National Collaborating Centre for Healthy Public Policy

"WHAT IS EVIDENCE?" A PHILOSOPHICAL PERSPECTIVE

PRESENTATION SUMMARY
NATIONAL COLLABORATING CENTRES FOR PUBLIC HEALTH
2007 SUMMER INSTITUTE "MAKING SENSE OF IT ALL"

BADDECK, NOVA SCOTIA, AUGUST 20-23 2007

Preliminary version—for discussion

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The aim of the National Collaborating Centre for Healthy Public Policy (NCCHPP) is to increase the use of knowledge about healthy public policy within the public health community through the development, transfer and exchange of knowledge. The NCCHPP is part of a Canadian network of six centres financed by the Public Health Agency of Canada. Located across Canada, each Collaborating Centre specializes in a specific area, but all share a common mandate to promote knowledge synthesis, transfer and exchange.

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This is a preliminary document. We invite readers to send their comments to ncchpp@inspq.qc.ca.

The data contained in this document may be cited provided the source is indicated.

FOREWORD

The National Collaborating Centres for Public Health (NCCPH) were created to promote and support the use of knowledge and evidence by public health practitioners across Canada. Each Centre has a national mandate to focus on a specific area of critical public health importance. As part of their knowledge exchange mandate, the NCCs host an annual Summer Institute. These conferences are part of a strategy to ensure that the NCCs identify and analyze priority health issues, exchange information with the public health community, and contribute to the development of a national public health approach.

The 2007 Summer Institute, whose theme was *Making Sense of it All,* was held in Baddeck, Nova Scotia. During this three day event, the questions “What is evidence?” and “When can we consider there to be sufficient evidence to serve as the basis for decisions?” were given in-depth consideration.

The NCCPH invited Professor Daniel Weinstock to address the question “What is evidence” during the 2007 Summer Institute. Professor Weinstock is director of the Research Centre on Ethics at the University of Montréal (Centre de recherche en éthique de l’Université de Montréal-CRÉUM). He has published extensively in a variety of areas in moral and political philosophy. He has also served on various committees and participated in several work groups, notably the Québec Public Health Ethics Committee. In his keynote address, Weinstock adopted a philosophical perspective to address the question.

What follows has been transcribed directly from a recording of Professor Weinstock’s presentation on August 22nd 2007. We have adapted the transcription from its original format to enhance clarity for the reader. The presentation was made in English, and a French translation is available on the NCCHPP website.

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A philosophical perspective on the concept of evidence

My topic for today's presentation is "What is evidence?". I will address this question by looking at how philosophers talk about this concept. I will also be doing a little bit of conceptual unpacking of the term 'evidence'.

The first thing I do in a philosophy class when I want to get students to understand a concept is to try to get them to understand what that concept is being contrasted to. Often in philosophy we elaborate concepts because we want to distinguish something from something else and very often, we get a clear understanding of one thing by understanding the thing to which that first thing is being contrasted. So, what is the concept that we try to contrast *evidence* with*?* The most salient contrast class or contrast concept for *evidence* is *proof*. Evidence is not proof. Proof is something that you get through deductive or logical reasoning: all men are mortal, Socrates is a man, and therefore Socrates is mortal. If the premises are true, there is no way logically that the conclusion can be false.

Evidence is something different. You gather evidence in cases where you have no way of hoping or expecting that you will be able to generate proof. You have this abstract proposition that can't be directly confirmed through direct observation and that isn't amenable to the kind of proof that I have just outlined. So what do you do? Well, you gather evidence that increases the confidence that you have in your abstract proposition or hypothesis. So evidence generates not proof, not certainty, it generates conviction, it generates confidence, it generates probabilistic knowledge, [like] "This is probably true given the evidence". This is much weaker than proof.

As a way to understand the question "what is evidence?", that's the way that most philosophy professors would do it—distinguishing it with proof. Evidence is something that yields relative confidence in the truth of some proposition that can't be either logically proven or directly demonstrated through empirical observation.

