

Lessons from the evaluations of Swedish work environment and public health research

by Christer Hogstedt¹ & David H Wegman²

The purpose of this contribution is to summarize some experiences that may be of value for consideration by those who determine there is need for a national evaluation of a field of applied public health research. We believe that efforts to assess a “national” body of research in any field is uncommon but that such efforts could prove highly relevant to public policy debate with respect to the intent and the success of research sponsored by public funds to address the public’s need for an evidence base for action. These lessons are intended for the consideration of those who agree to undertake such an evaluation, those who accept participation as evaluators, and those who are the subject of the evaluation.

Our experiences are based upon evaluations that have been completed for a national assessment of research in occupational health (1) and in public health (2) in Sweden. The two Swedish government efforts were in response to a charge to undertake retrospective evaluations of mainly applied research from many units with large research activities in many disciplines at different sites and in a comparative international perspective. Reviews of the described evaluations are not necessarily relevant for those more commonly considered for the evaluation of research proposals or the evaluation of specific research programs. Therefore, some comment is provided on how the described Swedish evaluations differ from an evaluation of an institute’s research portfolio (ie, the current evaluation of the National Institute for Occupational Safety and Health in the United States).

We have organized our presentation around a series of questions that we believe need to be answered in the process of undertaking such an evaluation.

Objectives and logistics of the evaluation

An evaluation of research can serve several purposes, including the ranking of different institutions versus each other for the priority of funding, the identification of weaknesses in a national research agenda in order to

address any gaps that are determined, the international comparison of research contributions in one or several areas, the overall assessment of scientific quality, and the examination of the relevance of research to needs of the “consumers”. Within the overall context of the objective, the purposes can also be specific and limited, for example, evaluating the knowledge base and monitoring the intended results of research strategies, findings from the assessment of the demographic composition of researchers, the attractiveness of the field for young researchers, and the like.

It is, however, fundamental for the scope and direction of the evaluation that the purpose be clearly stated from the directing agency. This is not always the case, and therefore we recommend that the evaluation coordinator and the secretariat interpret the purpose in writing and present this interpretation for formal acceptance or modification by the responsible body.

1. What units are included, how should they be categorized, and what is the basis for comparison?

The Swedish efforts showed that it is not self-evident which base unit(s) should be included in the request to submit material for an evaluation and how they are going to be identified and treated. Approaches to the base units could include their citation identification through funding agencies, through university or institute administrations, or through professional organizations.

In the evaluations of Swedish work environment research, the assessment was explicitly restricted to evaluations of chemical, biological, physical, and ergonomic research. Psychosocial research and research on occupational health systems were specifically excluded. Although there were no such constraints placed on what to include within “public health research”, this body of research was determined to be best considered by organizing the wide range of efforts into a few appropriate subheadings. They were research on health outcomes, research on social and behavioral determinants, research on descriptive, analytical or interventive studies, and research on health systems and public health economics.

¹ Swedish National Institute of Public Health, Östersund, Sweden.

² School of Health and Environment, University of Massachusetts Lowell, Lowell, Massachusetts, United States.

In addition to specifying the appropriate units, it is important to recognize that increasingly many researchers belong to more than one research group or have changed research groups during the period of concern for the review. Measures must be taken to manage overlaps and identify researchers or research groups who might otherwise be missed.

In public and occupational health, researchers often do only a part of their research in the specific field, especially if the work is not undertaken within a department or unit that is wholly concerned with the field of interest. A restriction could be made to those belonging to a designated department of the discipline or a criterion that the researchers should work at least 25% or 50% of their time in the field. While there may be concern that important aspects of the field will be lost to the review if it is restricted, it will be difficult to evaluate productivity unless there is clarity about the person time available for research in the unit. It is also advised to get figures on the time spent on research, teaching, and the communication of research results.

In occupational health research, the major units to be evaluated were easily identified, but the more peripheral and smaller groups were less clearly specified, and some of them were particularly multifocused so that the research time allocated to the relevant occupational health research needed to be determined by appropriate interaction with the units.

In the evaluation of national research, as well as that of large, multicenter institutes, comparisons with other countries and large institutes are natural, although usually hard to do quantitatively, except for the use of bibliometric measurements. The purpose of an international evaluation group with participants from several countries is, in our judgment, a desirable qualitative approach that appropriately facilitates these international comparisons.

