

Introduction. Which philosophy, ethics, and politics for epidemiology today?

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Epidemiology is an area of research that has a relatively short history, if compared with other disciplines, and one that lives at the intersection of several of these other areas in biomedicine and beyond¹. In this sense, philosophical, political, and ethical considerations have a similarly recent and interdisciplinary history.

Starting from Alex Broadbent's seminal book², some philosophers have increasingly focused on epidemiological research and its methods, models, theories, data, etc. Philosophical interests in this area have come from the intersection with work on the philosophy of medicine and biomedical research, the life sciences and biology, public health and the socio-political status of disease and health. More recently, a special issue of the journal *Synthese*, dedicated to a re-introduction of the state of philosophy of epidemiology, has provided an overview of the topic and issues that have defined philosophy of epidemiology so far³. Following a traditional focus of philosophy of science, philosophers of epidemiology have for instance discussed the epistemic nature and status of theories in epidemiology, often on the basis of the analysis of classic texts of epidemiology. Relatedly, causal inference has been extensively discussed, as a consequence of the cen-

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¹ A. Morabia (ed.), *A History of Epidemiologic Methods and Concepts*, Birkhäuser Verlag, Basel 2005.

² A. Broadbent, *Philosophy of Epidemiology*, London, Palgrave Macmillan, London 2013.

³ J.M. Kaplan, S. Valles, *Reflecting on what philosophy of epidemiology is and does, as the field comes into its own: Introduction to the Special Issue on Philosophy of Epidemiology*, "Synthese", 2019.

trality of causality in both epidemiology and philosophy of science⁴. Partly in connection to questions about the evidential basis of causal inference, philosophers have analysed the types of measurements and data collection practices employed in epidemiology⁵, in connection with trends and movements in biomedical research (evidence-based medicine, personalised medicine, genomics) and the sciences more generally (big data, data-intensive approaches). The role of epistemic and non-epistemic values in epidemiological research has been analysed in the context of disputes and debates on epidemiological practice⁶. In line with approaches and lines of research in philosophy of science and beyond, the Eurocentrism of both epidemiology and philosophy of medicine and epidemiology has increasingly been criticised and debated in recent years⁷. And many of these topics have been developed in close collaborations between philosophers and epidemiologists, who have often contributed to debates in both fields⁸.

In the context of the COVID-19 pandemic, epidemiology has gained increasing – if not new – prominence for public, political, and academic discussions. Various discussions, critiques, and tensions have arisen in this context, involving epidemiological modelling, data, response measures, scientific communication, etc. Some philosophers have contributed to these discussions from the point of view of philosophy of epidemiology and beyond. Internally, this has led to discussions in academic philosophy about the role and contribution of the field in cases of emergency such as the pandemic. At a more external level, interactions between philosophers, epidemiologists, meta-scientists and other researchers have been established. More generally, however, we think that the COVID-19 pandemic can be a starting point for a more general reflection on the status of philosophical considerations on epidemiology and medicine. Crucially, we will argue that this needs to go in direction of a more integrative approach to the study of these disciplines and issues, which comprises philosophy of science as well as critical theory, political philosophy, philoso-

⁴ F. Russo, J. Williamson, *Interpreting Causality in the Health Sciences*, “International Studies in the Philosophy of Science”, 21, 2, 2007, pp. 157-170.

⁵ S. Leonelli, N. Tempini, *Where Health and Environment Meet: The Use of Invariant Parameters in Big Data Analysis*, “Synthese”, 2018.

⁶ S. Valles, *Philosophy of Population Health: Philosophy for a New Public Health Era*, Routledge Press, London 2018.

⁷ S. Valles, *A Pluralistic and Socially Responsible Philosophy of Epidemiology Field Should Actively Engage with Social Determinants of Health and Health Disparities*, “Synthese”, 2019.

⁸ J.P. Vandenbroucke, A. Broadbent, N. Pearce, *Causality and Causal Inference in Epidemiology: The Need for a Pluralistic Approach*, “International Journal of Epidemiology”, 45, 6, 2016, pp. 1776-1786.

phy of medicine, science and technology studies, etc. The pandemic has highlighted many issues that require additional and close attention after the immediate aftermath of the pandemic and are significant for epidemiological and philosophical analyses beyond the context of the current spread of COVID-19. This focus of “Mefisto” can be considered one of the first new steps in this direction, and in this introduction we specify what we mean by such an integrative approach, where we see this applied in the context of the articles of this issue and how we can move forward.

