



# Historical Methods: A Journal of Quantitative and Interdisciplinary History

ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/vhim20>

## The healthscaping approach: Toward a global history of early public health

G. Geltner & J. Coomans

**To cite this article:** G. Geltner & J. Coomans (2023) The healthscaping approach: Toward a global history of early public health, *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, 56:1, 18-33, DOI: [10.1080/01615440.2022.2128487](https://doi.org/10.1080/01615440.2022.2128487)

**To link to this article:** <https://doi.org/10.1080/01615440.2022.2128487>



© 2022 The Author(s). Published with license by Taylor and Francis Group, LLC



Published online: 10 Oct 2022.



Submit your article to this journal [↗](#)



Article views: 1086



View related articles [↗](#)





View Crossmark data [↗](#)



Citing articles: 1 View citing articles [↗](#)

## The healthscaping approach: Toward a global history of early public health

G. Geltner<sup>a,b</sup>  and J. Coomans<sup>c</sup> 

<sup>a</sup>Monash University; <sup>b</sup>University of Amsterdam; <sup>c</sup>Utrecht University

### ABSTRACT

This article presents a modular, multidisciplinary methodology for tracing how different communities in the deeper past adapted their behaviors and shaped their environments to address the health risks they faced, a process also known as “healthscaping.” Historians have made major strides in reconstructing preventative health programs across the pre- or non-industrial world, thereby challenging a common view of public health as a product of Euro-American modernity and biomedicine. However, these studies’ general focus on cities and their reliance on archival and other documents that are more readily available in Euro-American contexts, limit the intervention’s potential for rethinking the earlier history of public health comparatively, transregionally and on a global scale. A broader definition of health, additional sources and alternative methodologies allow us to expand research in and especially beyond urban Europe, promoting a global turn in health historiography that operates outside the seductive teleology of modernization, colonialism and imperialism.

### KEYWORDS

Global health; methodology; periodization; public health; sources

### Introduction

Historians have both preempted upon and heeded Carole Rawcliffe’s (2013, 12) call for “less mudslinging and more facts” when it comes to early public health history, that is the reconstruction of how societies promoted health and fought disease before the onset of industrialized modernity, the alleged trigger of the public health movement. In doing so they defined public health broadly, as any health-promoting or disease-avoiding intervention at a group level. This may include, especially in ancient and non-literate societies, acts of prevention or communal healing, either physical or spiritual, done in a public setting and carried out by individuals, health specialists, administrators or political or religious leaders. In this way, for nearly a century, scholars have steadily dismantled the edifice of earlier societies’ hygienic apathy by providing evidence for public health theory, policy and practice (Rosen 1958; Guerra 1964, 1966; Harvey 1981; Waite 1987; Ortiz de Montellano 1990; Porter 1999; Kinzelbach 2006; Jørgensen 2008; Wilson Bower 2013; Fay 2015; Skelton 2015; Agresta 2020; Gómez-Dantés and Frenk 2020; Mundy 2021). Yet despite these works’ quality and broad geographical and chronological span, the field’s focal point has remained

western European cities between the thirteenth and eighteenth century, that is the area and era immediately preceding the Industrial Revolution. While extending the history of public health backwards in this way has challenged a prevailing view by stressing a spatial, cultural and (bio)political continuity over a presumed rupture, it has also inadvertently contributed to an ongoing distortion. Leaving non-European and non-urban societies out of a revised narrative shields a teleological view of “civilizational advances.” This neglect reflects what Dipesh Chakrabarty (2000) has termed a “stagist approach” to global history, and buttresses pre/modern and non/Western binaries, which continue to cast a shadow over research foci and frameworks (Ho 2017; Bhattacharya 2018).