The content and quality of the relevant research policies and strategies should be scrutinized, as well as the knowledge base for them, the incitements to track the implementation of relevant research findings, and the ways of monitoring the implementation of the overall research strategy.

2. What period of work should be reviewed for the evaluation?

Research, by its nature, is an ever-evolving endeavor. As a result, there is no clear beginning or end to research, particularly when it relates to applications to broad public agendas. Therefore, it is important to decide, in advance, the period of time that will be targeted for the review. It is recognized that many of the intermediate and end outcomes of the completed research are the consequence of research outputs accomplished earlier

in time. Concluded research is, of course, the most interesting in terms of direct relevance to application; however, research currently underway or in the planning stages is critical to the future. Whether this research is well organized and directed towards the highest priority needs is also important to know.

3. What should be the composition of the evaluation team and how should it function?

Obviously the size of the evaluation team depends on balancing the effectiveness and efficiency of the team, and an adequate balance of differing perspectives, with the amount of research that will be evaluated, the depth of the evaluation, the number of disciplines necessary, and the budget set up for the enterprise. For a comprehensive evaluation of larger institutes with several annexes or a whole nation, a minimum of five evaluators with broad experience in evaluation, as well as appropriate representation of research directions, seems to be a minimum, and perhaps ten is a maximum. It may be preferable for each evaluator to have more time rather than using a larger number of evaluators with shorter time. The average time spent by an evaluator in our experience has been around one full-time month and 50% more for the coordinator.

Public and occupational health are very multidisciplinary research areas, and it would be infeasible to have evaluators from all of the participating disciplines. Therefore, senior researchers with different backgrounds, long experience, and usually a leading role with responsibility for multidisciplinary research should be looked for.

To be effective and accepted, it is very important that the evaluation group be respected for its knowledge, as well as its integrity, by the community that will be evaluated, as well as by the consumers of the research. Therefore, we determined that the evaluation team needs to be complemented by one or two reference groups with representation from the scientific community of concern as well as the "consumers" (eg, ministries, government agencies, labor market partners, health care providers, research councils).

Reference groups may serve in an ad hoc capacity, meeting only once, or might follow the process, give advice on suitable evaluators and the best measures for collecting relevant material, and propose organizations to be interviewed by the evaluation team to gain perspective on research relevance. Reference groups can also serve in a limited quality-control role by reviewing report drafts from the evaluators to correct mistakes, point out unclear formulations, or identify missing information. However, it is essential that the organizing agency decide which evaluators to invite to comprise the team and that the agency also agree that the evaluation

group has the sole responsibility for the final report and its recommendations.

We recommend at least two face-to-face meetings with an international group of evaluators. One at the beginning of the exercise to agree upon procedures, what material to request from the researchers, which groups to meet, the evaluation categories and the division of labor. This process could take 2–3 days. It is relatively easy to determine the types of published research findings to be collected for assessment by the evaluation group. Less evident is what informal information can be collected about research organizations, functions, interactions across organizations, policy drivers, hidden constraints or determinants, and the like. The first meeting allows the evaluation team to identify the key areas to be surveyed from representative members of the evaluated groups or the consumers of the research. Taking time to structure the survey questions before the first meeting closes allows these surveys to be completed in a timely fashion.

Another meeting at the end is essential to clarify questions that have arisen, discuss discrepancies in the evaluation (if the same material is evaluated by more than one evaluator), discuss and agree upon the different aspects of the evaluated material, and finalize the written report, including the executive summary. Such a meeting usually takes 5 full days.

A meeting in between (eg, with site visits and hearings) could be warranted, if the budget and time allow, and certainly it could enhance the effort by resolving problems that have been identified through direct conversation and engagement. Only those who agree to participate in all of the meetings should be the final members of the evaluating group, as the mutual discussions are important. In any event, there is usually substantial correspondence between the secretariat and the evaluators, as well as within the group, throughout the process.

4. How might the secretariat function to provide context, background, history, and practical support?

A comprehensive evaluation needs a qualified secretariat that spends 6–12 full-time person months on the task, from the beginning to the end. The secretariat may provide, translate, and summarize background material on policy and strategy documents from the government, agencies and research councils, map the funding possibilities and the size of awarded grants, distribute and collect questionnaires, and compile descriptive data on the number and characteristics of researchers. In addition, the secretariat handles all other practicalities around meetings, hearings, and seminars.

