Introduction

> World data … are essential for international organizations assisting countries to organize their health services, as well as for institutions and individuals undertaking research into epidemiological and statistical matters of world or regional concern.[1]

In a World Health Organization (WHO) document entitled "International Work in Health Statistics, 1948–1958," WHO founding statisticians Yves Biraud (also known as Yves-Marie Biraud) and Satya Swaroop, along with a former consultant, Harry Sutherland Gear, set out their aspirations for global health data. The document was published in 1961, decades before the catchwords "evidence-based medicine" and "big data" came to epitomize the predominance of quantitative data in global health policy-making. The trio underscored the importance of incorporating statistics into research and policy-making, presenting a vision in which researchers and public health officers across the world would use statistics to advance understanding of epidemiological situations and devise policies aimed at improving people's health. The quotation above also encapsulates the main purpose of this book. Whereas policy publications tend to present numerical analysis as an innovative – if not exactly new – panacea for global health research and governance, this book aims to portray the historical process and sociopolitical contexts through which statistical practices circulated and eventually became a legitimate means of communication between international health organizations and national and local administrations. I also examine the strategies public health institutions and experts used to collect and disseminate statistics vis-à-vis international health organizations.

It is no accident that this book starts with the 1910s, when a wide array of transnational organizations, public and private, aspired to serve several countries at once and used statistics as a language to facilitate international collaboration. Governments, in Western Europe in particular,

[1] Harry Sutherland Gear, Yves Biraud, and Satya Swaroop, *International Work in Health Statistics, 1948–1958* (Geneva: WHO, 1961), 56.

had of course already been collecting numbers to better manage the health conditions of their populations in various ways.[2] Although historians have provided accounts of early (and often failed) European-led attempts to collect statistics at the international level ever since the first International Sanitary Conference of 1851,[3] little is known about how countries outside of Western Europe (including their colonies) and North America used similar statistical practices to tackle public health crises. As this book will demonstrate, it was only in the twentieth century that American philanthropic organizations began to provide resources and expertise to help administrations and research organizations on other continents to quantify their public health affairs. These programs, which aimed to improve the well-being of humanity across the globe through public health actions, spread the consensus on the usefulness of statistics for public health beyond Europe and North America, persuading research institutes and health administrations in a number of countries to learn the language of numbers.

It should be stressed that the statistical initiatives presented in this book were a continuation of nineteenth-century European initiatives that sought to standardize vital and health statistics at the international scale. Specifically, nineteenth-century Europe underwent a series of administrative changes – public health movements, the increased use of statistics by national administrations, and growing intergovernmental collaboration – which led to the collection and exchange of vital and health statistics at the international level. Existing historiographies chronicle how, during the first half of the nineteenth century, an increasing number of experts in Europe began to rely on numbers to tackle public health crises.[4] For instance, British experts Edwin Chadwick (1800–1890) and John Snow (1813–1858), along with their French counterparts Louis René Villermé (1782–1863) and Pierre-Charles Alexandre Louis (1787–1872), all used cross-tabulated birth and

[2] See, e.g.: Michael Donnelly, "William Farr and Quantification in Nineteenth-Century English Public Health," in *Body Counts: Medical Quantification in Historical and Sociological Perspectives/La Quantification Médicale, Perspectives Historiques et Sociologiques*, eds. George Weisz et al. (Montreal: McGill-Queens, 2005), 251–65; Mervyn Susser and Zena Stein, *Eras in Epidemiology: The Evolution of Ideas* (Oxford and New York: Oxford University Press, 2009).

[3] Valeska Huber, "The Unification of the Globe by Disease? The International Sanitary Conferences on Cholera, 1851–1894," *The Historical Journal* 49, no. 2 (2006): 453–76; Céline Paillette, "Épidémies, santé et ordre mondial. Le rôle des organisations sanitaires internationales, 1903–1923," *Monde(s)*, no. 2 (2012): 235–56.