Thus, because of the tendency, in itself questionable, of associating urbanization and (European) civilization, recent revisions risk reproducing claims of European exceptionalism when it comes to the development of public health measures. This has created something of an ironic situation, since historians of modern medicine themselves have begun to rethink modern public health’s achievements, be it in the context of nation states, subject territories or post-colonial global endeavors (Headrick 1981; Arnold 1993;

**CONTACT** J. Coomans  [j.coomans@uu.nl](mailto:j.coomans@uu.nl)  Utrecht University, Postbus 80125, 3508 TC Utrecht, The Netherlands

© 2022 The Author(s). Published with license by Taylor and Francis Group, LLC

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

Vaughan 1991; Amrith 2006; Cornet 2011; Crook 2016). The challenge by historians of more recent eras has been strategic, for public health has so far played an emblematic role in narratives of modernization and civilizational distinctions. Therefore, the capacity of health historians working on earlier periods to respond accordingly, and work deliberately across and beyond a traditional, Eurocentric, pre/modern divide, may finally help to collapse what Kathleen Davis has aptly named “the simplex of the pre” (Davis 2008, 2018), that is, an ahistorical construct of all that modernity ostensibly rejected.

In particular, societies’ preventative-health measures, including the development of diverse legal, administrative and physical infrastructures and spiritual precautions, can be seen as part of a wide and long-term set of “healthscaping” programs. The term is used here more broadly than in its original coining by public health professionals Thomas Farley and Deborah Cohen (2005). Yet it nonetheless seeks to extend the original term’s notion of consciously striving to create “environments where health can bloom” from the combined perspective of environmental design and human behavior, and informed by culturally specific medical science, natural-philosophy, ethics and piety (Geltner 2013). To speak of “early healthscaping” is thus to proclaim the possibility—indeed, the historical reality—of such efforts in numerous societies operating before or outside the context of Euro-American modernity.

In doing so, however, it is crucial to avoid privileging a particular direction from which preventative and harm-reductive programs were designed, promoted or enforced, usually sought among political and/or religious elites. Likewise, compliance with or resistance to healthscaping initiatives could be multidirectional and diversely motivated, rather than merely top-down or bottom-up. It is also important to include health practices that are seldom perceived as pertaining to health promotion in the modern biomedical sense, often dubbed “traditional” or “unofficial” (Armus and Gómez 2021) medicine, or else dismissed as vernacular or indigenous religious practices. For instance, in the context of precolonial Africa, communities regularly conducted public healings concerned with the appeasement of (ancestral) spirits and gathered assemblies to oust sorcerers (Schoenbrun 2006; Kodesh 2008). Rainmaking rituals with dancing and drumming and shrines protecting lands and crops likewise consciously participated in promoting collective health—and therefore in healthscaping—as did smallpox inoculation campaigns, even if these efforts

differed widely in their premises. In short, preventative health measures were neither necessarily coordinated nor harmonious, even when a shared health paradigm informed them, which was not always the case (Geltner 2019b; Coomans 2021).

To illuminate the possibilities for reconstructing these dynamics, we present an inclusive methodology for studying healthscaping in a diverse (and diversely documented and remembered) range of contexts. It is intended to serve several types of scholars, including those working on social, medical and cultural themes prior to, say, the nineteenth century; those focusing on public or preventative healthcare (which is often more intrinsically linked with other themes than assumed); and those already toiling in the field and interested in undertaking comparative or transregional research or explore new types of sources. The approach is also relevant to historians of modern public health, who, as noted above, have expressed ample interest in re-evaluating transitions into modernity from traditional health practices, but are rarely offered comprehensive alternatives to those frameworks. Finally, the healthscaping approach outlined here ties in with a growing interest among public health professionals today to incorporate traditional or alternative medical practices and systems of beliefs, commonly referred to as integrative medicine (Ali and Katz 2015), rather than dismissing them or even actively destroying knowledge and practices, as was common in many colonial contexts (Waite 1987; Mendoza 2003).

One key aspect of our approach is that it aspires to connect multiple scales: political ideas, medical theories, social practices, material technologies, religious beliefs, administrative regulations, spatial relations, and environmental and biological indicators. This multiscalar methodology takes into consideration various possible admixtures of concepts and sources at scholars’ disposal, as well as the variety of agencies promoting such processes. It thus anticipates what Catherine Holmes and Naomi Standen (2018) benignly call the “evidence conundrum” in a premodern global context. As they rightly underscore, disparities in evidence types hinders comparisons and, perhaps more importantly, have led to the dismissal of activities in societies that lack written sources that Euro-American historiography privileges. That much tends to be true when it comes to the global history of community prophylactics.

