

**What if... smoking does not “cause” lung cancer?**  
**About counterfactuals and biomedicine.**

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Gathering knowledge that is useful for the prevention of, and intervention in, diseases is the primary goal of epidemiologists, and of biomedical scientists in general. Given these goals, a counterfactual approach to causation and, by consequence, counterfactual reasoning on disease causation, seem to underlie the scientific research practice in this domain of science. Nonetheless, the usefulness of the counterfactual approach is not taken for granted in epidemiology. On the contrary, the precise role of counterfactuals and counterfactual reasoning is heavily debated among epidemiologists. During my lecture, I will briefly review the epidemiological debate on counterfactuals. I will take a closer look at some of the arguments used in the discussion among epidemiologists, and further reflect on this debate from a philosophical point of view. Finally, I will wonder whether this discussion matters after all for the scientific practice of epidemiology. If it is not fully justified, given the current epidemiological research results, to claim boldly that smoking “causes” lung cancer, so what?