confidence. The availability of financial resources, toward levelling the playing field between giant developers and small communities, is also a critical factor. This is discussed in **Section** 4.3.

In many situations, the initial relationship between the local community and the proponent, and between the community and the entire EA process, is adversarial. This fact prompted discussion of the "environmental mediation" concept, in which a party accepted as neutral attempts to clarify misconceptions and improve communication from a very early stage. Such a mediator could also engage the community in basic discussions about risk and health. If the extremes on the health spectrum-death and aesthetics-are acknowledged, perhaps all concerned would be more able to talk constructively about the less clear middle ground, and agree on a basis for decision-making.

"The real task in a hearing is to put together the life experience of ordinary people, with the input of experts, so that it all makes sense."

An environmental mediator would require an ability to build trust, considerable sensitivity and communication skills, and expertise in managing community dynamics. As pointed out by several participants, such a body of knowledge does exist, and its practitioners have had success at the community level in areas other than environmental assessment

The reality of perceived risk, even in the absence of actual risk, emphasizes the importance of early and effective involvement. The fact that anxiety and an adversarial climate frequently polarizes the community, which in turn precludes intermediate positions, underscores the level of skill required by someone attempting to constructively intervene at the community level. Even so, highly adversarial situations may prevent successful mediation.

Another problem facing both mediators and public participation in general, particularly in small and relatively unsophisticated communities, is lack of familiarity with the planning timeframe. Often, public perception is that participation will yield immediate results. When that does not occur the typical response is, "What's the point in participation? Nothing happens anyway."

Regrettably, government representatives frequently do not have the credibility required for effective mediation and communication. Given this reality, existing non-governmental agencies or a new institute may be more appropriate providers of this service. (This subject is explored further in Section 3.2.)

Regarding the public hearing itself, comments made at the Ontario workshop by a participant familiar with Ontario's Environmental Assessment Board are most relevant. In the participant's opinion, "The real task is to put together the life experience of people, with the input of experts, so that it all makes sense.+' He noted that the general public frequently brings valid and valuable hard data and information to a hearing. Ontario EA hearings are more interactive and less formal than court hearings, so the Board *can* work with both general and expert witnesses to sort out the facts and work toward common ground: "It's in everyone's interests that a joint understanding be arrived at... and it's amazing how a fusion of evidence comes together at the end of the day."

Who will the public believe?

The same participant also argued that someone must help the public understand the process and clarify the facts from the beginning. This again raises the notion of environmental mediation. Misconceptions of fact are commonplace (eg. regarding the distance to a landfill, the number of trucks passing per day, the hours of operation). Such issues should be clarified in advance.

However, this leaves the question of credibility: who will the public believe? In Ontario, community liaison appears to fall within the mandate of the Environmental Assessment Branch, but there was considerable doubt whether that office, or any other office of govemment, could succeed at this task Similarly, it may be argued that Ontario Ministry of Health staff should be available to all parties and present as a resource at all public events. But the Ontario Ministry of Health is understaffed in the environmental area, and could be perceived as biased. Again, this suggests the need for some new, provincial environmental protection organization that somehow attains public credibility.

2.5 Standards and Public Policy

At the Eastern workshop, it was evident that a review of procedures for the inclusion of health in envimnmental assessment must go beyond the EA process itself. EAs consider whether project effects fall within the limits set by guidelines, standards and regulations, but in some cases it is the validity of those ground rules that is in question. An EA is not mandated to reconsider those ground rules, and the basic research that would be required to do so could not be undertaken within the EA time horizon.

There should be some formal linkage between the EA process and broader reviews. EAs will generate valuable feedback on existing standards and policies.

Similarly, EAs operate within the general governmental policy framework For example, the EA on a second nuclear reactor at Point Lepreau in New Brunswick was explicitly instructed not to consider whether Canada or the province should be using nuclear energy at all. Likewise, oil fired generating stations would be required to meet emission standards, but arguments questioning policy that permits combustion plants, in view of global warming, would not be considered.

For environment-related health concerns to be adequately addressed, health professionals must have ongoing input to regulations and policy. In many cases, regulations are based on biological, physical or technical considerations, and may not reflect developments in our knowledge of the effects of environmental factors on human health.

In the policy area, the questions to be considered may be as basic as "What is a healthy society? What is a healthy body?" Input on this level, in the long run, may be even more important than participation in the formal EA procedure. Most policy development requires some form of economic analysis; it is argued that policy development should also require evaluation from environmental and health perspectives.

This line of thought suggests that some kind of forum for general policy discussion and standards review is necessary. Such a forum would move beyond the project-specific nature of EAs. The roundtables on sustainable development across the country, and processes established to develop new regulations under CEPA, may be moves in this direction.

In any case, it has been argued that there should be some formal linkage between the EA process and broader reviews. Project-oriented as they are, EAs could generate valuable feedback on existing standards and policies.