With these challenges in mind, we chart a path to identifying and analyzing preventative health theory, policy and practice across a broad range of past

societies around the world. Our aim is to further stimulate and facilitate interdisciplinary, comparative and transregional research that can help expand and revise the history of public health, broadly construed. Offering methodological tools to bridge different case studies enables scholars to move beyond a focus on European cities, and toward a critical global turn in early public health history. Rather than striving to be entirely objective and normative, however, our approach is also descriptive and subjective, drawing inspiration from situational research (Basberg Neumann and Neumann 2018). We build therefore on our own studies of urban Italy and the Low Countries between the thirteenth and sixteenth century, yet whenever possible we demonstrate that the exercise can be profitably conducted farther afield, and conversely that some methodological paths are only open elsewhere. The effort is premised on giving a wide berth to the transmission and appropriation of non-biomedical prophylactic theories, policies and practices, and on a careful, contextual use of biometric and other data, which can serve scholars working in other fields. The article begins by drawing a few key lessons from complementary scholarship and then proceeds to survey sources and methodologies either already employed or likely to be highly productive for reconstructing early healthscaping. A third section reflects more deliberately about the pitfalls of Eurocentrism in this endeavor, ignorance of which may otherwise continue to haunt the healthscaping approach.

## Methods

### *Preliminary observations*

Two fields echo and in part foreshadow the approach we propose, offering important lessons about its fruitfulness. The first is historical epidemiology, including paleopathology, that is the study of crowd disease transmission. The second is medical history, and in particular the history of medical and natural-philosophical ideas about etiology, harm reduction and disease prevention. In the first of these fields, scholars have harnessed statistics and increasingly affordable digital and chemical technologies to place originally disparate finds into a new and dynamic global context. For instance, thanks to paleopathologists' access to C14 dating, stable isotope analysis, aDNA sequencing, and other methods drawing on environmental and earth sciences, our knowledge of plague, cholera, smallpox and their pathogens' mutation and movement in space and time has never been more plentiful

and accurate, even if major lacunae remain to be filled and data's statistical significance continues to fuel debates (Little 2011; Green 2020).

The fascination with global disease transmission is understandable, as is funding bodies' eagerness to support its historical study. From a cultural-historical perspective, however, we advocate resisting the assumption of a strong correlation between epidemic outbreaks and public health watersheds, since positing such links sometimes risks reinforcing the stereotype of lethargic and ignorant "premodern" societies outside the context of crisis. This is for instance why even those public health historians willing to give earlier civilizations the benefit of the doubt when it comes to prevention, have tended to focus on people's responses to the Justinianic Plague or the Black Death, and rarely looked beyond cities' well-intentioned but ultimately "failed" attempts to block the spread of epidemic disease (Berridge 2016, 35). This, despite strong evidence for routine interventions outside the context of major disruptions such as famine, war or pandemics (Mordechai and Eisenberg 2019; Geltner 2020). To be sure, epidemics and other crises have on occasion left uniquely rich traces for otherwise poorly documented communities. However, and without dismissing the important insights of existing epidemiological studies, we propose to treat related finds as one among several indicators for where communities might have engaged in preventative action and scientific and moral reflection, and to avoid privileging disease outbreaks as a unique trigger or as a starting date for community prophylactics.

Moving from disease transmission to the spread of ideas about contagion and its prevention spotlights an important discrepancy between modern epidemiology and medical history. Intellectual historians tilling this field have sought to trace how networks of knowledge created and disseminated medical ideas, like friendly modern germs. From an emic, or culturally specific viewpoint, the subjectivity of this approach is more reliable as compared with the (ac)claimed objectivity of information furnished by (paleo)medical sciences. That is to say, the increasingly available biomedical proof for the existence of past pathogens or pathologies offers no guarantee that their impact was experienced or understood as disease, amounting to what some medical historians call, with a touch of disdain, retrospective diagnosis (Leven et al. 2004; Karenberg 2009). Moreover, when such studies, based on biomedical parameters alone, imply that past communities were hygienically apathetic or incompetent, they at least inadvertently engage in moral judgment, that

is they employ an etic perspective that historians generally seek to avoid. When, on the other hand, texts, structures, stories, landscapes and images left by members of past societies describe the health hazards they were facing, they place us on firmer historical and anthropological ground. That is certainly not to rule out using biomedical, statistical and other recent tools, if only to provide some form of cultural translation and a comparative framework for understanding past events. Yet in all matters an emic perspective, or more realistically its approximation, serves health historians better although it is often harder to hone.