In addition to the scientific material to be evaluated, there is also other information that can be of value that

would place the presented research into perspective (eg, the history of the organization of the research efforts of concern to the national scientific agenda). While it is possible that this information can be organized effectively by the secretariat, it is likely, and possibly preferable, that this work be undertaken by well-informed consultants.

5. Are site visits or interviews with researchers and stakeholders required?

Two different modes for face-to-face meetings between the evaluators and the researchers were employed in the evaluation of occupational health research and public health research, hearings in front of the occupational health evaluation group and site visits by the public health evaluation group. Site visits can obviously give more information and a sense of the research environment, but they are practically impossible if 50–100 research groups or units around a country are to be evaluated. Choosing which sites to visit or which groups to invite for a hearing is a sensitive issue, and visiting a very active site can be even overly impressive and lead to an unbalanced assessment of its relative importance or success. In any event we suggest taking gender, geographic, and disciplinary distribution into account, as well as the size of the group. Before site visits or the meetings with representatives for some of the evaluated groups, their submitted material should have been studied and questions preferably distributed to them in advance.

It is equally important to have interviews or hearings with the practitioners, stakeholders, and “consumers” of the research if relevance is to be considered. Again the selection of participants and the effort to provide a properly balanced representation is likely to prove to be a sensitive matter and should be done in a well thought out and transparent manner. As for meetings with researchers, questions should be submitted in advance to the stakeholder groups. [See the examples in the appendix.]

In order to listen to as many as possible, we chose to split the evaluation group into subgroups that allowed a sufficient number of interviews with groups of no more than 6–8 researchers or stakeholders. We believe this procedure allowed ample time for input by all of the invited participants.

Evaluation components and methods

6. How might the evaluation of innovativeness, scientific quality, productivity, and relevance be organized?

There is recognized literature on how to evaluate the quality of scientific publications, including bibliometric aspects like citation and impact indices. One important

limitation on most of these quantitative methods is that they constrain informed judgment about scientific quality. Rather they depend on the peer-review process and different aspects of the relative ranking of scientific journal importance. It is more difficult to assess the balance of individual contributions within a broad interdisciplinary team and to separate highly competent research contributions from highly innovative ones. We have practiced a few very simple methods in addition to bibliometric ones.

To make certain that the evaluation identified the best available evidence of high quality research, we asked the research group leaders to provide the evaluation group with their best publications with respect to originality and impact. The number of publications asked for was related to the size of the group, but never more than 10 publications from the last 5 years. The publications were read and scored independently by two evaluators according to the originality, scope, and presentation of the analyses and the discussion in grades of high, medium, and low. While these assessments were necessarily subjective, the purpose of identifying an appropriate international evaluation group is to bring together senior, experienced researchers precisely to obtain their professional judgments. Although the purposes were not the ranking of individuals or groups, the summary scoring indicated whether the subcategory of the research area was regarded as of average, higher, or lower international standard on the basis of the appreciation of the evaluators. In order for one person's perspective to not overly influence any assessment of this type, each submitted publication was reviewed by two evaluators. During the final meeting, these evaluations were painstakingly considered. When the two reviewers had scored the submitted research very differently, they were asked to discuss and revise or share the different opinions with the whole evaluation group. This is more of a semi-qualitative approach rather than a quantitative scoring, but, in our opinion, it provided an important balance to the quantitative assessments provided by the more formal bibliometric reviews.

Productivity, as opposed to quality, is a difficult area for examination in research evaluation. The simplest way to measure productivity between groups is to relate the number of published articles of different types and other relevant products to the researcher time available. This process is further elaborated under a later section on bibliometrics, as are possibilities to make a more quantitative analysis of international productivity or at least appearances in journals. In addition, published articles, such inputs as the organization of international research networks, conferences, and research courses should be taken into account.

The amount of external funding for a research group was of interest, although it will certainly depend on the

amount of permanent funding otherwise available, as well as on the principles for awarding certain institutions funding from research councils and the like. For Scandinavian countries the amount of funding from the European Union is of special interest.

It might be tempting to ask for elaborate self-analyses of strengths, weaknesses, opportunities, and threats or other qualitative information from the research groups, plans for the future, and the like. It was our judgment, however, that these valuable undertakings are not appropriate or meaningful when the evaluation targets national research. Self-analyses of strengths, weaknesses, opportunities, and threats seem more relevant for the evaluation of research departments and groups. Even if such analyses from all of the research groups involved (77 in the occupational health review and 66 in the public health review) had been thought to be desirable, it was judged that they would be too difficult to summarize in an informative and fair manner.