2.6 Recommendations on Procedural Mechanisms

A number of recommendations on procedural mechanisms can be drawn from the discussion at the regional workshops. These include:

1. Mechanisms should be established or enhanced to ensure that public health practitioners, the public and EAs can contribute to the development of policy, and to processes used in setting standards, regulations and guidelines.

2. Legislation making the assessment of health effects a statutory requirement in EA processes should be considered.

3. Public participation should be engaged at the outset, to determine whether and which health issues need to be addressed, and to establish what health parameters — physical, psychological, social — are to be used.

The public should be involved at the outset, to determine whether and which health issues need to be addressed, and to establish the health parameters to be used.

4. The role of public health officers, municipalities and regional governments in environmental assessment should be expanded, particularly with regard to small and medium scale, private sector development.

5. Guidelines for the assessment of health effects should be prepared and widely distributed.

6. Guidelines for community health studies, and for judging the feasibility of such studies, should be developed.

7. Environmental training and development opportunities for health professionals should be enhanced, with an emphasis on interdisciplinary approaches.

8. Access to environment-related health data and information by public health professionals should be much improved.

9. Procedures should be established for critical evaluation of both the EA process and the resulting EIS.

10. EA legislation should be expanded to cover a greater range of developments in both the public and private sectors.

11. Environmental mediation should be considered early in the EA process to rectify misconceptions, improve communications, and, where possible, to resolve differences.

3 INSTITUTIONAL/JURISDICTIONAL ISSUES

3.1 Overview

With so many separate jurisdictions and institutional mechanisms across Canada, improving the inclusion of human health in EAs might involve adjustments and innovations in many different jurisdictions and institutions.

For example, one might foresee adjustments to existing federal and provincial EA legislation and the departments and boards set up under them; new institutions to meet newly perceived needs; and improved coordination between institutions.

Improved coordination is required in several areas:

- between the federal, provincial and municipal levels of government;
- between sectors (eg. government, university, private research organizations, industry, and public interest groups); and
- between disciplines (eg. environmental professionals and health professionals).

This is a list of possibilities, by no means all inclusive.

In the first two regional workshops, discussion of institutional and jurisdictional issues for the most part was limited to the need for environmentally-oriented provincial or regional health protection organizations (see **Section** 3.2). Discussion at the third workshop seemed to build on that base, examining institutional and jurisdictional issues in greater detail, with a focus on inter-disciplinary and inter-jurisdictional coordination and development (see **Sections** 3.3 **and** 3.4).

We need better coordination between sectors, disciplines and levels of government.

Additional institutional/jurisdictional issues identified include the following:

- Explicit inclusion of human health in EA legislation may promote role clarification, better resourcing, and the development of guidelines.
- Uniformity in EA language, legislation and processes across the country does not exist. This presents some problems, but it also provides a creative environment in which numerous approaches ate tried. Also, regional differences may require differences in both procedures and institutional mechanisms.
- The nature of regulations for the management of hazardous substances can be seen as an institutional question as well. Regulations tend to be prescriptive. It has been suggested that, in a rapidly changing and uncertain climate, it would be mom appropriate for regulations to be performance-based. This would allow for professional judgment and innovation, and avoid a mere programmed response.
- The search for new ways of addressing environment-related human health issues is an institutional issue of fundamental proportions. Highly expensive public panels, for example, may not be the only means of conflict resolution. Interesting additional options are mediation, a stakeholder/common ground approach to conflict resolution, and more "freewheeling" discussion across disciplines, players and regions.

Municipalities should be a full partner in the EA process.

- Effective participation in the EA process may requite that major players re-organize internally. For example, elements of Environment Canada have been intemally structured to facilitate input to the federal EA process. The Environmental Health Directorate (of the Health Protection Branch, Health and Welfare Canada) has been structured to facilitate its input to developments under CEPA.
- More attention must be paid to the municipal role in environment-related health issues and in the EA process. Given their familiarity with local issues, their closer relationship to local populations, and their powers and expertise in public health land use, development control, water quality and waste management, municipalities should be a full partner in the EA process. Generally, this has not been the case. Also, federal and provincial assistance may be required if municipalities are to consider environmental and human health issues independently, outside the provincial and federal EA procedures.

3.2 The Environmental Health Protection Organization Concept

The need for credible provincial or regional organizations devoted to environment-related health protection was discussed in every workshop, in response to a number of problems:

- the absence of a central resource for information that would be easily accessible by local health units;
- the need for a coordinated approach to environment-related health research. (This would include both basic research and field research in support of environmental problems or environmental assessments.);
- the need for a central pool of experts that could provide both special project funding and on-site assistance to local health units;
- the need for a pool of skilled professionals with both the technical knowledge and facilitation skills to undertake community liaison early in the EA process, and possibly, to provide environmental mediation; and
- the absolute necessity that any agency trying to fulfil any or all of the above needs must achieve and maintain "honest broker" status in the eyes of all stakeholders in the EA process, including governments, the proponent, the public, experts and the media.