Evidence as probabilistic knowledge

Most of the time when we gather evidence, it increases the confidence of a person in the likelihood that a certain proposition that can't be directly confirmed either through observation or through logic is probably true. Now, if we look at philosophy textbooks from David Hume, we will find that most of the time those abstract propositions that people are trying to demonstrate are causal claims. Such and such a thing cause such and such another thing. You might say, "Well, causes are out there in the world, we can directly observe causes." Well actually we can't. David Hume, a famous philosopher from the 18th century, demonstrated that all observation can really do is reveal constant conjunctions, as he called them. Correlations, we would say today. When we go from correlation to causality in what we claim, we outstrip the evidence. The evidence will never give us proof of a causal claim. The most that it can do is give some degree of confidence in a causal claim. Causal claims are not directly given to observations, but directly given to observation are correlations—and a correlation can always only be probabilistic proof or evidence of a causal claim. So, remember your first year philosophy classes: you remember the, "When I wake up this morning can I be certain that the sun has risen every morning since I have been conscious.

Can I be certain that the sun will rise again? No, all I can be certain of is that it has risen every day until today," That is pretty strong evidence. But it is only evidence.

This is the first point I wanted to make, which is to distinguish evidence from proof and to suggest that, the philosophical tradition since Hume and onto today, has suggested that evidence does not give us certainty, it gives us probabilistic knowledge. It tells us this is probably true given the state of the evidence at this point. A reasonable person would be licensed to believe this causal claim given the evidence we have been able to ascertain until now. So, the first take-home message: evidence is not proof.

Evidence as the result of human activity

The second thing I wanted to talk about has to do with how we gather evidence. Philosophers historically and even today have been fairly abstract and simplistic in the way in which they answer that question. How do we go about getting evidence? Well evidence is facts, and how do we go about getting facts? Well we go out there and we look. We open our eyes and we see that the sun rises, we see that—to repair to one other of David Hume's famous examples—when the first billiard ball hits the second billiard ball with such and such a velocity and such and such an angle, the second billiard ball goes that way. We just look, open our eyes and look.

Those of you who practice research in the social or human sciences know that the things that we are interested in discovering do not offer themselves up for observation that easily. Some of us might be interested in the way in which billiard balls behave in relation to one another when they are struck at a certain velocity and with a certain angle, but most of us are interested in more complex things. First of all, some of us—and I think here of the people in the natural sciences—are particularly interested in understanding conjunctions, correlations, between things that are not directly observable. We aren't interested in the human body that we can observe, we are interested in things that are going on inside the human body that require that we set up laboratory experiments to figure out how different enzymes or proteins or whatever behave in isolation. In the social world, there are all these confounding variables. If we are trying to understand how one factor impacts the behaviour or the well-being or the health of individuals, we will never find that factor in isolation out there in the real world. There are all these confounding variables, which means that you have to set up research designs, the function of which is to isolate the factor that you are trying to discover the causal incidence of. So evidence doesn't just jump out at us in the way suggested by the philosophers. We can't just go out there and look. We have to set up labs, laboratory conditions; we have to set up research designs. Evidence is something that is produced by us, rather than something that jumps out at us unbidden from the world out there. It's set up through conscious human design, it's set up through institutions, it's set up—as a lot of institutions are—through applying for grants, etc., etc…

So the second point I really wanted to make is that evidence is not something that we get, as if it were, for free, simply by opening our eyes. Evidence is something that has to be actively searched for and it is something for which the search will only succeed if we set up the right laboratory techniques, if we set up the right laboratory conditions, if we set up the right

research designs, etc., etc.… In other words, evidence is the result of conscious, deliberate, institutionalized—in the world such as it is today—human activity.

