

ETH350H1 – Topics in Value Theory:  
**Bias in Medicine**  
**From Evidence Based Medicine to Artificial Intelligence**

**Monday 10-12 am** (*online, synchronous*)  
**Office hours** (*online, flexible*)

Dr. Juliette Ferry-Danini  
[juliette.ferrydanini@utoronto.ca](mailto:juliette.ferrydanini@utoronto.ca)

**Summary of class:**

Biases in medicine are unfortunately ubiquitous and impede reliable evidence and efficient medical care. When we take a pharmaceutical drug and feel better, we might infer that the medicine has cured us. However, our illness may have very well improved on its own. This is what we call confirmation bias. Of course, medical research has implemented overtime different methodological safeguards in order to avoid this type of bias, notably, carefully designed studies. Since the 1990s, “Evidence Based Medicine” refers to the idea that we can rank by quality these different levels of evidence. The methodological safeguards in medical research however are not perfect and confirmation bias is not the only bias impacting the reliability of medical evidence and the quality of care. For instance, what we call publication bias favors the publication of positive or striking results over negative results or replications. Moreover, some other biases are directly linked to gender and race discriminations. This course will explore some of the different biases medical science is facing, what it means for medicine overall and how it impacts society. Finally, the course will consider what impact the introduction of artificial intelligence technologies in medicine may have on these issues: is artificial intelligence likely to make medicine more reliable or on the contrary even more biased?

**Online Format: Synchronous online sessions on Teams or Zoom**

**Evaluation:**

**Essay Proposal of 500 words (5%)**, due via Quercus on January 25, 2020 at 10:00a.m.

**Book review of 1200 words (20%)**, last due via Quercus on February 22, 2020 at 10:00a.m.  
Book review from the suggested list (see below) – preferably everyone should pick a different book. Detailed instructions on how to best write a book review will be given during the first class. A book review is not solely a summary of what you have read. You should also try to engage with what you have read, discuss the arguments with your own and confront them with your other readings. I included a book suggestions list at the end of this syllabus.

**Book review oral presentation (10%)**, presenting your book review to the rest of the class in the most pedagogical way – 20 min maximum – slides or no slides – video or oral only – synchronous or asynchronous (this oral presentation replaces the usual evaluation of participation). Dates to be define individually.

**5 mini assignments of 500 words (30%)**, each worth 6% for weeks designated with an \*.

The details of the assignments are given the week before they are due. Assignments are to be submitted on Quercus under “assignments” before Saturday for weeks designated with an\*. Work count is flexible, but no less than 500 words or so.

**Essay of 2000 Words (35%)**, due via Quercus on March 15, 2020 at 10:00a.m.

Note that between February 15 and February 22, 2020, you are offered to submit at any time via Quercus a draft of your essay in order to get feedbacks. Submitting your draft will not impact your final grade. Feedbacks will be given before March 1.

**Note that all words counts are flexible**, if you want to write a bit less or a bit more, suit yourself. However, I would advise not to overdo it: it is always a good idea to be concise in your writing. More pages will not mean a better grade.

Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University’s use of the Turnitin.com service are described on the Turnitin.com web site.

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or Accessibility Services at 416-978 8060; [studentlife.utoronto.ca/as](http://studentlife.utoronto.ca/as).

*The readings listed below are tentative and subject to change*

**January 4 –No classes On January 4 week ([see link](#))**

**January 11** – Introduction: Syllabus Overview – Philosophy of Medicine meets Ethics meets Philosophy of Information Technology

Topics that will be covered:

- What are biases? One word, several phenomena.
- Syllabus Overview.
- How to read research papers. How to read academic books.
- How to write a philosophy essay. How to write a book review.
- How to cite. How to make a bibliography.

Alexander Bird, 2019, “[Systematicity, knowledge, and bias. How systematicity made clinical medicine a science](#)”, *Synthese* 196 (3):863-879.

*Suggested non-mandatory reading:*

Lenman, L., “[How to write a crap philosophy essay: a brief guide for students](#)”

## **January 18\* — A short intro to “Evidence Based Medicine”**

Daly, D. L., “Why we randomize”, a 6 min video on YouTube:

<https://www.youtube.com/watch?v=dSOjpxo1UX0&t=20s>

La Caze, A., 2017, “The randomized controlled trial”, in the *Routledge Companion of Philosophy of Medicine*, pp. 195-208, ed. Solomon, Simon, Kincaid, Routledge.

Sackett and al, 1996, “*Evidence Based Medicine: What It Is And What It Isn't*”, *BMJ*, Jan 13;312(7023):71-2.

Bluhm, R., 2017, “The hierarchy of evidence, meta-analysis, and systematic review”, in the *Routledge Companion of Philosophy of Medicine*, pp. 209-216.

## **January 25 – Essay proposal of 500 words due – Bias in medical research – Financial Bias Part 1**

Sismondo, S., *Ghost-Managed Medicine*, Chapter, 1: “Power and Knowledge in Drug Marketing” (excerpts to be defined).

Goldacre, B., *Bad Pharma*, Chapter 6: “Marketing” (excerpts to be defined).

Holman, B., Elliott, E.C., 2018, “[The promise and perils of industry-funded science](#)”, *Philosophy Compass*, 2018;e12544.

## **February 1\* – Bias in medical research – Financial Bias Part 2**

Sismondo, S., *Ghost-Managed Medicine*, Chapter 3: “Ghosts in the machine: publication planning 101” (excerpts to be defined)

Goldacre, B., *Bad Pharma*, Chapter 1: “Missing Data” (extracts to be defined).