### Methods

With these two insights in mind, we begin by exploring some of the main avenues for reconstructing preventative health interventions. There are four, partially overlapping categories of sources and related methods that we (and others) have found to be helpful or at least highly promising: texts and images; artifacts and material deposits, also manifesting as landscapes; intangible ethnographic data, including linguistics and oral history; and visualized, georeferenced data. What follows is a situational description and analysis of how we employed these in our own work as well as examples of how they (could) have been used for other historical contexts. As such, it provides a preliminary and decidedly non-prioritized list of possible sources, and the kind of information on group health each may yield, building on Rawcliffe's (2012) important survey yet expanding it in ways that could facilitate a comparative, transregional and, where possible, global application.

### Texts and images

Our work on urban healthscaping in Italy and the Low Countries has relied on evidence reflecting different scales. Broadly speaking, its aim has been to juxtapose information on preventative theories, policies and practices, and combine multispecies (mis)behavior and material aspects. These three levels often coincide within discrete sources, above all in administrative texts that attest efforts by various stakeholders to reduce harmful behaviors and remove physical and moral threats at the community level and for its benefit. Here, prescriptive records include law codes and continuously adapted and repeated ordinances. Such regulations were generally issued by princely and urban councils or group deliberations at various levels, and which occasionally express the desired health outcome of a planned intervention. This spectrum of

recorded ideals of physical and spiritual/moral order also emerges from documents of practice, as recorded for instance in court proceedings and financial accounts such as lists of fines for violating norms or expenses incurred for upholding them. The latter types of sources further elucidate the specific spaces, materials and species pertinent to local healthscaping practices, including construction materials, costs of repairs and fees paid to those involved in monitoring at-risk sites. In our experience, virtually every society with an extant legal repository (also when transmitted orally; see below) preserved some aspect of health- or safety-related issues it dealt with, although these certainly can be described in ethical, political or religious terms rather than strictly medical or biological ones.

A key link among many legal and prescriptive sources is their focus on enforcing preventative programs. For instance, the records generated by Italian roads officials (*viari*) between the thirteenth and fifteenth centuries, preserve many thousands of fines levied from health-related offenders (or their masters or owners), especially in or around urban infrastructures. Roads officials had their counterparts in different times and places, also beyond western Europe. Cleaners, supervisors, water and market inspectors, fire brigades and many types of public works builders labored alongside waste scavengers and dung collectors, workmen and sometimes women who were active inside and outside municipal service, permanently or ad hoc. They only rarely produced written sources of their own. Yet urban administrations throughout the southern Low Countries, for instance, documented their income and expenses. This sometimes allows for detailed reconstructions of infrastructural works and officials installed to enforce sanitary regulations, and thus offers insight into the spatial and material aspects of healthscaping.

Petitions by residents or institutions and conflicts among inhabitants, as documented for instance in court records and notarial registers, occasionally mitigate the bias of the sources in favor of governing elites. Such texts show how people used local law courts to solve disputes concerning stench, sewage and blockage by various types of refuse, and sought to formally arrange access to clean water, for instance from shared wells. In Latin American scholarship, for instance, Spanish Inquisitional records from the early colonial period give insight into the medical pluralism and continuities across pre/colonial boundaries (Gómez 2013; Few 2015; Zemon Davis 2016). Likewise, running water from rivers, canals or aqueducts provided a major resource for many artisanal

activities and means of disposing waste, and as such could be sources of new technologies, conflict and negotiation (Squatriti 2000; Conesa and Poirier 2019). Documents generated by religious or lay institutions offer their own perspective on promoting preventative healthcare. Key agents or loci included hospitals, confraternities, craft guilds, monasteries, royal, princely and papal courts, but also, for example, the waqf charitable funds established throughout the Islamic world (Sabra 2000; van Berkel 2017). These institutions are part of an even wider collective of agents that may not commonly be identified as types of legitimate “public” government. Nevertheless, they could assert their authority over numerous people and spaces, and facilitate services that purported to either protect or improve communal wellbeing, including mobile armies or even large trade caravans and fleets as well as pilgrims (Geltner 2019a; Phillips 2021). Incorporating records produced by these organizations, or in which they are described, and comparing them with urban administrative sources has the additional benefit of providing alternative perspectives on how rolling out preventative programs could be resisted and negotiated by different stakeholders converging on the same location.