[4] For more on public health experts' use of statistics in their work see, e.g.: Alfredo Morabia, *A History of Epidemiologic Methods and Concepts* (Basel: Birkhäuser, 2004); Susser and Stein, *Eras in Epidemiology*.

death statistics by district (or other criteria) to infer the origins of communicable diseases. At the same time, European public administrations were beginning to recruit specialists to collect and compile statistics. The best-known case was that of Louis' two pupils, William Farr (1807–1883) and Marc d'Espine (1806–1860), both of whom became official compilers of vital and health statistics (Farr in England and Wales, and d'Espine in Geneva). Farr and d'Espine further took on leading roles when the number of international conferences and congresses mushroomed in the 1850s, and the two men endeavored to standardize the collection of vital and health statistics across countries. Specifically, the International Statistical Congresses and the International Sanitary Conferences each produced a set of reporting standards for health statistics that are still maintained and revised by international health organizations: an international nomenclature of causes of death (the precursor to the International Classification of Diseases), which Farr and d'Espine were the first to draft, and the International Sanitary Regulations (now known as the International Health Regulations). Despite their differing priorities, the participants in the conferences managed to devise these standards in the hope of harmonizing vital and health statistical collection and reporting across countries. The goal was for statistics to be comparable and be used to alert the world to future epidemics. Reaching a consensus proved extremely difficult during both series of gatherings, as there was disagreement as to the etiology of communicable diseases for most of the nineteenth century. The International Sanitary Regulations also became embroiled in diplomatic disputes and international trade issues.[5]

If the main development in the nineteenth century was the birth of these sets of standards, the core achievement in the twentieth was the crystallization and implementation of statistics-led health administration procedures in different corners of the world through the work of various organizations, with financial support from American philanthropic

[5] For detailed historical accounts of these international gatherings and the standards they produced, see, e.g.: Norman Howard-Jones, *The Scientific Background of the International Sanitary Conferences, 1851–1938* (Geneva: World Health Organization, 1974); Éric Brian, "Statistique administrative et internationalisme statistique pendant la seconde moitié du XIXe siècle," *Histoire & Mesure* 4, no. 3 (1989): 201–24; Huber, "The Unification of the Globe by Disease? The International Sanitary Conferences on Cholera, 1851–1894"; Anne Rasmussen, "L'hygiène en congrès (1852–1912): circulation et configuration internationales," in *Les Hygiénistes: Enjeux, modèles et pratiques, (XVIIIe-XXe Siècles)*, ed. Patrice Bourdelais (Paris: Belin, 2011), 213–39; Sylvia Chiffoleau, *Genèse de la santé publique internationale: de la peste d'Orient à l'OMS* (Rennes: Presses universitaires de Rennes, 2012); Mark Harrison, *Contagion: How Commerce Has Spread Disease* (New Haven, CT: Yale University Press, 2013).

foundations. In 1917, the Johns Hopkins School of Public Health (JHSPH), financed by the Rockefeller Foundation, established the very first statistics department within a public health school, thus launching the legitimatization of statistical practices within public health academia. The establishment of the JHSPH dovetailed with the end of World War I, when the establishment of the League of Nations institutionalized a form of internationalism that promoted collaboration between nation-states.[6] In the decades that followed, health statisticians trained at the JHSPH went on to be employed by the League of Nations and health organizations around the globe. The Rockefeller Foundation also backed the Epidemiological Intelligence and Public Health Statistics Service of the League of Nations Health Organization (LNHO, 1922–1946), which aimed to standardize and legitimatize the statistical practices of national health authorities. The Service went further than its predecessors by developing knowledge and programs to help member countries integrate statistical collection into their health systems. The impact of the JHSPH and the LNHO statistical service at the international and local levels endured after World War II and left its mark on the United Nations Relief and Rehabilitation Administration (UNRRA, 1943–1947) and the vital and health statistics system of the WHO.

Some alumni of the JHSPH would become leading figures in China and Taiwan before or after the political upheavals of the mid-twentieth century. These statisticians brought their interwar and wartime experience to the postwar context, during which the WHO strove for an all-encompassing global statistical system, and Cold War rivalries came to be a critical factor in international organizations' work,[7] as well as in the attitudes of the two Chinese regimes vis-à-vis the organizations.