The environmental health protection organization concept appeared in a number of forms. Possibilities included:

- an expanded environmental toxicology and epidemiology unit in health ministries, perhaps dubbed the "health assessment branch" or the "provincial environmental health protection organization";
- an independent environmental health institute that attains status through a strong research orientation; and
- an independent institute oriented to service in the field This is a project-oriented approach, emphasizing trouble-shooting rather than standards setting. As a "flying squad" of free consultants, the organization could ensure that human health is included in environmental assessments at the earliest stage. This service would include an initial consultation to d&ermine whether potential health effects required direct attention by health professionals, and whether the squad should be involved.

The most fundamental issue facing this concept is clearly the question of credibility: how can any institution get and keep an "honest broker" reputation? The ability of health ministries to achieve such status was questioned, largely because of their regulatory role. In principle, provincial staff should be free of the conflicts of interest that can trouble local public health units, but in practice, this does not appear to be the case. On the other hand, the success of Toronto's Environmental protection Office demonstrates that government agencies can indeed gain considerable credibility. A similarly successful example, in Australian EA, is the role of "independent supervising scientist".

The fundamental issue is credibility: how does an institution get and maintain "honest broker" status?

A strong case was also made for service by an unbiased third party, although there was no consensus on the role that a third party might undertake. In fact, discussion disclosed that several different proposals for government-funded, but independent, environmental health agencies were on the table or in preparation in Ontario, just when the Ontario workshop was held.

Two suggestions have been offered for forging honest broker status. The first is to build in feedback loops. The logic here is that it is easier to be critical than creative: if there were a feedback mechanism for all information sent out, the creative response might be a more likely result. Another promising approach is multi-stakeholder collaboration. The Canadian Centre for Occupational Health and Safety's tripartite board is a good example. If it is recognized that each of the players has vested interests, perhaps a joint approach can achieve not only external credibility, but build trust among the players as well.

A credible environmental health protection organization must be able to answer the ultimate question: "What does it mean for my health?"

At the Eastern workshop, concerns about provincial health protection organizations received less attention, possibly because participants felt the matter had been well covered, but more likely because the participants from the small Atlantic provinces seemed to think in regional terms. Formal transboundary mechanisms for information exchange and coordination were of great concern.

To a degree, this need is being met by the regional offices of the Health Protection Branch, Health and Welfare Canada. A spokesperson from one of those offices reported that the Branch provides health-related information to federal and provin-

cial departments and agencies, and is also an information source for both the public and the media. Risk communication is a major issue for the Branch, and it has recently been working on ways to express relative risk, including tobacco equivalency. However, while the Branch participates in regional workshops and committee work (eg. on groundwater and pesticides), it does not have research scientists, does not evaluate hazards, and has not participated in environmental assessments.

Additional questions and comments on the provincial or regional environmental health protection organization concept are summarized below.

- Any such organization should have strong cross-links to the general public, universities and research centres.
- To support local health units, any proposed organization should coordinate the information now available, provide expertise and resources, and direct research into areas lacking attention. The major clients would be communities, their health units, and public interest groups, but the organization should also deal with individual concerns.
- The highest priority should be needs least served by existing bodies. Management of research grants is already well handled, so the focus should be on community needs and policy development As an aid to decision-making, the organization should be accessible not just upwards, but to municipalities, public interest groups and individuals as well.
- Both community service and research may be required for credibility. Also, the organization will need a certain critical mass to have impact; it must have more than one or two researchers.
- A vital aspect of community service is risk interpretation. Ultimately, the public wants to know, "What does it mean for my health?"
- The resources exist, but are dispersed. If this were a private sector problem, action would be immediate.
- Critical agencies in promoting such organizations are health-related councils and committees formed to look at cross-boundary issues. An example would be the Premier's Council on Health Strategy in Ontario.
- A provincial or regional environmental health organization must keep up with emerging public values. If it did, it would likely be far ahead of most other government bodies, who have yet to respond to the fact that environment-related health issues have been a top public concern for years.
- A national library devoted to the relationship between human health and the environment may prove to be critical in the development of provincial or regional health organizations.

3.3 Inter-Disciplinary Coordination and Development

Closer ties between researchers and the EA process would enable research to respond to current and emerging scientific and technical needs, including those in the social science area, such as social impact, perceived risk, and risk communications.

At the Eastern workshop, in an extended discussion, the participants explored the need for better contact between environmental and health professionals. It was observed that the biological and physical sciences tend to dominate EA. Other discussion revealed that many environmental professionals have scant knowledge of the entire field of public health, and that most health professionals know nothing of EA.

