PH458

Evidence-Guided Policy: What is it? Why Do we Need it?

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Introduction to the Course
What’s expected of you coming in

• Pre-requisite: none.

• Mathematical skills: minimal.
  * a little algebra
  * a little probability
  * a little decision theory

• Logical skills: moderate.
1. Evidence-Based Policy: What is it? Why do we need it?
2. Public Understanding Science
3. Epistemic Autonomy
4. Evidence and Values
5. Aggregating Judgment
7. Case study: Medicine
8. Case study: Climate Science
9. Case study: Politics
10. Case study: Economics
Seminars

- PH458:

  Seminar 1: Thursdays 17:00-18:30 (Location: NAB.1.19)
  Seminar 2: Thursdays 15:00-16:30 (Location: NAB.2.08)
Readings

• Main (but not required) reading source:


• Weekly readings (and much more) listed on Moodle.
Assessment

• Formative:
  - One 2000-word essay.
    due: Monday 8 January 2018 at 17:00.
  - Weekly sets of three short-answer questions.

• Summative:
  - One 2000-word essay that counts for 33% of total mark.
    due: Friday 26 January 2018 at 17:00.
  - One end-of-year exam that counts for 67% of mark.
Introduction (to the lecture)
There are all sorts of policies. Those that work. Those that don’t. And those that make a mess of things.

**Examples:**
Railing against the consumption of eggs because they presumably lead to a substantial rise in cholesterol levels.

Blanket-sponsoring biofuels (to reduce greenhouse gases) failed to take deforestation and soil erosion into account.

Now, it goes without saying, that nobody wants bad policy; at least not for itself.
How can we improve policy design and implementation?

Surely, one (almost trivially true) answer is by being:

(i) more informed

(ii) avoiding or minimising mistakes in reasoning

Evidence-based policy is an approach that seeks to:

(a) inform policy through evidence

(b) avoid/minimise mistakes through rational deliberation
Why do we need it?

- Evidence-based policy is meant to give better answers to questions like the following:

  Will mass mammography decrease the number of deaths from breast cancer?

  Will making a drug available on the NHS have (as a rule) a positive effect on patients?

  Will smaller class sizes enhance scholastic achievement?
Before we proceed to consider such questions, it is important to first understand what we mean by:

* policy

and

* evidence
What Do we Mean by ‘Policy’?
Narrow and broad construals

• According to the Oxford dictionary:

**Policy**: “A course or principle of action adopted or proposed by a government, party, business, or individual”.


*NB*: There is also a more narrow conception that relates only to governmental or semi-governmental organisations.

• What is key in the idea of policy is *the intension to consistently pursue* a course or principle of action.
• Policies may concern any one of a number of domains, e.g.:  
  * climate  
  * conservation  
  * education  
  * electoral systems  
  * health  
  * international development
What Do we Mean by ‘Evidence’?
Evidence: General characteristics

• Evidence is central to our endeavours to understand the world around us.

• It is meant to be an *objective* and *neutral* adjudicator.

• We use it to construct, modify, confirm, disconfirm, establish and refute hypotheses.

• It informs science, the police, intelligence agencies, investigative journalists, courts of law, policy-makers, etc.

• Without it, we are left with... uninformed opinion, random guesses and, worst of all, dogma.
Many forms, one function: Reducing uncertainty

• Obviously, evidence comes in variety of forms.

Examples:

* temperature readings
* bubble chamber photographs
* Geiger counter audible clicks
* fossilised imprints
* drawings made by surgeons
* the absence of broken windows

• In spite of this variety, evidence plays the same function. Its informational content is meant to reduce uncertainty.
Evidence in propositional form

• Williamson (2000) argues, correctly in my view, that any true proposition can serve as evidence.

• On this view, not only are all true propositions evidential but also any evidence can be put into propositional form.

• Why is this important?

• Because it allows us to gauge the strength of evidence-theory relations in terms of powerful tools like:

  LOGIC: Does $p_2$ follow from $p_1$?