Over the course of seven chapters covering statistical initiatives in the interwar, wartime, and postwar periods, and their implementation in China and Taiwan, this book focuses first and foremost on investigating the circulation of statistical practices from the North Atlantic sphere to other parts of the world – that is, how health organizations at different levels came to use statistics in their work (for some, this also included devising a network to integrate standardized practices into other organizations). I also examine how various stakeholders – whether experts from

[6] This feature of interwar internationalism is discussed in Glenda Sluga, *Internationalism in the Age of Nationalism* (Philadelphia, PA: University of Pennsylvania Press, 2013).

[7] Scholars have argued that distinct countries and their experts had different ways of making use of the Cold War rivalry for their respective public health programs. See: e.g. Anne-Emanuelle Birn and Raùl Necochea López, *Peripheral Nerve: Health and Medicine in Cold War Latin America* (Durham, NC: Duke University Press, 2020).

international organizations or officers within national or local administrations – used statistics to evaluate health conditions on the ground and communicate (and argue) with one another.

Ultimately, this book asks the question: To what extent did statistics influence global health policy-making?

Quantification, its Socio-Historical Context, and Politics

In this book, people and their statistical practices are kept center stage through the application of socio-historical research on the rise of statistical thinking.[8] (I use the term "statistical practices" to refer to all statistical work, including the collection, dissemination, and use of statistics to formulate arguments.) I postulate that statistics are closely intertwined with the people who produce them: the following chapters therefore present and analyze the visions and actions of individuals – researchers and administrators for the most part – in producing quantified data, and how their work impacted public health programs. Experts employed by research institutes and health organizations at the international, national, and local levels made use of a large variety of statistics to support their arguments.

In investigating how quantification fits into its socio-historical context, I do not seek to repeat or add to existing accounts on the intellectual genealogy of renowned statisticians and epidemiologists such as Karl Pearson or Major Greenwood;[9] nor do I intend to structure my narrative around the history of each type of statistics. Generally speaking, the statistics used for public health are divided into the following categories: demographic statistics, which aim to present the composition and changes in a given population in terms of age, sex, and marital status;[10] vital and health statistics,

[8] See, e.g.: Ian Hacking, *The Taming of Chance* (Cambridge: Cambridge University Press, 1990); Alain Desrosières, *La politique des grands nombres: histoire de la raison statistique* (Paris: Éd. La Découverte, 1993); Theodore M. Porter, *Trust in Numbers: In Pursuit of Objectivity in Science and Public Life* (Princeton, NJ: Princeton University Press, 1995).

[9] See, e.g.: J. Rosser Matthews, *Quantification and the Quest for Medical Certainty* (Princeton, NJ: Princeton University Press, 1995); Eileen Magnello and Anne Hardy, ed., *The Road to Medical Statistics* (Amsterdam; New York: Rodopi, 2002); Anne Hardy and M. Eileen Magnello, "Statistical Methods in Epidemiology: Karl Pearson, Ronald Ross, Major Greenwood and Austin Bradford Hill, 1900–1945," *Sozial- und Präventivmedizin* 47, no. 2 (2002): 80–9; Susser and Stein, *Eras in Epidemiology*.

[10] See, e.g.: Simon Szreter, "The Idea of Demographic Transition and the Study of Fertility Change: A Critical Intellectual History," *Population and Development Review* 19, no. 4 (1993): 659–701; Keith Breckenridge and Simon Szreter, *Registration and Recognition: Documenting the Person in World History* (Oxford: Oxford University Press/British Academy, 2012).

which record the health conditions of a given population, including morbidity, mortality, cases of disease, etc.;[11] and health economic statistics, which are based on the first two categories but which add in the cost of health services and disease prevention.[12] As all three categories were gradually combined within the collection and dissemination work coordinated by international organizations during the period under study, to examine them separately would be to lose sight of how statistical practices as a whole were integrated into the global health domain.