It was suggested that substantial efforts be made to bring the environmental and health communities together, and independently or jointly, to increase knowledge of each others' disciplines. The effect of environmental factors on human health, it was argued, should be on the public health agenda. This might be done through discussions and recommendations at the annual meetings of medical associations; in training programs for community medicine and public health (in part by providing practical opportunities in environmental health protection offices); and by regular exchange of information and data between practising physicians and public health offices, and between public health and environmental specialists.

*As **accountablity pressures increase, environmental and public health professionals** will **need to work together in professional development.***

Exchange of data between public health officials and environmental professionals, possibly through linked databases, was viewed as particularly important. Workshops and conferences are another information exchange opportunity. At such events, work could be done on database integration, and retrospective case studies could be jointly developed. In general, as accountability pressures increase on environmental professionals, on public health professionals, and on the private sector, there will be an ever greater need for all three groups to work together in professional development.

A constraint to this is the absence of organizations for health professionals specializing in environmental effects. Locally, provincially and nationally, such organizations would act as magnets, drawing in health professionals from all sectors with an interest in the environment. They could offer solid professional development experiences, dealing with questions of immediate professional concern, and could promote linkage between environmental professionals and health professionals.

Such organizations would also help environment-oriented health protection develop as a distinct discipline. This was seen as vital since the emerging field tends to atrophy when subsumed within occupational health and safety or general medicine.

3.4 Transboundary Coordination

During the workshops, the need for transboundary (or inter-jurisdictional) coordination was noted repeatedly. At the Ontario session, it was observed that the terms and conditions set by an EA Board or Panel in response to a potential problem often extend beyond its authority to enforce. The terms and conditions may involve the authorities of several levels of government and many agencies. This implies a need for improving coordination in EA.

For example, in a landfill hearing, the Board or Panel may require the proponent to do more about mandatory recycling. However, the regional government proposing a landfill project is not responsible for recycling, which is controlled by local municipalities. Nor is the proponent responsible for packaging regulations, which are a federal matter. At best, the Board may require the proponent to enter into agreements with other levels of government to look at joint alternative measures.

Another inter-jurisdictional issue is the need for studies, regulations and enforcement on a multi-media basis. Presently, contamination of air, water and food, by the same substance, is handled by a number of agencies at each level of government.

Perhaps because concern about the health effects of environmental agents is relatively new, jurisdictional authorities are often unclear. Authorities and roles must be clarified, but as was emphasized at the Atlantic session, this should not lead to narrow specialization. Rather, ongoing formal mechanisms for inter-jurisdictional coordination should help eliminate "buck passing". Interdepartmental screening committees, and New Brunswick's "one window" approach in which all players in an EA come together, are existing examples at the provincial level. Intergovernmentally, improvements could be made by including health units in existing referral systems (eg. the Atlantic Region Pesticides Advisory Committee (ARPAC)), and by developing formal linkages between all three levels of government. One example in place is the Department of Health and Welfare's Food Safety Committee, which involves a variety of departments from senior governments to work toward consistency in regulations.

The terms and conditions set by an EA board often extend beyond its authority to enforce.

Several participants at the Eastern workshop reported that, strictly speaking, existing mandates are quite narrow. For example, human health lies outside the mandate of most environment departments, and public health units are only reactively responsible for the local environment. Jurisdictional fragmentation may have some positive outcomes, but for the most part this is not the case. Numerous illustrations were offered, including the following:

- It is generally assumed that provincial municipal affairs departments adequately represent individual municipalities in EAs. This may not be the case. The interests of local health units and their provincial ministries are not necessarily congruent, and in many provincial municipal affairs departments staff involved in environment-related health issues are few or non-existent
- A province may not have enforcement **authority** over a project generating effects felt in another jurisdiction, and it may have no regulatory authority over projects whose effects only occur in another jurisdiction.
- If provincial **regulations** do not apply, a province has no basis for enforcement.
- Similarly, federal reviews have little impact in areas that are not federally regulated.
- The best governmental level for regulation may not be the best level for implementation and enforcement.
- Generally, a local Board of Health will not view severe air pollution or ground water contamination as a health problem unless and until a health effect is observed. Even then, it must turn to environmental officials to establish levels, and may only have authority to advise citizens to minimize contact (eg. don't use your well). It certainly has no power over offending operations until a clinical problem can be proven. (One local Medical Officer of Health in the Atlantic region reportedly has resigned over exactly this issue.) In any case, most local health units are neither oriented to nor staffed for environment-related health issues.

A transdisciplinary, inter-jurisdictional working group, with all the necessary authorities around the same table, could truly say "The buck stops here".

Jurisdictional issues such as these led one participant at the Atlantic workshop to comment that the public is overconfident that human health is adequately protected. Another observed, more positively, that despite these issues, EAs and environmental problems are in fact handled relatively well. This he accorded to informal communication among technical people, and their lack of concern for jurisdictional technicalities. Another noted that existing inter-jurisdictional mechanisms at least enable the players to get to know each other; when an issue arises, each member knows who to contact and how far her or his mandate extends.