We also urge that special attention be paid to the type and number of requests for information from the affected groups. When requesting information from all research groups in a country, one should be very restrictive with questions and be sure that they will give important information, as many person hours will be spent answering the questionnaires.

7. How is relevance taken into account?

Most research in occupational health, as well as Swedish public health research, is applied, and therefore the relevance for society has been a natural and necessary component of the evaluations. We employed two complementary methods, interviews with "consumers" and requests to the research groups to submit examples of studies or products that they regarded to be their best contributions of relevance [eg, conclusive analyses of preventable risks or interventions, new patents, and products (measuring device, personal protection equipment), manuals, basis for occupational exposure limits or standards, teaching material for practice webpages designed for the public]. The estimated value of these products of relevance were also scored as high, medium, or low and summarized for the subcategory.

There are alternative means with which to assess the societal impact of health research, such as measuring increased life expectancy, health-related quality of life, saved health care costs, and reduced sickness absence, but mostly suited for and applied in the evaluation of medical treatment. However, some of the methods (eg, an evaluation of the benefits of a healthy workforce to the economy through occupational health research) could possibly have been done but would be a separate agenda. As attractive as such measures are for the ultimate relevance of research, they are rarely, if ever, the

product of a single research finding or line of research investigation, nor is it likely that research alone can be attributed as the source of a positive impact on society.

One difficulty for an international group in assessing relevance properly may be that much of the material is in a language not known to all the evaluators. Therefore the interviews with stakeholders is of great importance.

8. What is the role for bibliometric analyses?

An essential basis for comparative research evaluation is the published literature focused on in the most appropriate international, peer-reviewed journals. Modern databases provide the possibility to compile all publications from specified researchers over many years, including citation and impact factors. Furthermore, the proportion of articles published in the most respected journals in the discipline can be compared with a look at national and international collaboration according to the institutional base for the authors and many more items. A reasonable time span for such analyses is the last 5 years, which can then be supplemented by the consideration of certain trends in productivity or within subcategories over a longer period. Longer time periods for a primary bibliometric analysis are not, however, necessarily representative of the research community today.

There is a great deal of controversy about the meaning and proper use of the citation and impact factors that are available for peer-reviewed journals. While it is important not to rely exclusively on these indicators, we believe that they provide value together with the other measures. Unless the knowledge of bibliometric methodologies is advanced among the evaluators, it may be wise to consult with an expert.

Evaluations should not overlook the importance of research or technical reports that can play an important role in practical applications despite not being published in peer-reviewed journals. They could be asked for in a limited number with English abstracts.

An unusual, possibly unique input in the Swedish evaluations resulted from the possibility to compile all doctoral dissertations from specified university departments that indicated time trends, the productivity from different universities, and, within subcategories as well, an illustration of the manpower base for future research. The quality of doctoral dissertations could also be an item for evaluation. However, in Scandinavian countries, practically all doctoral dissertations are based upon articles published or accepted for publication, and therefore their content has already been taken into account.

9. How is research capacity and sustainability evaluated?

In an assessment of any research program, national or otherwise, it is essential to consider the demographics

of the research workforce. This consideration is important with respect to the following issues: (i) making certain that the necessary range of expertise is available to address the research objectives properly, (ii) making certain that a reasonable range of perspectives is represented (eg, a balance of gender and ethnicity when relevant), (iii) making certain that the workforce is sustainable and not inappropriately young or old, and (iv) making certain that research leadership is open to all qualified persons. Data with the necessary specificity to be useful are unlikely to be available from existing occupational census data that are routinely collected. We recommend that an appropriate survey be undertaken that is directed towards the research community engaged in the research to be evaluated in order to ascertain the necessary demographic information. Furthermore, if available, documentation on the nature of the emerging workforce, as seen through doctoral training programs, can provide a very useful understanding of how the reviewed fields are likely to progress as the established research scientists retire.

10. Should a draft be discussed with the research community before the report is finalized?

Consideration should be given to whether or not to provide an opportunity for comment on any draft report in advance of a formal release of the report. There are good reasons to distribute a draft to the reference groups and the research groups that have been evaluated in order for factual mistakes to be corrected, clarifications added, and perhaps judgments specified. However, there are also risks of attempts to lobby for more positive remarks. We still recommend feedback to the evaluated community before the report is finalized, preferably with a possibility to participate in a seminar, as well as submit written comments. Naturally all other stakeholders can be invited to the same seminar and participate in the discussion.