A crucial reason for the adoption of an integrated approach is the urgency to avoid any denial of the complexity of the current situation and the consequent polarization of ideas and positions. Lately, we can see how this risk is present in the sphere of public opinion and in the scientific community as well: suppressive measures vs mitigation strategies, prudence vs proportionality, predictive models vs randomized control trials. It is reasonable to think that such cleavages might replicate themselves in the philosophical community, which is already characterized by a high level of disagreement and parochialism. In this sense, this volume aims to instead promote ecumenism and intellectual cooperation between different philosophical perspectives that address the same set of topics using different methodological approaches and writing styles. But what are the possible reciprocal benefits and advantages that such a dialog can produce?

Thanks to normative ethics, biopolitics and critical theory, analytic approaches to the philosophy of medicine and epidemiology can gain more indications concerning the social and historical origins of the limits of epidemiological models and practices. Through their genealogical and historical methods, and normative perspective, ethics, biopolitics and critical theory can clarify questions like: Why are non-epistemic and epistemic values strongly imbricated in public health policies? Why do SIR and SEIR models tend to opt for an aggregate of individual-level observation as evidence base, instead of considering also socio-economic conditions? To what extent and how can scientific communication be manipulated according to a political agenda or ideology?

In turn, the analytic philosophy of medicine and epidemiology can help philosophers to understand in which cases, and to which extent, scientific concepts, discourses, and practices sideline the effects of non-epistemic values and factors. There is no doubt that the latter can influence epidemiological models, their presuppositions, their mathematical structure, and the collection and quality of data that drive their predictions. An analytic, rigorous, and argumentative approach can uncover logical inconsistencies and produce a conceptual analysis capable of explaining the

intersection and interaction between medical concepts, which are often supposed to be theoretically neutral, and economic, social, and political ideas and values.

Thus, this dialogue can promote an eclectic perspective that does not embrace a totalizing and pessimistic critique of scientific reason but does not depict medical science as a smooth, value-free domain either. In an analogous way, the confrontation between these two different philosophical branches can also help us to better understand how and when public health policies (or biopolitics and biopower, if you prefer) “exerts a positive influence on life that endeavors to administer, optimize, and multiply it, subjecting it to precise controls and comprehensive regulations”⁹. This could mean, for instance, preventing the collapse of the health care system, protecting individual and public health, while respecting principles of prudence and proportionality without enacting health restrictions through mere coercion and mystification.

In presenting this approach we thus hope to promote a new philosophical point of view, which goes beyond the false dichotomy between a medical science that is integrally objective and totally based on facts and a medical practice that is necessarily an expression of asymmetric relations of power and, to some extent, oppression. The contributions in this focus of “Mefisto” implement this approach by discussing and analysing the following cluster of topics.

Data and evidence are of course crucial components of any area of scientific research, but are perhaps particularly interesting in the context of biomedicine and epidemiology more specifically. The historical rise of epidemiology as an area of research is crucially linked to the collection of data on populations by national states as well as its role as a provider of evidence for public health interventions¹⁰. In recent years, an increase in the volume of data that can be collected, analysed stored, and used for research has affected epidemiology too and yielded epistemic strategies for the integration of diverse datasets into bodies of evidence and knowledge¹¹. At the same time, the topic of evidence is often a contested issue in biomedical research, especially in connection to movements such as Evidence-Based Medicine and specific ways to classify and evaluate qual-

⁹ M. Foucault, *The History of Sexuality, Vol. I*, Vintage Book, New York 1978, p. 137.

¹⁰ A. Morabia, *A History of Epidemiologic Methods and Concepts*, cit.

¹¹ S. Canali, *Making evidential claims in epidemiology: Three strategies for the study of the exposome*, “Studies in History and Philosophy of Biological & Biomedical Sciences”, 2020, 82, 101248.

ity¹². In this broader context, data and evidence have been at the centre of increasing attention during the COVID-19 pandemic, whereby some commentators have argued that the evidential basis of mitigation measures such as lockdowns has very low quality¹³. This has opened up an important debate on the quality of COVID-19 data and, more generally, the intricate relations between scientific evidence and policy-making¹⁴. Tapping into these issues, in their article Cristina Amoretti and Elisabetta Lalumera investigate the data practices connected to counting deaths by COVID-19. Amoretti and Lalumera show that these practices, and thus the data themselves, cannot be considered objective in a simplistic sense of the word, as they rather reflect and encapsulate value judgements made at various steps of the process. This is an important point in the context of the debate on COVID-19 evidence, where arguably outdated notions of objectivity and data as neutral entities are employed. Susanne Bauer additionally situates the epistemic, social, and political dimensions of data practices in the epidemiology of COVID-19 with a contribution that discusses instances of what she calls “capture-all enumerative infrastructures”, i.e. epidemiological devices, approaches, and technologies that have been used in the context of the pandemic to track its development and spreading and ground policy interventions. Analysing the bathtub/container model of population, semi-automated dashboards, omics techniques, and remote sensing technologies as examples of these infrastructures, Bauer argues that several of these efforts run the risk of increasing stratification, segmentation, and injustice.