However, neither informal communication nor dependence on the courts was seen as adequate. In addition, formal, ongoing, action-oriented, multi-partite mechanisms arc essential. A transdisciplinary, inter-jurisdictional working group, with all the necessary authorities around the same table, could truly say "the buck stops here". Cooperative action by such a group could work creatively around institutional, jurisdictional and regulatory snags. For example, if a health representative identifies a problem which is presently not subject to health regulation, the group would deal with the problem using whatever tools are available. This may well be an environmental regulation because, ironically, in many cases it has been easier to establish health effects in animal populations than in people.

3.5 Recommendations on Institutional/Jurisdictional Issues

A number of recommendations on institutional/jurisdictional issues can be drawn from the discussion at the regional workshops These include:

1. Improved coordination and collaboration on environment-related health issues is essential, across political jurisdictions, levels of government, sectors and disciplines. Ongoing, formal mechanisms of coordination should be established.

2. The role of municipal and regional governments in environmental assessment should be expanded. .

3. Cross-disciplinary coordination and professional development (particularly between public health and environmental specialists) should be promoted through exchange of data (linked databases should be considered); cross-training; joint conferences; and greater coordination and collaboration on a day-today basis.

4. Provincial or regional environmental health protection organizations are recommended, primarily to support local health units with information (including meaningful risk interpretation), specialized expertise, and research. Such organizations should also provide information directly to community organizations and individuals, and should be significant contributors to policy development.

Performance-based regulations and standards may prove more effective than those that are prescriptive.

Public credibility will be crucial to the success of such organizations. Credibility will be built largely on the quality of service at the community level (eg. in risk interpretation and community health studies), and on credibility as independent centres of research. Strong cross-links to the public, public health units, provincial policy development bodies, universities and other research centres will also be essential.

5. A national library devoted to the relationship between human health and the environment should be considered to facilitate the work of public health units, and to serve provincial or regional environmental health protection organizations.

6. In many cases, performance-based regulations and standards may prove more effective than those that are prescriptive in nature.

4 SOCIO-POLITICAL FACTORS

4.1 Overview

An examination of the sociopolitical climate for the effective inclusion of human health in EA begins with a look at the stakeholders who populate the sociopolitical landscape. Seven have been considered: the public, public interest groups, politicians, the media, the proponent, consultants, and government EA staff.

Frequently, the initial position of the public is opposition to development. This reflects both the "not in my backyard" (NIMBY) phenomenon, and the fact that first expectations are often of a worst case. Three Mile Island, Love Canal and other serious environmental incidents have generated anxiety, and the uncertainty of health data has raised concerns to a high emotional pitch.

An initial consideration is how to deal with emotions, how to get past emotional responses to a point where constructive work can be done. Of course, the issues are indeed emotional, but the high level of emotion can be a significant barrier to effective public participation.

This suggests that communication skills, sensitivity, and an ability to translate technical data, especially risk assessment, into meaningful language that the general public can understand, are vital qualities that must be located somewhere in the EA process. A more extended sociopolitical discussion of public participation can be found in **Section** 4.3.

The role of **public interest groups** is currently under great stress. The major groups, such as Pollution Probe and Greenpeace, are now extremely well funded by an anxious public. But the recent adoption of "environmentalism" by political leaders of all stripes is requiring a hard and difficult look at the traditional, adversarial role of environmental groups. In addition, there are many different types of groups, including multi-issue national or regional groups, and small, single issue local groups.

In principle, **politicians** should be leaders, but in fact, they follow the electorate. Concern about the next election is the greatest barrier to their creative participation in the EA process — which, of course, is geared to the long term. Ideally, politicians could provide leadership by directing attention at larger societal issues, by expanding the policy and planning time horizons, and by interpreting the EA process to the public. They could also do much to transcend jurisdictional issues.

On the other hand, many workshop participants have argued that political agendas rarely influence environmental assessments, that nearly all are based on scientific and technical evidence.

Certainly, in response to rising public concern, there has been a dramatic rise in interest at the political level, both in environmental issues in general, and in environment-related health issues in particular. It should be noted that this interest is not limited to the two senior levels of government. Municipal politicians directly reap the effects of development, positive and negative, so it is not surprising that they are taking an interest in both environmental assessment and sustainable development.

The **media** are often reactive and sensationalist. Ideally they should be more responsible and balanced, they should do more thorough research, presenting all positions on an issue, and they should document successes. The barrier to this, of course, is the fact that the media are driven by what sells. The role and nature of the media, with respect to environmental assessment, will be discussed further in **Section** 4.2.

