

# Decision Theory for Tomorrow's Doctors

## Belief and Decision under Uncertainty

Compulsory philosophy course for 1<sup>st</sup>-year medical students



### Introduction

In 2014, the Peter Sowerby Foundation offered King's College London a grant for activities that would encourage medical students to study philosophy. This occurred at a time when the curriculum for the MBBS (Bachelor of Medicine, Bachelor of Surgery) degree at King's College London's GKT School of Medical Education was undergoing reconstruction, and the idea of a philosophy mini-course fit well with the medical school's plan that the new curriculum would enhance critical thinking, ability to cope with change, integration of physical and mental health care for "whole-person" medicine, and the ability to deliver patient-centred care, in its graduates.

MBBS curricula in the UK have explicitly defined learning outcomes for every week, and these are geared toward educational goals set in the government publication *Tomorrow's Doctors 2009*. Of the objectives set out there, the philosophy module aims to enhance the medical student's ability to "discuss ... concepts of health, illness, and disease", "analyse complex and uncertain situations", "critically appraise the results of relevant diagnostic, prognostic and treatment trials and ... studies as reported in the medical and scientific literature", "continually and systematically reflect on practice", and "deal effectively with uncertainty and change".

### The course

Belief and Decision under Uncertainty is a five-week course – one lecture hour, one seminar hour per week – in the second semester of the first year of the compulsory medical curriculum. Philosophy cannot be assessed by multiple choice exams, and the only way it could be assessed via essay writing was if we did it as an element in the portfolio assessment through which clinical skills are evaluated. In portfolio assessment students engage in an activity – e.g., taking blood pressure -- and receive a sign-off from a medical professional when they've demonstrated competence.

Analogously, we will evaluate a 1,000-word essay the student writes for whether it demonstrates competence at analyzing a concrete case in terms of the concepts of the course. This placement of the philosophy module within the curriculum highlights the fact that what we are teaching is not a body of information or substantive theories but thinking skills and conceptual tools that can improve practice.



### Content of the course

- Week 1 – Belief and Evidence – We distinguish belief, justified belief, knowledge, certainty, and evidence. We explain conditional probability, base rates, and reference classes, and illustrate base rate neglect, and the importance of using the reference class that takes into account one's total evidence.
- Week 2 – Decision and Value – We define the concepts of utility, expected utility, dominance, and risk aversion, and assess the advantages and limitations of the expected utility maximization paradigm. An overall lesson is that rational action does not require certainty about the truth of the relevant propositions.
- Week 3 – Ambiguity and Interpretation – We discuss the role of background assumptions (auxiliary hypotheses) in what we perceive, what is evidence for what, what we think is possible, what we prefer, and what gets communicated. We discuss the necessity of background assumptions and the cognitive load involved in doubting them.

- Week 4 – Self-assessment of Reliability – We discuss pervasive psychological biases – e.g., confirmation bias, framing effects. We distinguish reliability from belief, knowledge, evidence, and certainty. We illustrate how to reflectively assess one's own reliability, how to re-calibrate, and how to use the substitution method on suspected biases.
- Week 5 – Concepts of Health – We discuss several key dimensions of health, including biological functioning, statistical normality, phenomenological well-being, and ability to pursue one's vital goals. We distinguish these features as they apply to mental and physical health, and discuss the roles of facts and values in the assessment of health.

### Assessment – sample essay questions

1. You are a GP. An obese patient with a diagnosis of bipolar presents with severe knee pain she thinks is related to her having a job where she stands all day. What do you ask, order, recommend, or refer her to, and what is your reasoning behind this?
2. You are the head of a committee in the NHS tasked with making a recommendation on whether sex change surgery, hormone therapy, and/or psychotherapy should be available in the public health service for the condition of gender dysphoria. What do you recommend and on what basis?
3. You have a patient in the hospital with acute gastrointestinal symptoms – vomiting and diarrhoea with some blood. She is young and otherwise healthy and has just returned from a foreign country so is likely to have an infection, but the lab tests identifying whether it is viral or bacterial won't be back for four days. She is on IV fluid replacement and her life is not in danger, but she has a law school entrance exam in a week. Do you treat her with antibiotics?

### Concepts – three of these must be used in the essay

Justified belief	Conditional probability	Phenomenological well-being
Utility/Expected Utility	Dominance	Risk Aversion
Catch-all probability	Reliability/calibration	Confirmation Bias
Biological function	Statistical normality	Vital goals
Disability	Background assumption	Substitution method