Instead, I do as many historians, philosophers, and sociologists of quantification have done and outline the relationship between quantification work and its socio-historical context. Researchers rooted in the disciplines of philosophy and history, such as Theodore Porter, Ian Hacking, and Alain Desrosières, have studied how socio-political contexts give rise to different ways of quantifying a phenomenon, and how numbers in turn shape knowledge about the phenomenon in question.[13] Taking case studies from North Atlantic countries, these scholars bridge the gap between historiographies that focus on the statisticians themselves and those that focus purely on the political context. Sociologists, inspired by such work, have adopted a similar approach to study quantification and its social effects in the contemporary world, such as in global rankings of universities and policing statistics.[14] Even closer to the themes discussed here, a book edited by anthropologist Vincanne Adams' edited volume presents a variety of case studies on the use of quantified data in public

[11] See, e.g.: Iris Borowy, "Counting Death and Disease: Classification of Death and Disease in the Interwar Years, 1919–1939," *Continuity and Change* 18, no. 3 (2003): 457–81; Iwao Moriyama et al., *History of the Statistical Classification of Diseases and Causes of Death* (Hyattsville, MD: National Center of Health Statistics, 2011).

[12] See, e.g.: Dan Bouk, *How Our Days Became Numbered: Risk and the Rise of the Statistical Individual* (Chicago, IL: University of Chicago Press, 2015); Michelle Murphy, *The Economization of Life* (Durham, NC: Duke University Press, 2017).

[13] See, e.g.: Theodore M. Porter, *The Rise of Statistical Thinking: 1820–1900* (Princeton, NJ: Princeton University Press, 1986); Porter, *Trust in Numbers*; Hacking, *The Taming of Chance*; Desrosières, *La politique des grands nombres*; Alain Desrosières, *Gouverner par les nombres*.

[14] Wendy Nelson Espeland and Mitchell L. Stevens, "Commensuration as a Social Process," *Annual Review of Sociology* 24, no. 1 (1998): 313–43; Wendy Nelson Espeland and Mitchell L. Stevens, "A Sociology of Quantification," *European Journal of Sociology* 49, no. 3 (2008): 401–36; Martha Lampland and Susan Leigh Star, *Standards and Their Stories: How Quantifying, Classifying, and Formalizing Practices Shape Everyday Life* (Ithaca, NY: Cornell University Press, 2009); Michael Sauder and Wendy Nelson Espeland, "The Discipline of Rankings: Tight Coupling and Organizational Change," *American Sociological Review* 74, no. 1 (2009): 63–82; Emmanuel Didier, "Globalization of Quantitative Policing: Between Management and Statactivism," *Annual Review of Sociology* 44, no. 1 (2018): 515–34; Andrea Mennicken and Wendy Nelson Espeland, "What's New with Numbers? Sociological Approaches to the Study of Quantification," *Annual Review of Sociology* 45, no. 1 (2019): 223–45.

health governance and resource allocation.[15] All of the above point to the salient role played by statistics in knowledge production and policy-making from the eighteenth century to today, as well as demonstrating the unintended consequences of quantification on the social world.

In addition to Adams, other emerging scholarly works also attempt to construct historical narratives on the use of health metrics at the international level. Research by Martin Gorsky and Christopher Sirrs compares metrics from statistical publications by international organizations in the interwar and postwar years, and draws a broad picture of the organizations' attempts to create records of their member countries' health systems: from mortality and morbidity to health expenditures and hospital numbers.[16] David Reubi's article starts by examining a contemporary program, the Bloomberg Initiative to Reduce Tobacco Use in Developing Countries, and traces the history of metrics and surveys back to the interwar years.[17] Both of these publications show that the pervasive reach of quantification in international organizations' health work has its origins in the interwar period. In this book, I will further argue that pervasive quantification began to radiate outside of the North Atlantic world well before the postwar years. Through multi-archival studies, I trace how the LNHO and WHO worked to include countries in regions with less administrative capacity, and how Chinese experts interacted with the organizations when it came to implementing and reporting statistics. In that sense, this book also complements the literature on how the use of customs statistics, social surveys, and national statistics came to be used in modern China.[18]

More specifically, the following quote from Desrosières encapsulates the approach employed here:

> Quantification provides a specific language, with remarkable properties of transferability, the possibility for standardized manipulations by calculations, and of routinized interpretation systems. Thus, quantification provides social actors

[15] Vincanne Adams, ed., *Metrics: What Counts in Global Health* (Durham, NC: Duke University Press, 2016).