Traditionally, the **proponent sees** public consultation as a necessary evil. In this lies the assumption that the proponent's least cost route (from an economic perspective) is a limited one-way information flow, outward from them, at their pleasure. As proponents realize that this **may** not be the least cost route, their attitudes may change. In fact, **industry's** problems are the same as those in an EA: getting enough information and being able to interpret it.

Bitter adversarial battles may not be the best or the only way to ensure safe development.

Enlightened proponents would take a collaborative approach and hire consultants with the expertise and mandate to communicate with the public and effectively involve them in the decision-making process. Enlightened proponents would also deal directly with human health issues and hire health consultants where health is an issue. Indeed, the fact that some 95% of the projects that fall under EA jurisdiction never get to the public panel stage places even greater onus on the proponent for ensuring public consultation.

However, the reality is that many proponents remain focused on short-term battles, and there are many ways the EA process can be manipulated. Even the smallest organization has the ability to question procedure and expertise. Sending assay samples to a different lab, for example, will often produce different results. And then there is always the economic threat of closure or cancellation of expansion plans. Moreover, under present laws, sanctions have been largely ineffective because stringent proof of criminality or negligence is very difficult to obtain.

At present, the **consultants** for the proponent **are** generally technical experts. Rarely are they health professionals, and as consultants for the proponent, they

are reluctant to release information that is less than positive. This does not promote effective public involvement or meaningful examination of all technical issues and concerns, including human health.

A key barrier for consultants, then, is their mandate from the proponent. Were the proponent to mandate the consultant to communicate freely and early, and utilize consultants with skills in public communication, issues would emerge earlier in EAs and be dealt with more effectively. It was repeatedly emphasized at both the Ontario and Western workshops that all EA consultants, whether scientific, technical, social or health in background, need to learn better communication skills, particularly in the area of risk assessment.

Regarding health consultants in particular, it was also observed that since they are new to the EA business, they often need training in how to handle cross-examination in a hearing. At times, this can be a difficult experience.

Government EA staff arc also technical experts, in both the EA process, and in the various specialties needed to deal with environmental issues. They are driven by self-interest as much as the rest of us, and share our culturally imbued inclination to assume it is possible to dominate nature. These elements affect where the government employee makes his or her stand in trade-offs that may in time affect human health.

The notion that humankind, with technical expertise, can and should dominate nature is a fundamental issue that applies to many of the actors in EA's socio-political landscape. Obviously, it is time for a reassessment of this position, but this is far from easy. For most of us, the assumption that we can dominate nature is well rooted in both our values and our behaviour. The sustainable development concept may reflect an emerging alternative.

The stakeholder/common ground approach seems like a promising alternative.

As for the relationship between the actors in EA's so&-political landscape, the most useful framework appears to be **the stakeholder/common ground concept. The** stakeholder notion defines at the outset who should be involved in an EA: anyone with a stake in the results. The common ground notion emphasizes conflict resolution by finding and expanding upon areas of agreement, rather than assuming that the relationship between players must be adversarial.

Cases where the stakeholder/common ground approach has been taken from the beginning have been quite successful. The Canadian Public Health Association (CPHA), for example, facilitated this type of process for the environmental assessment of low level flying in Labrador. All parties received full information and were repeatedly consulted along the way, and all parties were given an opportunity to comment on an interim report of the study. The Associate Director of CPHA at the time described the organization's stance as "attentive", and reported

that most people did feel their concerns were addressed in the final report. CPHA even received letters of commendation from groups that previously had been quite anxious and skeptical.

All parties to an EA have their own self-interest. The task is to surface hidden agendas and transcend self-interest, in a commitment to collective well-being through respect for all human life and the planet. As people become better informed, seeing themselves as part of the environment and dependent upon it, this high ideal becomes more and mom a realistic possibility.

These communitarian values are embodied in the stakeholder and common ground concepts: being a stakeholder exploring common ground implies a shared participation in a larger entity. The further challenge is to live out this vision within our organizations and institutions.

4.2 The Media and EA

Participants in most of the workshops observed that the media is a highly influential player, particularly in small centres with a single newspaper, and that media reporting tends to be sensational, superficial and polarized. However, several individuals commented that the media, in some cases, had been quite reasonable in its handling of risky situations. Others reported both positive and negative experiences A number of participants felt that recently there have been positive changes, likely because both the media and the public are better informed.

The primary problem with environmental reporting appears to be a shortage of experienced environmental reporters.

The primary problem appears to be a shortage of experienced environmental reporters. Several participants recalled their attempts to build relationships with reporters, but rapid turnover, particularly in smaller communities, makes this difficult.

The following strategies were suggested for positively affecting the media's handling of environment-related health issues.