Moving beyond political elites foregrounds the deep connections between communal health and religion or, broader still, moral codes. For instance, in the sites we study, religious orders were a strong presence. Nuns, friars, beguines and others used their financial means, political power and expert knowledge to practice their spiritual athleticism, but only in extreme cases at the cost of their physical wellbeing. Here and elsewhere, they provided themselves with healthcare services and hygienic facilities and sometimes distributed them to or shared them with others as a form of charity (Miller 1985; Salguero 2017). Likewise, bridges, wells and waterways built by monasteries and confraternities could be accessible to nearby dwellers, and serviced the local metabolic flows of larger areas (Arnold 2007; Rawcliffe 2010). Religious rituals (also documented in sermons, liturgical texts, saints’ lives, travel guides and chronicles) communicated ideas about the nexus of piety and spiritual health as a defence against moral miasmas. Processions on feast days, for instance, could serve an explicit prophylactic purpose, as they helped to calm divine wrath and dispel dangers such as epidemics and famines (Rawcliffe 2013).<sup>1</sup> Furthermore, religious communities acted as vectors for spreading hygienic knowledge in their capacity as in/formal educational institutions, from monasteries, to church schools to

universities (van Engen 2008; Marnef and van Bruaene 2018). In particular, the speed with which Galenic medicine traveled through religious networks attest how Latin Christendom appropriated Greek, Roman, Hebrew and Arabic medical teachings into their vision of a pious, honorable and orderly collective body (Rawcliffe 2010). Furthermore, lay and religious groups that shared cultural repertoires understood the moral messages expressed for instance in plays, songs and processions, where ideas about healthy communities were propagated (Marnef and van Bruaene 2018; van Bruaene 2008). In sum, religious didactic texts, images and performances preserve important information about the links between physical and spiritual wellbeing that structured a community.

In many literate societies, medical-scientific literature comprises a large range of related texts: medical tractates and compendia, regimens of health, physicians’ un/solicited opinions, but also letters, recipes, household books, educational texts for children and students, and even mining guides and military engineering and tactical manuals. Collectively these sources attest the presence of medical knowledge and the perception of health risks facing a certain community, at least among its literate members, whether or not this knowledge led directly to devising preventative programs. In Meso-American contexts, for example, explorations (and appropriation) of Nahua plant-based medicine have been among the very first texts produced by Spanish colonial encounters in the sixteenth century (Gómez-Dantés and Frenk 2020).

Researching artistic expressions in different media can further extend this line of inquiry, including through paintings, miniatures, poetry, plays, songs, and panegyrics (Weeda 2019). Contextualizing these sources and transitioning from the individual to the population level may be challenging at times, yet it can illuminate hygienic standards, domestic practices and employment of prophylactic knowledge in sanitary routines such as those used in courts, (elite) households, armies, mines and monasteries (Biow 2006; Morrison 2008; Strohm 2008; Bayless 2012; Baker, Nijdam, and van’t L and 2012; Storey and Cavallo 2013). Another key clue, at least within a pre-modern or Galenic paradigm (see also below), is that medical texts propagated the notion of health preservation as essentially an environmental endeavor. The quality of airs, waters, and places, to invoke a well-known Hippocratic treatise, and other external factors analyzed by the theory of the so-called six *res non-naturales*, determined how to manage spaces to

promote health. One well-known and widespread example comes from the Benedictine monastic rules for a strict, diverse and seasonal diet, a balanced daily routine and hygienic instructions applied to the convent as a unit. As both archaeological remains and documents such as account books attest, abiding monks and nuns put these prescriptions into practice supported by water infrastructures, medicinal gardens and a steady supply of nutritious foodstuffs (Harvey 1993; Gilchrist 2020).<sup>2</sup>