The role of value in the production of evidence

The next thing I want to bring forward is that insofar as evidence is the product of deliberate, conscious, institutionalized human design, it is amenable to a whole host of ethical and political questions. Evidence is not a value-free idea to the extent that evidence is couched in the production of human decisions. And human institutions are amenable to ethical evaluative questions. What are the values that underpin this particular way of going after our evidence, and what are the values that we would want to have underpin our search for evidence?

Now, this might run against the grain of a lot of current thinking, particularly in the area of medical research. Everyone here will be familiar with the notion of evidence-based medicine. And I think that the chief impetus behind evidence-based medicine is in a way an ethical one, which is to say we have to get the treatment of individuals and also health policy outside of the realm of fuzzy values and opinion and prejudices. Let's make health policy and let's make the treatment in clinical context a question of science, a question of evidence. So, in a way, let's take the judgement about what the right thing to do is out of the hands of the individual practitioner or out of the hands of the policy maker. Let's make the accumulated fund of research that is out there the source of the guidelines that will lead to good treatment and lead to good health policy. Now, underlying this is the idea that there is evidence on the one hand and there are values on the other.

What I would like to suggest is that regardless of the abstract metaphysical question of the fact-value distinction, in the real world of scientific evidence production, this distinction cannot be upheld. At every decision node in the production of evidence there are evaluative questions that arise. There are ethical and political questions that arise and there are values that are written into the ways we presently do science. The danger we face is that, because we think that the scientific enterprise is value-free, those values will be playing themselves out in our practice without us taking conscious hold of them. This is something that I will try to address for the rest of my presentation: we need to be aware of the extent to which values are present at every decision node in this human deliberate enterprise of evidence production that we are involved in, be it on the natural or biological sciences side or on the social sciences side. I will run through a few of those nodes just to try to point out that they are decisions. They are not just given to us as if written in some kind of God-given script, and they involve values that will either play themselves out behind our back or that we can take conscious, deliberate hold of.

First decision node: research objects

First of all, and most obviously, there is the decision to research this or that part of the world. We don't have the time or the energy or the person-power to attempt to know everything. Knowledge takes time, knowledge costs money, and we have to choose to understand this rather than that. How do we determine what will get chosen as a candidate for research? Now those of you whose main dealings in trying to acquire money to do their research are

with the Social Sciences and Humanities Research Council of Canada (SSHRC) will have noticed that in recent years, or certainly since I entered the profession, the proportion of money that is allocated for what is called curiosity-driven research is dwindling every year more and more. I am sure the same is true with NSERC, and the same is true with Health Canada Research Funds. There is an interest on the part of government to understand, given that we can't understand everything, certain things rather than others, and the decision to understand certain things rather than others is driven by politics and it is driven by values. How are those politics organized? What are the values at play?

That is the first decision node that I wanted to point out because I think it is worth saying again and again and again, because it is terribly important. Values drive our decisions to research particular areas of the world, and in today's research context those values are determined by funding agencies, and ultimately by government, rather than by researchers themselves.

Second decision node: research subjects

A second thing, again an obvious one, is when experiments require the use of human subjects. What are the ethical norms that we must put into practice to extract evidence from those human subjects? And here is a sort of subsidiary question: Are the norms that we think are important to impose to do with informed consent, to do with the good of "never subject an individual to a research project from which they can't derive any benefit"? Does that mean that we will tend to exclude certain types of human subjects, and therefore some types of research, because we think that we just can't meet the constraints in the case of these types of human subjects? For us rational, competent adults, it is easy, or at least easier, to get informed consent. Once you get at the beginning and at the end of life to the gray areas of rational, informed consent, well things get a little muddier, and very often ethics committees get a lot edgier. There is a temptation to perhaps say, "rather than go there, where I might get my research protocol sent back to me by the ethics committee, maybe I'll just stick to doing research on those types of subjects from whom informed consent can be very easily generated"?

Are our completely laudable choices about how to institutionalize the ethics of research on human subjects guided by other values that may sometimes orient our research in certain directions rather than in others?