National versus institutional review

The evaluation of an entire nation's scientific research in any area is a challenging task. The described approach is intended to provide a reasonable balance between feasibility and comprehensiveness. As it is, each of the two efforts took a year to complete and required significant participation by the active research community that was the subject of the reviews.

This effort differs from that which may be appropriate for a single institute, even a fairly large one. For example, the National Institute for Occupational Safety

and Health (NIOSH) in the United States has recently engaged the National Academies in a systematic evaluation of its research and research accomplishments. The Institute is a large federal organization that has locations in six cities [Atlanta (GA), Washington (DC), Cincinnati (OH), Morgantown (WV), Pittsburgh (PA), and Spokane (WA)] and more than 1400 employees. The institute has the major national responsibility for research on occupational injury and illness and their prevention. This work is accomplished both through a large intramural research program organized into several major units and competitive awards of grants and contracts to the extramural research community. In addition, the Institute engages in direct services through information and education programs and through the assessment of workplace hazards, when invited.

At the request of the director of the Institute, the National Academies was invited to undertake a multiphase effort to assist the Institute in assessing the relevance and impact of its research to address the Institute's goal of reducing workplace illnesses and injuries and improving occupational safety and health. This evaluation began by having a multidisciplinary committee of experts develop an evaluation framework to serve as a guideline and structure for a series of 15 separate research program reviews to be carried out by appropriately constituted evaluation committees. The 15 evaluations are expected to be completed within 5 years.

This "Framework for the Review of Research Programs of the National Institute for Occupational Safety and Health" was prepared in 2005 as a draft document to be amended, as necessary, after the initial evaluation committees have applied it to specific work areas (3). The Framework was designed to provide a detailed structure and consistent approach for each of the 15 evaluation committees that are to be used in guiding the assessment of each of the research programs. Based on the logic model adopted by the Institute, the 35-page Framework describes how to assess program goals, inputs, activities, outputs, intermediate outcomes, and end outcomes. The document advises that close attention should be given to the external factors that constrain the impact of the Institute's research. It also presents specific guidance on scoring with special emphasis on the importance of a detailed qualitative description providing the basis for the final scores.

The first evaluation report (4) was published in 2006, and a second will be published in the first half of 2007 (5). Experience applying this framework illustrates some important differences from the approach to a national review of research by all relevant bodies.

- *Target of the review:* The Swedish reviews were charged to assess the entire scientific field for the country. The NIOSH evaluations are restricted to the

research undertaken or sponsored by NIOSH. These evaluations, therefore, are more narrowly targeted and require a closer examination of a smaller body of work.

- *Scoring of the review:* In contrast to the Swedish reviews, the National Academies was asked to score each NIOSH research program on a scale of 1–5 for relevance and impact. Such scoring is familiar to most scientists when undertaking individual project reviews, but it has proved difficult for the committees to assess an entire research program in quantitative rather than qualitative terms.
- *Longer period for the evaluation:* The Framework document instructs the evaluators to begin by determining the time frame for the review. In general, this is about 15 years [ie, the time since the last strategic plan was developed (NORA 1) 1996 (6)]. Flexibility in the time period is, however, left for the evaluation committees to determine. For example, the mining review would be remiss if it ignored the major impact that NIOSH research had in the early 1970s in reducing coal workers' pneumoconiosis. The current research and research agenda for mining needed to be seen in this larger time context.
- *Appropriate inputs:* The Framework document suggests questions for programs and types of documentation that may prove useful to the evaluation committees. Since each program review was to be carried out in a very short period of time (4 months), the first meeting already needed substantial background data in hand rather than having time to develop a well-targeted request at the first meeting. Therefore, the generic requests of the Framework have had to be supplemented, and some of the preparatory work done by NIOSH has proved to be unnecessary.
- *Hearing from stakeholders:* There was no easy mechanism through which to receive stakeholder inputs other than including, as possible, one expert each from labor and from management on each committee. Public input at each meeting is possible, but unusual, and a stakeholder survey through the Internet has proved to be only moderately successful.
- *Input before the finalization:* Studies directed by the National Academies do not allow for public review before finalization. However, each study undergoes an external evaluation by reviewers selected to represent expertise relevant to the charge for each committee, but it also may include stakeholders as appropriate. This process may prove to have a more rigorous prepublication assessment, but it does not assure the correction of inadvertent errors or missing information.