  PROBABILITY: Is $Pr (p_4/p_3) > Pr (p_4)$?
Orders of evidence

• Epistemologists, e.g. Christensen (2010), often distinguish between first and higher-order evidence:

• **First-order:** Evidence that is meant to bear directly on the hypothesis under test.

• **Higher-order:** Evidence concerning the quality of lower-order evidence or how subjects rationally react to it.

*Example:* Suppose $H$ is the hypothesis ‘The global average temperatures will rise by 1° C in the next 20 years’

1\textsuperscript{st} order evidence: meteorological data $D$ about $H$.
2\textsuperscript{nd} order evidence: the meteorologist’s reaction to $D$. 
• Hempel (1966) identifies a number of criteria that boost the confirmation hypotheses receive from evidence.

• They include:
  * Quantity of evidence
  * Diversity of evidence
  * Precision of evidence
Evidence hierarchies

• In recent years, the evidence-based movement has championed the use of evidence hierarchies.

• Some sources of evidence are meant to be epistemically privileged to others & hence are ranked higher than them.

• What determines which ranks higher?

• Generally speaking, but by no means always, this is fixed strictly by imposing further constraints on the source.

  Example: RCTs are CTs with randomisation.
Evidence hierarchies: An example

- Meta-Analyses and Systematic Reviews
- RCTs
- Cohort Studies
- Case Reports
- Expert Opinion
Once one agrees that there are different properties and sources of evidence a question arises: 

*How exactly do we make a combined judgment?*

- Ranking sources provides an order of preferences but does not actually tell us how to weigh them.

- For example, ranking makes clear that RCTs are more desirable than CTs but does not tell us how much more.

- Assigning weights to evidence allows us to do that. The only trouble is determining weights in a non-arbitrary way.
Current Practice
From there to here via RCTs

• Cartwright and Hardie (2012) identify the main problem in EBP as determining when to make inferences:

  *from ‘it worked there’ to ‘it will work here’.*

• At present, the most common advice is that such inferences should only be made when efficacy is shown through RCTs.

• That is to say, for policy to count as evidence-based, the ‘it worked there’ must be backed by one or more RCTs.
Internal vs. external validity

- The problem of determining when to make such inferences can be framed in terms of the notion of external validity.

- **Internal validity**
  
  That is, when the study’s results are valid for the population being studied (and hence for some population).

- **External validity**
  
  That is, when the study’s results are also valid for the general population.
Why (R)CTs?

• Why RCTs? Before we answer this question, we first need to fathom why CTs?

• In any study, we want to ensure that any effect is attributed to a specific action.

• **Problem**: It’s not easy to know what would happen to the same objects or subjects in the absence of that action.

• To overcome this problem we use a comparison group which is not subjected to that specific action.
We call the group subjected to the specific action the *treatment group* and the other one the *control group*.

Objects or subjects in the two groups must:

- possess the same condition under study
- be differentially subjected to actions
Confounding factors

- Suppose the groups contain subjects with some illness and the specific action applied is a treatment (vs. a placebo).

- If those in the treatment group recover or at least recover faster, have we proven that the treatment is successful?

- The answer is NO! All sorts of confounding factors, other than the treatment, could have led to that positive effect.

Examples:
- Individuals in the control group may have been suffering from a harsher form of that medical problem.
- Individuals in the control group may be more frail.
Other things must be made equal!

- Only if the two groups are equal in all relevant respects, do we know that the treatment is the only difference.

- Various ways to mitigate this problem. For example:
  * Remove from the study subjects with confounding factors.
  * Equally distribute these factors by hand.

- A number of problems arise in the context but we can single out one in particular: unknown confounding factors.

- Randomisation is meant to solve this problem by blindly distributing the subjects into the two groups.
“[Presumably the strongest argument for the epistemic superiority of randomized trials… is precisely that RCTs are alleged to solve the problem of ‘unknown factors’: a randomized trial is – allegedly – controlled for all factors known and unknown” (Worrall 2007, p. 1004).

“In a randomized trial, the only difference between the two groups being compared is that of most interest: the intervention under investigation” (M. Clarke, Director, Cochrane Centre).
The End