Third decision node: statistical significance

I will now be getting down to perhaps slightly less obvious things. These are things that you have all probably thought about in your own research. I said earlier that evidence is not proof. Evidence is something that generates, in a rational or reasonable person, more or less confidence in a causal proposition; more or less confidence. At what point do we decide that we have enough? Is there some kind of law written into nature that says that once you've had x thousand subjects in a randomized controlled trial, and this has been repeated y times, then a magical line has been crossed? Is there an x or y that is given to us by nature that determines once and for all in ways that we can all accept, in a value-free way, thresholds of

statistical significance? I want to suggest that there isn't and I that issues to do with statistical significance are value laden.

The more we are stringent—the higher we expect our x and y values to be—the more certainty we might be able to claim to have achieved, but on the other hand, the fewer individual cases start showing up as significant. The more we start adopting a kind of utilitarian population approach to a problem, the less we allow ourselves to get our attention trained on individual cases.

Fourth decision node: production of evidence

Those of you who work in the field of medical research know that the gold standard in producing evidence is the randomized controlled trial. To the point where if you ask a lot of practitioners in the field, there is really no other way of generating evidence, or if evidence is generated in other ways, it is to be ranked in meta-analyses that are conducted in order to generate guidelines; it is to be ranked much lower than the randomized controlled trial. Let's take a step back and ask ourselves why.

There really is no philosophical reason to say, for example, that the opinion of a practitioner with 40 years of experience who believes that *regardless of what the guideline produced by the Cochrane Collaboration say* what he should do with his patient is x rather than y is not evidence. Is that person producing evidence? Is that person's source of experience a source of evidence? There is no philosophical reason that I can think of to say no. There is a famous Canadian philosopher of science from earlier in the last century by the name of John Charles Polanyi who made a distinction between two ways of knowing: "knowing that" and "knowing how." "Knowing that" is propositional knowledge: I know that it is beautiful and sunny and 24 degrees in Baddeck today. "Knowing how" is something that is generated through practice: I know how to tie my shoes. Could anybody get up now and state what it is you do to tie a shoelace? It is quite difficult. You know how, you've done it a million times, but could you translate that "know how" into a "know that"? And when we go through our lives, both as individuals and practitioners, we realize that a lot of our knowledge is "know that," propositional, evidence-driven in the randomized controlled trial sense, but a lot of it is also "know how." In the area of health, do we want to deprive ourselves of the evidence that comes from accumulated years of "know how" because we have decided that only "know that" is real knowledge and that only the kind of evidence that can justify "knowing that" is going to count? What are the values that underpin that decision?

So we have seen a variety of decision nodes where what seems to be obvious when we are in the everyday practice of evidence production all of sudden becomes problematic. Why am I studying this rather than that? Is it simply because that is where the money was? Or is it simply because that is where I could get a job? And not to say we shouldn't do it once we realize that the answer is yes. We live in the world, right? How are the ethical constraints that are in place impacting on my choice to study this rather than that? How are my decisions to place the threshold of statistical significance here rather than there made? What are the ethical implications of that? What are the ethical implications of viewing the randomized controlled trial as the standard, the gold standard of knowledge or evidence production?

Fifth decision nodes: presentation of evidence

Finally, those of you who are statisticians, epidemiologists know far better than I how difficult it is to translate raw data produced by research into consumable, intuitable, intelligible information. There is nothing more difficult for the average and even the not-so-average intellect to get their mind around than probabilistic reasoning. There is experimental data that could fill this room five times over showing that probabilistic reasoning is something that people just don't understand. If you tell people there is a chance, and you describe the probability that they will, given their profile, get that disease, they translate it into "Oh my God, I'm going to get that disease," right? People have a binary, an on/off attitude toward evidence, whereas what evidence produces is anything but on/off. It is probabilistic. It is shades of gray. It is the very opposite of binary. How do you get people to understand probabilistic reasoning? Well there are all kinds of ways. And these different ways will lead people—normally constituted, intelligent people—down different paths. Presenting the same probabilistic evidence generated by the same randomized controlled trial in terms of numbers needed to treat, in terms of odds ratios, in terms of absolute numbers of lives that can be saved if such and such an intervention is put in place, you could have the same information packaged in these three different ways. The implications that people will take away from them will be very different and therefore the ethics that go into determining how to package them are really extremely difficult. You know that you can manipulate people into drawing a very different message from the raw data; but that if you just presented it as raw data, it would be completely indigestible. So what are the ethics that underpin the presentation downstream of results of experimental data?