References

1. Swedish Council for Working Life and Social Research (FAS). International evaluation of Swedish work environment research. Stockholm: FAS; 2006. FAS evaluation report. (Summarized in this supplement of the Scandinavian Journal of Work, Environment & Health)
2. Carsjö K, Erikson R, Hogstedt C, Kamper-Jorgensen F, Käll-estål C. A status report on Swedish public health research: history, inventory and international evaluation. *Scand J Public Health*. 2005;33 suppl 65.
3. Framework for the review of research programs of the National Institute for Occupational Safety and Health. http://dels.nas.edu/dels/rpt_briefs/Framework121905.pdf (accessed 27 April 2007)
4. Institute of Medicine and National Research Council. Hearing loss research at NIOSH. Washington (DC): The National Academies Press; 2006. Reviews of research Programs of the National Institute for Occupational Safety and Health, report 1.
5. Institute of Medicine and National Research Council. Mining safety and health research at NIOSH. Washington (DC): The National Academies Press. In press. Reviews of research programs of the National Institute for Occupational Safety and Health, report 2.
6. Rosenstock L, Olenec C, Wagner GR. The national occupational research agenda: a model of broad stakeholder input into priority setting. *Am J Public Health*. 1998;88:353–6.

Appendix

Interview questions

Questions to funding agencies (the Swedish Council for Working Life and Social Research, etc)

1. What is the basis for setting priorities in funding, and is the process transparent?
2. What is the input of stakeholders?
3. Do you feel that there are substantial gaps in the knowledge needed to set these priorities, and how might these gaps be filled?
4. Over what time period do you establish priorities, and how are these priorities and long-term views communicated?
5. Is there communication between funding agencies in order to seek an adequate balance across all areas and different types of funding (projects, programs, personal grants)? How is the balance arrived at between areas and types?
6. How do you evaluate the outcome of funded research (quantity, quality, does the project meet the aims, dissemination, and relevance for science and society)?
7. How do you monitor the trends in occupational health and the benefits of research?
8. How do you identify strategic areas for continuing support (infrastructure)?

Questions for occupational health services

1. In what ways are you involved in setting priorities for work environment research in Sweden?
2. Do you feel that your scientific needs are met? If not, in what respect?
3. How well is the scientific output from the research community communicated in a way that meets your needs?
4. How does the research community bring emerging research concerns to your attention?

5. Are you actively engaged in conducting research?
6. Do you have sufficient resources to take full advantage of the output of the scientific community?
7. How do you monitor the trends in occupational health and the benefits of research?
8. What research developments in the past 5 years have you been able to use to enhance worker health or prevent work-related disease?

Questions for the ministries

1. Do you have the information you need for setting priorities in research in general and for emerging issues in particular?
2. Does your ministry have sufficient input in setting priorities?
3. How do you judge value for money?
4. How do you arrive at decisions about the available money for research?
5. Are you satisfied with the structures in place (with funding agencies) to determine priorities for research?
6. What concerns do you have about the infrastructure of research in occupational health?
7. What is your view about collaboration at the level of the European Union?

Questions to employers, trade unions and labor market partners

1. In what ways are you involved in setting priorities for work environment research in Sweden?
2. Do you feel that your scientific needs are met? If not, in what respect?
3. How well is the scientific output from the research community communicated in a way that meets your needs?
4. How does the research community bring emerging research concerns to your attention?

Questions for the researchers

1. Do you have a strategy for determining research needs? If so, how was this strategy developed?
2. Are you maximizing the knowledge base that your unit has in carrying out your research activities? Can you identify existing obstacles to your better utilizing your capacity and achieving your objectives?
3. Is your group or research environment sufficiently interdisciplinary to accomplish your research goals? If not, what is the expertise that you need and how might it be made available?
4. What methodological impediments exist for you to undertake research that you think is of high priority?
5. Are there serious problems in occupational health in your areas of expertise for which you have sought funding but have not been able to develop adequate interest in support from funding agencies?
6. What mechanisms do you use to recruit young researchers and promote their careers? How do you promote gender equity in this process?
7. What efforts have you made to translate your research findings into practical outputs? Have these been successful or what impediments have you encountered?
8. What opportunities have you had for international collaboration? In what way have these activities proved useful for your research or other outputs?
9. What opportunities have you had to seek international funding? What has been your experience with these efforts?