A second theme that the articles of this issue engage with is the role of *models and modelling* in epidemiology. Scientific models have been a topic of significant interest in the philosophy of science literature of the last two to three decades as a result of their crucial role in scientific practices and epistemic dimensions that are different from scientific theories. In this context, philosophers have discussed the epistemic dimensions and features of models, their relation to data and theories, the ways in which models represent the world, explain, etc.¹⁵. As for biomedicine and epi-

¹² J. Worrall, *What Evidence in Evidence-Based Medicine?*, “Philosophy of Science”, 2002, 69, S3, S316-S330.

¹³ J.P. Ioannidis, S. Cripps, M.A. Tanner, *Forecasting for COVID-19 has failed*, “International Journal of Forecasting”, 2020.

¹⁴ J. Fuller, *Models v. Evidence*, “Boston Review”, 2020. Available at: <https://bostonreview.net/science-nature/jonathan-fuller-models-v-evidence>

¹⁵ D. Bailer-Jones, *Scientific Models in Philosophy of Science*, University of Pittsburgh Press, Pittsburgh 2009.

miology in particular, modelling is a more recent and yet increasingly central tool for studying disease and health in populations¹⁶. Such a centrality has, again, been particularly highlighted by the COVID-19 pandemic, where specific models (e.g. the Imperial College model) and specific types of modelling (e.g. compartment models) have taken central stage and have gained political and media exposure, increasing scientific discussions on the limits of models¹⁷ and philosophical analyses of their predictive abilities¹⁸. The articles we present in this issue focus on and extend this discussion on the limits and dimensions of epidemiological models. In their paper, Federica Russo and Myke Kelly critically assess the ways in which epidemiological models have approached public health. Their claim is that the assumptions employed in modelling have several limits and in particular focus almost solely on aggregates of individuals, thus mostly obscuring social dynamics and mechanisms. This limitation opens up the possibility for other and different approaches to modelling, which include a more clearly social component and population character, and in this sense their work gives substance to many discussions we have witnessed during the COVID-19 pandemic about the social character of health and public policy interventions. Cristina Amoretti and Elisabetta Lalumera's work in their article is also important in this context, as they highlight the various assumptions that affect and realise the evidential significance of COVID-19 death data. These include assumptions about which aspects and elements of public health have to be protected and how they need to be protected, including for instance prevention and treatment. Susanne Bauer's article is equally concerned with the epistemic and infrastructural role of models in epidemiology, and particularly with the ways in which a specific model – the bathtub/container model – frames the notion of population for epidemiological research. Bauer argues that the model is based on a mode of thinking according to which populations as entities need to be contained and this has key implications for which measures are conceptualized when it comes to public health.

The problem of what and how to include in conceptualisations of population, health, and disease, how to develop a more inclusive perspective on public health policies on this basis is a topic of key importance that is dis-

¹⁶ A. Morabia, *A History of Epidemiologic Methods and Concepts*, cit.

¹⁷ A. Saltelli *et al.*, *Five Ways to Ensure that Models Serve Society: A Manifesto*, "Nature", 582, 2020, pp. 482-484.

¹⁸ J. Fuller, *What Are the COVID-19 Models Modeling (Philosophically Speaking)?*, "History and Philosophy of the Life Sciences", 2021, 43, p. 47.

cussed in this volume, in particular in relation to the *democratic and political dimension of epidemiological research and public health measures*. In their article, Flavio D'Abramo, Giulia Gandolfi, Gerardo Ienna, Pietro Daniel Omodeo, and Charles Wolfe discuss the historical entanglements of medical expertise, economic interests and surveillance politics for analysing the political nature of today's public health policies and epidemiology. On one side, they sketch the general outlines of a political epistemology that is focused on analysing the political features embedded in a scientific praxis and method that are never totally pure or neutral. On the other side, they put the basis for developing a biopolitical viewpoint that is strongly materialistic, historically grounded, attentive to the conditions that can ensure the 'rational use of scientific rationality'. In doing so, they not only pose the basis for a biopolitical critique that is far from the doctrinal assumptions of the Italian theory and the messianic posture of Agamben's biopolitics, which tend to depict citizens as passive victims of a biopolitical Leviathan. They also support the idea that biopolitics as a method of inquiry can have a positive normative outcome, working in favor of non-alienated and emancipated forms of scientific knowledge and technology. In this sense, Susanne Bauer discusses some concrete cases of the biosurveillance systems that are often mentioned in the context of biopolitical discussions and concludes that several of these discussions can be brought to bear on the features of the infrastructures that are used to study and intervene on disease. Bauer proposes that a specific focus on "pandemic apparatus and viral infrastructuring" should be a crucial element of these discussions way of making these more concrete – with a move that we think goes in the direction suggested by D'Abramo, Gandolfi, Ienna, Omodeo, and Wolfe.