Conclusion

What I have tried to suggest very briefly is that at every point, from upstream to downstream, in this conscious, deliberate human exercise of evidence production, we are faced with evaluative questions. Evidence is intrinsically an ethical and political issue at every decision node. We have ways of producing evidence, and we have ways of institutionalizing evidence today in Canada and elsewhere that are underpinned by values. But because we think this is science and therefore value-free, these values are not ones that we have thought about, talked about, deliberated about, accepted or rejected, but rather ones that are playing themselves out behind our backs. And that is something terribly, I would argue, dangerous.

I'm going to end by making a suggestion, which I hope will be provocative in the good sense of provoking some discussion and some thought. If you look at the literature on medical health policy ethics, you realize that today there is—whereas, perhaps a generation ago people were very caught up in the clinical side of health ethics— there is a greater attention, being paid today to questions of resource allocation. What is justice in the area of health? At an earlier stage this was "What is justice in the area of health care?" So we were interested and still are interested in knowing what is just, what does justice require in terms of everybody's access to the resources that the medical institution is capable of providing us with? Very important question and one that we haven't entirely settled here in Canada as the debates that follow from decisions such as *Chaoulli* continue to occupy our attention. But increasingly, in the philosophical literature, there is a changing of focus away from justice in the allocation just of health products to justice in the allocation of social determinants of

health. Given that our health is impacted by all kinds of dimensions of policy, from education to infrastructure to income distribution to housing, etc., what does justice require in the distribution and the allocation of all of these other goods? So there has been a move towards thinking of health ethics in terms of distributive justice, which I think is entirely salutary. The first one is more narrowly focused on health institutions and the other one more widely focused on the social determinants of health.

Note that neither of these two programs addresses the question that I've been trying to lead you towards here, which is the ethics and the politics of the production of evidence. What is justice? What does justice require, given that evidence is produced by deliberate, conscious, institutionalized human activity? What does justice require as far as the decisions that go into shaping this activity in this way rather than in that way? What does justice require there? I think that it requires more input. I think it requires justice in deliberative input. People have a right as citizens to have their voices heard and to have an impact on the ways in which all of these decision nodes are treated. So I'm leading you down to something that has become the ultimate truism of health ethics, which is public participation, public input. A phrase often heard, and often paid lip service to, but rarely actually acted upon in any serious way.

I can think of a number of forums in which we have come to the conclusion that we should know more about what the public thinks, and more than that, we should actually have some kind of mechanism through which the public gets to inform us about how these decisions should be taken. And then we all go off and have lunch. I think that part of the residual resistance has to do with the fact that as scientists, at some level, the hold of the fact-value distinction has not completely disappeared. There is the residual thought that at some level we don't really want the public to have an impact on the ways in which health policy and evidence is generated for health policy design because health is a matter of science. We are scientists. God forbid we should give too much power to those people who will take all kinds of value-driven, emotional, non scientific decisions if we give even an iota of power to them. So I think that what we have to do in order to break through that ultimate resistance is to start realizing just how tenuous and fragile that line between fact and value, between evidence on the one hand and everything else on the other really is. Evidence is something that is produced by deliberate, conscious, institutionalized human activity. It is the result of choice, and like any choice, it is therefore driven by values. We do it this way. We could also do it that way. The different choices would be underpinned by different values, which we have to talk about explicitly and agree to and accept within a democratic context rather than have them play themselves out behind our backs as I think they all too often do today.