## **February 8 – Bias in medical research Part 3 – Insights from history**

*Some of these readings can be upsetting*

Brandt, A. M., 1978, “[Racism and Research: The Case of the Tuskegee Syphilis Study](#)”, *The Hastings Center Report*, Vol. 8, No. 6 (Dec., 1978), pp. 21-29

Blum, D., 2011, “The Radium Girls”, *The Wired*, <https://www.wired.com/2011/03/the-radium-girls/>

Heneghan and al, 2017, “[Trials of transvaginal mesh devices for pelvic organ prolapse: a systematic database review of the US FDA approval process](#)”, *BMJ Open*, 2017;7:e017125.

Green, J., 2002, “[Babies, Blemishes and FDA: A History of Accutane Regulation in the United States](#)” (2002 Third Year Paper, Harvard Law School).

**February 15 – Reading Week – No classes – You can send a draft of your essay any time during this week.**

**February 22\* – Last day on which you can submit a first draft of your essay for feedback – Book Review Due – Focus 1: Gender Bias in Medicine**

De Melo-Martín, I. and Intemann, K., 2017, “Gender in Medicine”, *Routledge Companion to the philosophy of medicine*, pp. 408-418.

Goldenberg, M. J., 2010, “[Perspectives on Evidence-Based Healthcare for Women](#),” *Journal of Women’s Health*, Volume 19, Number 7.

22min Video on YouTube - “[Bias in medicine: Last Week Tonight](#)” with John Oliver (HBO).

*Complementary non-mandatory reading:*

Holroyd J, Scaife R, Stafford T. “[Responsibility for implicit bias](#).” *Philosophy Compass*. 2017;12:e12410.

**March 1 – Focus 2: Racism in medicine**

Valles, S., 2017, “Race in Medicine,” in the *Routledge Companion to Philosophy of Medicine*, pp. 419-431.

Gravlee, C.C., 2009, “[How Race Becomes Biology: Embodiment of Social Inequality](#)”, *American Journal of Physical Anthropology*, 139:47–57 (2009)

*Complementary reading:*

Kaplan, J. M., 2010, “[When Socially Determined Categories Make Biological Realities: Understanding Black/White Health Disparities in the U.S.](#)”, *The Monist*, Vol. 93, No. 2, (April, 2010), pp. 281-297.

Bessonne, M., 2020, “[Racism and Epistemologies of Ignorance: Framing the French Case](#)”, *Ethical Theory and Moral Practice*, 23:815–829

**March 8\* – Focus 3: Covid-19**

“[Against pandemic research exceptionalism](#),” Alex John London, Jonathan Kimmelman, *Science* 01 May 2020: Vol. 368, Issue 6490, pp. 476-477

Freedman, B., 1987, “[Equipoise and the Ethics of Clinical Research](#)”, *The New England Journal of Medicine*, Vol. 317, No 3, 141-145.

*Non-mandatory reading suggestion:*

Ferry-Danini, J., 2020, (in French), “[Petite introduction à l’éthique des essais cliniques. Coronavirus —Réponse au Professeur Raoult](#)” on Medium.

## March 15 – ESSAYS DUE – Artificial intelligence and bias: why this is an issue

**Invited speaker: Mel Andrews (University of Cincinnati) “Reification of bias in machine learning”**

39min talk on the Centre for Ethics’ YouTube Chanel where Catherine D’Ignazio and Lauren F. Klein present their book *Data Feminism* : <https://www.youtube.com/watch?v=bnc5uEILQj8>

O’Neil, C., 2016, *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*, Introduction.

## March 22\* - Explanation in Medicine and Opacity in Medical AI

Chin-Yee, B. Upshur, R. 2018, “[Three Problems with Big Data and Artificial Intelligence in Medicine](#)”, *Perspectives in Biology and Medicine*, Vol. 62, 2, 237-256.

Karches, 2018, “[Against the iDoctor: why artificial intelligence should not replace physician judgment](#)”, *Theoretical Medicine and Bioethics*, Vol. 39, 2, 91-110.

London, A. J., 2019, “[Artificial Intelligence and Black-Box Medical Decisions: Accuracy versus Explainability](#)”, *Hasting Center report*, 49, no. 1 (2019): 15- 21.

**Book reading suggestions (books marked with a \* are the one I recommend for the book review assignment, as they relate the most to the topics in class, but you are ultimately free to choose):**

Criado Perez, C., 2019, *Invisible Women, Exposing Data Bias in a World Designed for Men*, Chatto and Windus, UK, London.

\*D’Ignazio, C., and Klein, L.F., 2020, *Data Feminism*, The MIT Press, Cambridge, Massachusetts.

\*Goldacre, B., 2012, *Bad Pharma: How Drug Companies Mislead Doctors and Harm Patients*, Farrar, Straus and Giroux, New York.

\*Goodman, K., 2016, *Ethics, medicine and information technology*, Cambridge, UK: Cambridge University Press.

Moore, K., 2016, *The Radium Girls: They paid with their lives. Their final fight was for justice*, Simon & Schuster UK.

O’Neil, C., 2016, *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*, New York, Crown Books.

\*Robert, D., 2011, *Fatal Invention: How science, politics, and big business re-create race in the twenty-first century*, New York: The New Press.

\*Sismondo, S., 2017, [Ghost-Managed Medicine, Big Pharma's Invisible Hands](#), Mattering Press.

\*Stegenga, J., 2018, *Medical Nihilism*, Oxford, UK, Oxford University Press.

Washington, H. A., 2006, *Medical Apartheid: The Dark History of Medical Experimentation on Black Americans from Colonial Times to the Present*, New York: Doubleday.