- Build an ongoing relationship with the media, rather than waiting until an issue is in the public eye. In this way, it is possible to develop an identity as both advocate and honest broker who can see all sides of an issue and provide an opinion. If you are willing to talk, it was observed, the media often come back and seek your opinion. Also, if you have good rapport, they will likely take your recommendations on who to speak to next.
- Earn credibility by being available and speaking in a balanced, well-informed fashion. While it may be that the media tends to treat doctors with more credence than government or industry officials, this need not remain the case.
- Encourage specialization in environmental reporting, and help to educate environmental reporters. Promote the development of more programs for health and science writers in schools of journalism.
- Peed complex issues to the media in understandable pieces, and at the right moment. Timing is critical, and delays (despite accusations of "cover-up") arc sometimes wise.
- Develop guidelines for risk communication.
- Develop different strategies for raising issues and for responding to emergencies. The former runs the risk of raising anxieties where none previously existed, but as several local health officers reported, it is often

difficult to predict what will generate concern and what will not. Good media relations in an emergency situation (whether real or perceived) seem to involve fast, open communication, and fast, well-coordinated remedial action.,

- Take the media seriously. If an issue remains in the media for a long time, it generally is a reflection of some significant concern
- Try to prepare for the future. A new concern in one part of the country often will quickly become a local concern. Sometimes it is possible to diffuse alarm by going to the press before this happens, a feat that was accomplished recently by a Vancouver health office when a meningitis scare arose in Ontario. (This also underscores the importance of a good ongoing relationship with the media.) Preparing public pamphlets for issues on the horizon is a similarly wise move, even if sometimes wasted.
- Understand your audience, their expectations, and changes in their expectations. Adjust for increasing sophistication and ensure that the right material goes out at the right time. Do this, perhaps, through an advisory committee on public communication.
- A proactive approach with the media is doubly appropriate as more and more individuals and groups recognize the attention, resources and research they can win through media exposure. A west coast participant: "If writing your MP doesn't work, holding up babies to TV cameras and claiming they are being poisoned frequently will." This sensationalist approach often creates inappropriate anxiety, but with good media relations, health officials can respond to real issues quickly, and add reason and perspective.

As the above suggests, many cases have been recounted in which the simplest questions from the media were handled poorly by technically qualified staff.

Often, a new concern in another part of the country quickly becomes a local issue. Sometimes it's possible to diffuse alarm by going to the press before that happens.

These cases stand in stark contrast to examples where public communication through the media was handled very well by internal media relations specialists. Understandably, whenever it has been offered, training in media relations has been greeted with great interest. Programs of this nature have been given by Environment Canada for the last two years, customized for govemment officials, proponents and public interest groups. One participant suggested that there should be media relations specialists employed somewhere in all EA mechanisms.

4.3 The Public and EA

The assumption that the public expects zero risk could well be the source of the patronizing attitudes that have been so characteristic of government and industry's dealings with the public in the past But the public is becoming more knowledgeable; it is beginning to understand degrees of risk.

If we accept the public as responsible partners in the EA process, public involvement should start at the very beginning, before the proponent begins to explore alternatives and before studies begin. This is particularly important where an economically significant project is seen in either/or terms: either it will create a problem, or it will not be undertaken. The task, in such cases, is to look for some acceptable middle ground.

Ideally, the proponent would trigger the public participation process, recognizing that early discussion and full disclosure is in their interest. The principle of early public involvement is damaged when decisions about alternative strategies are made very early, and public involvement is solicited only later when decisions between different technologies or different sites are being made.

It is important to remember that not all public response is in opposition. Also, it is important to remember that EAs may spark dramatic and potentially damaging community processes, such as polarization. As has been mentioned earlier, this suggests better communication, public education, community liaison, and environmental mediation. However, these well-meaning practices will only work — they will only encourage constructive public participation in EAs — if three conditions are met.

Public involvement should start at the very beginning, before the proponent begins to explore alternatives and before studies begin.

First, the public must believe in the process. They must receive evidence that they are listened to, in part by getting responses from experts. To date, most feel they are facing a wall of indifference. They must have faith that the EA process will actually defend community interests. And they must believe that alternatives are properly explored. At the Quebec workshop, it was argued that research on alternatives to a project should be funded and carried out by groups independent from the proponent.

Second, the public must have immediate and full access to information. The proponent and EA officials must be open, honest and straightforward. As soon as any information on a possible EA is available, the public should be informed. Information mechanisms should include public workshops and meetings with all inter-

ested groups. Those present should have some control of the process (Roberts' Rules are inappropriate), and it should be made clear that part of an EA is an assessment of not doing the project at all.

Third, if the public is to be a participant on a level playing field, that means public groups must have access to appropriate financial and technical resources. Without these resources, participation is really consultation in the context of a very unequal power relationship.