[16] Martin Gorsky and Christopher Sirrs, "World Health by Place: The Politics of International Health System Metrics, 1924–c. 2010," *Journal of Global History* 12, no. 3 (2017): 361–85.

[17] David Reubi, "A Genealogy of Epidemiological Reason: Saving Lives, Social Surveys and Global Population," *BioSocieties* 13, no. 1 (2017): 1–22.

[18] See, e.g.: Andrea Bréard, "Robert Hart and China's Statistical Revolution," *Modern Asian Studies* 40, no. 3 (2006): 605–29; Tong Lam, *A Passion for Facts: Social Surveys and the Construction of the Chinese Nation-State, 1900–1949* (Berkeley, CA: University of California Press, 2011); Arunabh Ghosh, "Accepting Difference, Seeking Common Ground: Sino-Indian Statistical Exchanges 1951–1959," *BJHS Themes* 1 (2016): 61–82; Arunabh Ghosh, *Making It Count: Statistics and Statecraft in the Early People's Republic of China* (Princeton, NJ: Princeton University Press, 2020).

and researchers with "objects that hold" [*des objets qui tiennent*] in the triple sense of their robustness (holding water in face of criticism), of their capacity to combine together, and finally, of the fact that they "hold people together" by encouraging them (or obliging them) to use this language with universalist aims, instead of others.[19]

Here, Desrosières provides a promising way of considering statistics within their socio-historical context. Instead of plunging into the classic debate as to whether statistics are a manipulated or faithful representation of a given phenomenon, studying statistics as a language that actors use to present their ideas and advance their agendas offers a fruitful third way to understand such practices without losing the nuances inherent to statistical collection and reporting. The language metaphor brings us back to the quotation that opened this book, and the implication by WHO statisticians that international organizations would one day use statistical data to communicate with public health research institutes and administrations at the national, regional, and international levels. In other words, statistics would act as a lingua franca. Numbers would eventually become a language into which public health conditions and fieldwork could be translated in order to provide that information to stakeholders in different localities or at different organizational levels.

In this sense, I hope to open a fresh chapter in the debate on the use of statistics for policy-making, which has been monopolized by political and social scientists for far too long. Inspired by Michel Foucault's accounts of biopolitics and governmentality, some researchers have presumed that actors trusted and lauded the capacities of statistics, and regarded statistical practices as a governing technique that organizations, whether national or international, used to influence the behavior of populations.[20] In general, these authors believe that the organizations

[19] Translated from: Alain Desrosières, *Pour une sociologie historique de la quantification* (Paris: Presses de l'Ecole des mines, 2008), 10. Original text: "*La quantification offre un langage spécifique, doté de propriétés remarquables de transférabilité, de possibilités de manipulations standardisées par le calcul, et de systèmes d'interprétations routinisées. Ainsi, elle met à la disposition des acteurs sociaux ou des chercheurs « des objets qui tiennent », au triple sens de leur robustesse propre (résistance à la critique), de leur capacité à se combiner entre eux, et enfin de ce qu'ils « tiennent les hommes entre eux » en les incitant (ou parfois en les contraignant) à user de ce langage à visée universaliste, plutôt que d'un autre*."

[20] For an analysis at the national level, see, e.g.: Graham Burchell, Colin Gorden, and Peter Miller, eds., *The Foucault Effect: Studies in Governmentality* (Chicago, IL: University of Chicago Press, 1991); Andrew Barry, Thomas Osborne, and Nikolas Rose, eds., *Foucault and Political Reason: Liberalism, Neo-Liberalism and the Rationalities of Government* (Chicago, IL: Chicago University Press, 1996). On the application of Foucauldian analysis to international organizations, see e.g.: Arturo Escobar, *Encountering Development: The Making and Unmaking of the Third World* (Princeton, NJ: Princeton University Press, 1995); Tania Murray Li, *The Will to*

trained experts to evaluate the status quo and make political decisions in a certain way (using statistical analysis, for example) and that the experts and their governing techniques served as intermediaries that translated local situations into a given analysis, based upon which certain policies were applied. Drawing on multi-archival sources, this book will put such conjectures into historical context by revealing the mechanisms that led public health experts to turn to statistics in their work and the standardized techniques used in health organizations at different levels. I will also illustrate how statistical practices – and the extent to which they were trusted as a basis of reasoning – evolved depending on the global sociopolitical context.

