Causation in medicine

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Philosophical fields expanding

Philosophy of medicine
From medical ethics and definition of disease to epistemology and methodology of medicine

Philosophy of causation
From finding *THE ONE* definition of causation to understanding the role of causal notions in several scientific practices

Causation in medicine:
Provide an understanding of many ways in which medicine studies and intervenes on causes and effects of health and disease
Overview

1. Preliminaries
   1.1 *What medicine?*
      ‘Medicine’ as an umbrella term
   1.2 *What causality?*
      ‘Causal mosaic’ as an approach to causal issues
   1.3 A causal mosaic for medical causation

2. Some ‘episodes’ of medical causation

3. Causal theories for medical episodes
1.1: MEDICINE AS AN UMBRELLA TERM
Medicine in the broadest terms

– Include all clinical, scientific, and political forms of engagement with health and disease
– Not just biomedicine
– Not just EBM
Medicine as a ‘disunion’

We include forms of practice sometimes not recognised as ‘medicine’, e.g.:

- Clinical practice, including primary care and hospital medicine
- Preventive medicine and public health (more policy-oriented)
- Epidemiology

We aim to capture major theories and approaches, including:

- Evidence-based practice and associated practice like guideline development and evidence reviews
- Narrative medicine
- Personalised medicine
- Gender medicine
Causation in medicine

A broad understanding:

Reasoning about causes & effects of health & disease

How should reasoning be understood?

See next!
1.2: CAUSAL MOSAIC
Making sense of a vast intellectual enterprise

Philosophical theorising about causes

– Long history, ups and downs, harsh criticisms, dominant views, etc

Expansion of philosophical theorising about causes

– Beyond physics, attention to the special sciences, and medicine

– Attention for questions about use, besides traditional metaphysics, epistemology, and semantics
What does it look like?

A dynamic picture that includes tiles about:

Scientific challenges
- Inference, explanation, prediction, control, reasoning

Philosophical questions
- Metaphysics, epistemology, methodology, semantics, use

Specific accounts
- Counterfactuals, mechanisms, processes, probabilities, information, agency, INUS, variation, regularity, ...
1.3: A CAUSAL MOSAIC FOR MEDICAL CAUSATION
Building a causal mosaic for medical causation

A reconstruction of how causal questions arise in medicine and to make philosophical / practical sense of them

Philosophical methodology

CitS
Philosophy of science in practice
History and philosophy of science
Philosophy of information
2: EPISODES OF MEDICAL CAUSATION
Individuals and populations

Complex relationship between individual interventions e.g.: prescribing a particular drug and knowledge about population outcomes

see also: external validity

Causal knowledge – evidence of difference-making and mechanisms – help bridge the gap
Hypertension treatment example

Fortin et al 2006: most patients in practice have multiple co-morbidities; most trial subjects do not

Co-morbidities change outcomes

Networks and mechanisms can help understand multiple co-morbidity


<table>
<thead>
<tr>
<th>Comorbid Condition</th>
<th>Percent of Total (n = 424)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperlipidemia</td>
<td>54.5</td>
</tr>
<tr>
<td>Heart disease</td>
<td>40.1</td>
</tr>
<tr>
<td>Any rheumatologic problem (other than arthritis and chronic back pain)</td>
<td>39.4</td>
</tr>
<tr>
<td>Urinary tract or kidney disease</td>
<td>34.7</td>
</tr>
<tr>
<td>Arthritis</td>
<td>32.8</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease or asthma</td>
<td>25.2</td>
</tr>
<tr>
<td>Any digestive trouble (other than peptic disease or reflux)</td>
<td>24.8</td>
</tr>
<tr>
<td>Diabetes</td>
<td>23.6</td>
</tr>
<tr>
<td>Peptic disease or reflux</td>
<td>18.6</td>
</tr>
<tr>
<td>Chronic back pain</td>
<td>17.2</td>
</tr>
<tr>
<td>Anxiety disorder</td>
<td>16.5</td>
</tr>
<tr>
<td>Depression</td>
<td>15.3</td>
</tr>
<tr>
<td>Cancer</td>
<td>14.9</td>
</tr>
<tr>
<td>Thyroid disease</td>
<td>14.9</td>
</tr>
<tr>
<td>Skin disease</td>
<td>13.9</td>
</tr>
<tr>
<td>Anaemia</td>
<td>9.7</td>
</tr>
<tr>
<td>Migraine or chronic headache</td>
<td>9.2</td>
</tr>
<tr>
<td>Any other chronic problem</td>
<td>36.6</td>
</tr>
</tbody>
</table>

* Number of patients with hypertension in the data set.
Deficiency diseases and causation by omission

But causation by omission is a worry for most philosophical theories of causation:

DILEMMA: Either there is no causation by omission, or there is far more than common sense says there is.

[McGrath 2005: 125]
Reasoning from effects to causes

- Ankle injuries
  - Fractures (15%)
    - Plaster immobilisation
  - Ligamentous injuries (85%)
    - Conservative management
Reasoning from effects to causes

An ankle x ray series is required only if there is any pain in malleolar zone and any of these findings:
• Bone tenderness at A
• Bone tenderness at B
• Inability to bear weight both immediately and in emergency department

An foot x ray series is required only if there is any pain in midfoot zone and any of these findings:
• Bone tenderness at C
• Bone tenderness at D
• Inability to bear weight both immediately and in emergency department

BMJ 2009;339:b2901
Confounding

Gender medicine and the ‘Yentl Syndrome’

Yentl, the 19th-century heroine of Isaac Bashevis Singer’s short story, had to disguise herself as a man to attend school and study the Talmud. Being ‘just like a man’ has historically been a price women have had to pay for equality. Being different from men has meant being second-class and less than equal for most of recorded time and throughout most of the world. It may therefore be sad, but not surprising, that women have all too often been treated less than equally in social relations, political endeavors, business, education, research, and in health care.

Confounding

Biological uniformity of individuals vs heterogeneity of population

Gender as ‘confounding factor’, calls for finer grained understanding of health and disease

Consider: symptoms of heart attack are gender-specific

A woman reporting strong back pain instead of pain in the left arm and close to the heart too often doesn’t get the right diagnose and treatment on time
Social determinants

Social class causes disease

“Poor social and economic circumstances affect health throughout life. People further down the social ladder usually run at least twice the risk of serious illness and premature death as those near the top. Nor are the effects confined to the poor: the social gradient in health runs right across society, so that even among middle-class office workers, lower ranking staff suffer much more disease and earlier death than higher ranking staff.”

[Wilkinson and Marmot 2003: 10]
Social determinants

By and large medicine established that $x$ causes $y$ yet a thorough understanding of how $x$ causes $y$ is prone to problems similar to those encountered in the mechanisms literature

Consider: non-industrial asbestos related deaths close to asbestos factories (England: Barking; Italy: Casale Monferrato, Taranto) That is not controversial, How is controversial
3: CAUSAL THEORIES FOR MEDICAL EPISODES
Inference, Prediction, Explanation, Control, Reasoning

Causal Mosaic
For Medical Causation

Metaphysics, Semantics, Epistemology, Methodology, Use
TO SUM UP & CONCLUDE
Challenges of ‘medical causation’ or ‘causation in medicine’

– What medicine?
– What causality?

We make non-neutral choices here

– Broad understanding of medicine
– Pluralistic approach to causality

Why this is – hopefully! – promising

– No ready-made recipes, no top down solution
– Understanding the practice to offer principled tool to address different ‘episodes’ of medical causation