Even if these conditions arc met, the public may still refuse to participate until the report is complete. In some cases, this may in fact be passive-aggressive behaviour on the part of those who feel powerless. In other cases, it may reflect terminal frustration, perhaps because the EA process generally precludes a consideration of basic policies and standards. (For example, should we be building coal-fired generating stations at all?) In still other cases, lack of public participation may reflect a true lack of concern, which in turn is rooted in a prior concern for jobs. This economic element is considered in the following section.

Without financial and technical resources, public participation is really consultation in the context of a very unequal power relationship.

On the other hand, public involvement at the local and regional levels may greatly reduce the need for problem resolution at the provincial or national levels — which inevitably is much more complex. There seems to be general agreement that public involvement is essential at the scoping stage (where the assessment parameters are set), in baseline community health studies, throughout the EA process, and on into monitoring.

4.4 Economic Factors and EA

It is apparent that economic considerations often play a significant role in the EA process, even when human health is an active issue. In Temagami, for example, local workers are concerned aboutjobs, while Torontonians raise concerns about trees. In some mining communities, miners are faced with an even more difficult choice, between their own health and the suffering that would be experienced by their families and community if the mine were closed. This issue emerged in both the Ontario and Western workshops, and in each case the discussion was extremely problematic and reached no firm conclusions.

At the Atlantic workshop, economic factors received considerable attention. It was emphatically stressed that job creation is the main priority of both politicians and the public in the region. Large projects are seen and portrayed very positively. Public participation in EA hearings is often limited to concerns about protecting the existing economy (eg. contamination of lobster beds), and inquiries about employment opportunities.

When the suicide rate among young males correlutes directly with unemployment, an EA that stops development can be seen as a threat to human health. Must Canadians be affluent to afford a clean environment?

It was also reported that difficult economic conditions do seem to generate a higher level of risk acceptance in and around existing enterprises. Even if health effects are widespread and evident, when the option is closure, "the medical officer of health becomes just another lobbyist", to quote one participant

However, this participant and a number of others were quick to point out that Atlantic Canadians should be seen as neither unquestioningly accepting nor wholly unreasonable. Indeed, one can view Easterners as having "their feet firmly on the ground". And when it is recognized that the suicide rate among young males correlates directly with the unemployment rate, unemployment becomes a significant health issue. Ironically, "dirty" projects that create jobs can be seen to reduce stress and promote mental health.

Certainly, when the health of the physical or biological environment threatens the existing resource base (eg. the forest, fishery or tourist trade), Atlantic Canadians are quick to react. And their behaviour is far from one-sided; perhaps due to their enduring connection to the land and the sea, Atlantic Canadians have proven to be staunch environmental protectionists.

These comments obviously have application in most parts of Canada. While an acceptance of dangers to maintain jobs or create jobs is common in areas lacking a

vibrant economy, there have also been communities in every part of the country that have turned down development in view of health or even lifestyle considerations. In practice, communities frequently become polarized around development issues, with the issue portrayed as "jobs versus the **environment."** The concept of sustainable development contends that common ground can **often be** found, but plainly, the challenges are **significant.**

Not the least of these are practical difficulties related to retraining and relocation. Workers laid off as a result of environmentally related closures frequently are middle-aged, with a limited range of skills, and are located in remote areas of the country. They face a world that is increasingly central&d and technologically sophisticated.

On the other hand, it is amazing how companies that argue they cannot go ahead with development or redevelopment plans because of environmental regulations do later go ahead. Even more interesting are cases where new technology in compliance with more stringent regulations proves to be more productive, achieving new, higher quality products and greater profits.

The economic factor is obviously an issue in the EA process. Must a clean environment be a function of affluence? Is there any way around this dilemma?

4.5 Recommendations Regarding Socio-Political Issues

The following summarizes recommendations on socio-political issues:

1. Representatives of all those with a stake in the outcome of an EA — all "stakeholders" — should be involved from the outset.

2. A promising approach to conflict management is the "common ground" approach, in which stakeholders explore and expand upon areas of agreement.

3. Problem resolution at the local and regional levels should be encouraged.

4. The public should be involved in the EA process as a responsible partner from the outset. EAs can spark potentially damaging conflict within communities, for example when a major economic initiative is at stake. For this reason, good communication (especially risk communication), community liaison, and environmental mediation are essential. Even more fundamental to the successful consideration of human health in EAs is public belief in the process, public access to information, and the creation of a "level playing field". The latter implies that public groups have access to appropriate financial and technical resources.

5. Local health units should develop media strategies to raise environment-related health issues, to defuse inappropriate concerns, and to respond to environment-related health emergencies.

6. Media relations training should be more widely available to all parties in the EA process.

7. Local health officers should actively build an ongoing relationship with the media to promote informed, balanced journalism.

8. Programs for health, environmental and science writers should be expanded in Canada's schools of journalism, and thought should be given to professional development for media personnel in these areas.

9. Particularly in less prosperous parts of Canada, the search must continue for ways to meet environment-related health concerns, while minimizing threats to the local economy.

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