Chronicles and travel literature likewise offer distinct perspectives on group health, including by the external observers of various cultures, which are especially important for regions with either scarce material or different emphases in record-keeping. Narrative sources of these kinds often contain valuable types of information, such as mentions of plagues and diseases among both humans and livestock, deaths during environmental disasters such as floods, but also technological “wonders” or, in passing, references to quarantine practices, or the construction and destruction (in armed conflicts) of infrastructures important to public health, such as for water provision. Finally, and most crucially in Galenic-Hippocratic medical frameworks, such sources can include assessments of peoples or regions as particularly in/salubrious due to the qualities of their environment (Weeda 2021).

Scholars have also used chronicles to reconstruct environmental conditions and anomalies, sometimes comparing them with modern data that climatologists and earth scientists generated from tree rings, ice repositories and soils (Harvey 1981; Alexandre 1987; Alverson 2003, Bradley, and Pedersen 2003; Hoffmann 2014). However insightful such endeavors are, they leave much crucial information on the perception of how nature impacted the wellbeing of communities (Vyazov et al. 2019). For instance, as Trevor Dean (2011) argues, to many chroniclers and authors of travelogues prior to the seventeenth century, extreme weather, sudden increased mortalities and environmental disasters served as moral indicators: for sins committed, or a potential sign of adversity yet to come. Giving meaning to environmental or even cosmic events thus influenced writers’ perceptions of anomalies and their description of such events. Rather than juxtaposing premodern superstition with modern de-sacralisation, these sources can be integrated into studies on public health, as chroniclers developed a complex and context-related awareness of the impact of nature on the health of communities, and often integrated reflections on local responses to mitigate that impact.

Finally, a word on images. Pictorial sources cross over from the group described so far, as texts were often accompanied by illustrations or indeed focused on physical images and depictions, to the material artifacts discussed below, where artistic expression takes center-stage. Medical, architectural, agricultural and tactical manuals often make use of icons, schematic or “realistic” images of ill/health, balance, order and perfection, as do religious literature, chronicles and even the occasional administrative text. This is particularly true for medical regimen manuals, theoretical literature, herbals and the variety of *materia medica* (Opsomer 1991; Janick, Christine Daunay, and Paris 2010). So far as we are aware, however, no literature exists that systematically draws on such records as clues to earlier approaches to prophylactic care. The same holds for art-historical analyses of paintings, murals, maps, statues, prints and other images that may convey ideas and practices of community health, safety and wellbeing.

#### *Material artifacts, deposits and landscapes*

Written sources and images that capture preventative theory, policy and practice survive for many different societies and offer significant insights. However, this may not always be the case. Nor should written evidence be the privileged focus even for richly documented past societies, since they tend to have been produced for and by governing elites. Healthscaping impacted, and was in turn shaped by, the built and unbuilt environment, including physical infrastructures, and the ways in which a community perceived and used natural resources and interacted with different life forms. These processes can be studied through a wide range of physical remnants and their integration into spatial-analytical frameworks. For instance, building archaeology has provided crucial evidence for fighting the stereotypes of apathy toward and neglect of health among earlier civilizations. Artifacts attesting industrial zoning, complex water management and waste disposal are an obvious example. Traces of relevant technologies, from wells to aqueducts to pipe systems, shore up the strengths and shortcomings of written records. For instance, private wells and cisterns – but also cesspits – are often hard to trace in administrative sources from the Low Countries. However, abundant archaeological evidence suggests they played a key role in community health and were regularly shared between neighbors and managed on a sub-neighbourhood level, which also explains their absence from municipal sources.