My focus is on the making of an international health statistics system through the transfer of statistical practices from public health schools, intergovernmental health organizations, and philanthropic public health programs to their counterparts in China and Taiwan. What makes this research unique in quantification studies is the extensive span of time and space covered. The relatively long time period serves to show the continuities and changes in international health statistics and to follow actors' endeavors to create a consolidated international statistical system for public health. The sections focusing on the LNHO (Chapter 3) and its postwar successors, UNRRA and the WHO (Chapter 5), juxtapose the underlying differences within the international health statistical network managed in Geneva. Theodore Porter posits that statistics build trust in groups of experts in need of authority,[21] and the history of the international health statistical network further shows that the collection of statistics also hinges upon the leading organization's authority.[22] Trust in numbers and in organizations can thus be symbiotic.

The broad geographic span under analysis here also signals the heterogeneity of quantification practices. Public health experts in different localities, in both the interwar and postwar periods, played different roles in the life cycle of making and circulating health statistics. The LNHO,

Improve: Governmentality, Development, and the Practice of Politics (Durham, NC: Duke University Press Books, 2007); Jeremy Youde, *Biopolitical Surveillance and Public Health in International Politics* (New York: Palgrave Macmillan, 2010); Jonathan Joseph, *The Social in the Global: Social Theory, Governmentality and Global Politics* (Cambridge: Cambridge University Press, 2012); Nicholas J. Kiersey and Doug Stokes, eds., *Foucault and International Relations: New Critical Engagements* (London: Routledge, 2011).

[21] Porter, *Trust in Numbers*. For a concrete example of experts resorting to mechanical objectivity, see Porter's fifth chapter, in which he discusses the case of accountants and actuaries.

[22] Porter also briefly touches upon the organizational basis for trust in numbers. See: Porter, *Trust in Numbers*, 213–14.

as discussed in Chapter 3, formed separate circles of experts when creating a global health statistics exchange system: North Atlantic statisticians sat in expert meetings, whereas others merely participated in training sessions. In the postwar period, statisticians from regions outside of the North Atlantic world were invited to join WHO expert committees, and the organization's experts tailored standards to localities with different levels of administrative capacity (see Chapter 5).

Throughout this book, I also investigate the diachronic implementation of public health initiatives, including statistical practices. During the interwar and postwar years, experts and researchers used statistical data to formulate their arguments, yet gave themselves leeway to select the statistics that supported their ongoing policies. During the interwar health demonstrations in both the United States and China, experts implicitly or explicitly designed their programs in line with controlled laboratory principles, which led them to include statistical collection in the hope of demonstrating the programs' effectiveness (see Chapters 2 and 4). However, when numbers were lacking, interwar program designers mostly resorted to their authority as experts to promote the program in question and simply dismissed the statistics. Thus, during this period, statistics did not always serve as an effective language for communication between organizations. Statistics became more embedded in argumentation for policy decisions after World War II, as the WHO centralized its various types of statistical data and devised statistical practices that connected fieldwork administration, research, and policy-making. Public health experts both within and outside the WHO were pushed to select statistics more meticulously to support their arguments.

The Globalization of Health Administrations

This is, by its very nature, a history that transcends national borders: a study of how statistical practices and data were transferred between international health organizations and local agencies. Phenomena that span borders have been a heated subject in historical studies. The number of such studies has peaked in the last two decades with the publication of a number of introductory books on how to conduct research on different kinds of border-crossing phenomena.[23]

[23] Pierre-Yves Saunier, "Circulations, connexions et espaces transnationaux," *Genèses* 57, no. 4 (2004): 110–26; Madeleine Herren, Martin Rüesch, and Christiane Sibille, *Transcultural History: Theories, Methods, Sources* (Berlin: Springer, 2012); Pierre-Yves Saunier, *Transnational History* (New York: Palgrave Macmillan, 2013); Akira Iriye, *Global and Transnational History: The Past, Present, and Future* (New York: Palgrave