As such, the articles we present in the focus deepen the critical position of those scholars who underline the friction between *expertise and values* – i.e. the difficult relationship between the mathematical and scientific expertise, which epidemiological models embody, and the moral, social, and political values and variables that they claim to transcend. At the very least, epidemics do not happen in a vacuum. They explode in contexts that are often affected by profound and structural socio-economic inequalities. If already flu epidemics hit disproportionately individuals with low socioeconomic status¹⁹, it is reasonable to think that the same phenomenon can happen in the case of the spread of a different airborne virus like COVID-19. Poverty tends to overlap the conditions of margin-

¹⁹ C.M. Zipfel, V. Colizza, S. Bansal, *Health Inequities in Influenza Transmission and Surveillance*, "PLOS Computational Biology", 17, 3, 2021.

alization from which ethnic, cultural, religious groups might suffer. Thus, many of these same citizens are more susceptible to getting extremely sick or dying from flu or COVID-19 epidemics. The contributions of this focus of the journal discuss several of these elements, including conceptualisations of disease, health and populations (Federica Russo and Myke Kelly), values in counting practices (Cristina Amoretti and Elisabetta Lalumera), the intertwining of the epistemic, social and political dimensions of infrastructures (Susanne Bauer), the need for emancipated forms of science (D'Abramo and colleagues). At the same time, during the last year it has often been highlighted how non-pharmaceutical interventions, which are enacted following epidemiological forecasts, can exacerbate existing harms, or introduce new ones: employment loss, food insecurity for children previously receiving school lunch benefits, increased domestic violence, psychological suffering related to social distancing, weakening of democratic norms, procedures, institutions. However, little attention has been paid to the fact that, intersecting already existing social inequalities and asymmetries, epidemics generate and amplify generating *health disparities*. In this regard, SIR and SEIR models that are grounded on an aggregate of individual-level observation are problematic also because they do not or cannot identify how infections or deaths are socially distributed, or who is most vulnerable to fall sick or die. In other words, the expertise embodied in such models does not consider sufficiently that the most vulnerable individuals in the social dimension also have a moral claim to health capabilities that demands equal concern. Social interventions must mitigate their vulnerabilities and help recover their lives and livelihood. This means improving the socioeconomic conditions of the most vulnerable and making them capable of managing social interactions and engaging with the physical environment in such a way that prevents infections²⁰. Therefore, a more inclusive approach toward poorer subjects – such as the ones suggested by Myke Kelly, Federica Russo, and Susanne Bauer in their contributions – might help partially mitigating the health inequalities. It can influence the construction of epidemiological models and the design of health interventions that are more sensitive to the needs, material living conditions, and capabilities of underrepresented social groups and classes²¹.

²⁰ S. Venkatapuram, *Human Capabilities and Pandemics*, “Journal of Human Development and Capabilities”, 2020.

²¹ C. Timmermann, *Epistemic Ignorance, Poverty and the COVID-19 Pandemic*, “Asian Bioethics Review”, 2020.

The focus comes to a closing with two reviews that discuss books that focus on both ends of the spectrum when it comes to the epidemiology, sociology, and politics of epidemics and pandemics. *Pandemics: A Very Short Introduction* by C.W. McMillen is an introduction to the science, history, and sociology of pandemics. Closely to the contribution by D'Abramo, Gandolfi, Ienna, Omedeo and Wolf that we publish in this issue, McMillen shows the merits of looking at the history of pandemic management and the social nature of pandemics, which as we have discussed are far from purely biological entities. The extent to which we will learn from the history and management for COVID-19 for future scenarios and we will be shaped by the current pandemic as societies is something that we should reflect in the humanities and beyond. The second volume reviewed in our focus is a very recent contribution on the COVID-19 pandemic: *De la démocratie en Pandémie: Santé, recherche, éducation* by Barbara Stiegler. The book is a critical analysis of COVID-19 policy and identifies several pitfalls in the communication and management of the pandemic by European governments in general and the French context in particular. Moving forward in this critical work, we hope that the reviews and contributions we present in this focus will improve our understanding of COVID-19 and biomedical emergencies, but also push for a more grounded, productive and pluralistic role for philosophical reflections in the context of pandemics and beyond.

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