What is more, local hydrology and topography could shape the focus of healthscaping activities within a certain community, a process that can be sometimes reconstructed by studying a historical landscape. For instance, the strength of a river's current, itself a product of geology and climate, and its potential to supply fresh water and hydraulic energy and flush refuse and other outpourings, helped determine the type of waste and water infrastructures that a community could support (Deligne 2003; Gläser 2004; Groenewoudt and Benders 2013; van Oosten 2015). Thus, even in the absence of visible, artificial remnants of healthscaping, it is possible to hypothesize how settlements were designed preventatively, and perhaps excavate accordingly. This could also consider prevalent wind direction as well as hydrology to examine the practice of industrial or spiritual/moral zoning, the separation of activities and communities thought to have adverse effects on a given population. Further, the architecture and decoration of, for instance, public wells and fountains reveal much about waterworks' symbolic, religious and political function. The construction of roads is another key area of archaeological interest, which across the world encompassed an intricate network of drains, ditches, pipes, gutters and paved surfaces meant to improve traversability for goods and animals coming into and out of population centers. Artifacts and infrastructures thus related closely to energy input and waste management, which in material terms could comprise anything from simple heaps, pits and pipes, to networks of sewage or large sophisticated cesspits – many of which left archaeological traces. These facilities were designed to promote domestic hygiene and industrial sanitation, yet the boundaries between the latter could be undermined by the organization of work and living spaces, which often took place in the same buildings, at least in many Western-European cities (Addyman 1989; van Oosten 2016; Sabbionesi 2019; Zaneri and Geltner 2022).

Beside forming crucial components in local chains of waste management, cesspits and other waste repositories contain important clues about inhabitants' diet and consumption patterns. They therefore provide some indication for the availability of food types, but also illuminate residents' cooking practices and socio-economic profile through discarded pottery and utensils (Matsui, M. Kanehara and M. Kanehara 2003; Anastasiou and Mitchell 2013; Yeh et al. 2014; Deforce 2017; Hald et al. 2018). Next, material testimonies of interventions in the built environment, meant for instance to prevent stagnant water or fire

movement, flush effluvia or promote air circulation between houses, can help validate or interrogate written sources. The same may hold for the non-built environment in cities' hinterlands, where evidence for land management, including water drainage and deforestation, shed further light on local efforts at sustainability, for instance through flood prevention, erosion control and controlled burning (Squatriti 1998; van Tielhof and van Dam 2006; Appuhn 2009; Gammage 2011; Campopiano 2013; Soens 2018). These are also spaces sporadically occupied by armies, pilgrims, trade caravans and periodic gatherings, and whose health and safety likely played some role in their selection and manipulation. Such groups may have in turn participated in transmitting such ideas to sedentary and other mobile communities.

Cemeteries and individual burial places too, in this regard, offer an important space for reconstructing prophylactic healthcare: from burial customs and ideas on the relations between spiritual cleanliness, morality and physical health risks, to practical prescriptions on how to manage relations between the living and dead bodies of different qualities (Roberts, Lee, and Bintliff 1989; Halsall 1997). While the latter issues have long been dealt with in ritual theory and the archaeological literature on burial, recent paleo-scientists have shown how skeletons convey information about the otherwise largely unrecorded presence and experiences of diseases, food scarcity and other health-related challenges such as air pollution among earlier communities (Panhuysen 2005; DeWitte 2016; Peterson-Gordina et al. 2018). In combination with such chemical analyses, anthropologically informed studies chart a fruitful path for reconstructing community care regimens and how these were designed to reduce (further) suffering from members who had to contend with lifelong illnesses (Tilley 2015).<sup>3</sup>

Furthermore, soil and pollen analysis generate data on the use and availability of foodstuffs and the interventions made to improve or expand that availability, such as by trade or changes in agriculture, which in turn responded to weather, war and climate fluctuations. This scale, then, can be compared to prescriptions in medical regimens of what a healthy household or group should or should not consume. Such comparisons may reveal class, gender or cultural biases or key discrepancies between theory and practice, especially in non-paroxysmal situations. Finally, zooarchaeological research can illuminate the use and interactions between human and non-human animals, including the impact humans had on the presence and development of various species, as well as how



they were treated, consumed and discarded (Newfield 2012; Seetah 2018). For some regions, these insights can be tied to documents on the use of local natural resources and issues of pollution, such as disputes on fishing or hunting. The insights from archaeological data have been incorporated in recent environmental histories, which have challenged a different stereotype, namely of the unpolluted, pristine natural and living environment before the Industrial Revolution, but can similarly be linked to the presence and impact of healthscaping (Poulussen 1987; Deligne 2003).

### *Ethnographic data*

For cultures that used few or no written documents, and/or those whose written and material records are very scarce today, linguistic information and oral traditions are instrumental for reconstructing traditional medical practices, including preventative healthcare. For instance, tracing words borrowed from intersecting cultures (“loan words”) that signify specific health practices or rituals across dialects reveals how such practices were appropriated and sustained by different groups (Schoenbrun 2006; Kodesh 2008). These insights in turn can be compared with outsider and later descriptions by foreign merchants, missionaries, travelers and colonizers, as well as examined for clues about shifting political hegemonies. For instance, Gloria Waite (1987) has demonstrated that, centuries prior to their conquest by European powers, the Bantu-speaking cultures of east-central Africa developed a complex medico-religious system that included several types of population-level preventative measures: the placation of ancestral spirits; the detection and control of sorcerers; the suspension of normal activities during times of crisis such as war, famine or epidemics; rainmaking; and sanitation control. In addition, Waite postulated the adoption or enforcement of these practices as an indication for the strength and weakness of certain alliances in the region as well as how control over them shifted to and from royalty and priesthood.

### *Digital tools and maps*

While public health historians have long consulted the array of sources falling under the categories discussed above, digital tools offer new opportunities for integrating and expanding knowledge about early healthscaping, including by connecting different scales. The availability of digitized manuscripts, archives and other source collections (maps, artifacts, etc.) varies widely across world regions, yet its expansion creates new possibilities for analyzing the occurrence and

spread of public health-related ideas and practices (van Dam 2020). Most importantly, however, and already widely used by contemporary public health professionals, are digital techniques of georeferencing data and mapping them in ways that reveal otherwise hidden correlations and discrepancies. Working within the context of Historical Geographic Information Systems (HiGIS) facilitates building robust databases and digesting large amounts of information that may appear tangential to fighting the spread of injury and disease, for instance paving and other infrastructural works (Musa et al. 2013; P. Galanaud, A. Galanaud and Giraudoux 2015; Coomans and Hermenault 2022). It also offers a means of visually gathering and representing multi-layered results in a single environment and allows for spatially grounded thinking and alternative ways of creating cross-sections between the outlined scales. For example, in the topographical place of the main market, likely a global phenomenon, physical-spatial features such as stalls, halls, water points and waste pits may have been excavated and can thus brought into dialogue with texts reflecting on zoning, food availability and events impacting it such as war, as well as data on diets from cesspits and skeletal remains. Mapping health-related nodal points may also uncover previously unnoticed or at least untested spatial and material correlations, for instance between social geography, polluting industrial activities and increased mortality rates, or else between hygienic interventions such as sinking a drainage system and the recalibration of environmental enforcement policies (Zaneri and Geltner 2022). Mapping therefore is a powerful tool for reconstructing the cultural, social and class biases of community healthscaping. On a more regional scale, mapping types of facilities and waste solutions help generate new hypotheses concerning the impact of topography and climate on healthscaping theory, policy and practice. As Roos van Oosten (2015) argues, for instance, diverging developments in cesspit use in the Low Countries between the fifteenth and seventeenth century can be explained by a combination of population density and ground types, with a notable discrepancy between coastal cities in Holland and more inland regions.

To conclude our brief survey: healthscaping constitutes any process meant to shape behaviors and environments to promote health at the community level. This broad definition of public or group health facilitates reconstructing its history well beyond its alleged birthplace in Euro-American modernity. Scholars seeking to trace such activities may consider the

significance of certain physical features of their object of study, with the advantage that these often survive even massive environmental degradation or can be reliably reconstructed. Data regarding a site's geography, geology, hydrology, topography and climate (in turn obtained variously through techniques such as soil and ice-core analysis, dendrochronology, aerial photography, etc.) improve an understanding of the physical circumstances in which people lived. However, it is important not to privilege objective information gathered by present-day techniques over records pertaining to its culturally subjective experience. For instance, a historian may have access to a community's nutritional data, as yielded by the analysis of a cesspit's contents and additional paleopathological indicators. If possible, this information should be set against the specific cultural and medical dietary prescriptions and customs of that community, rather than be evaluated only in terms of modern nutritional science. To offer another example, as paleo-pathologists are right to stress, many (infectious) diseases do not leave decisive skeletal traces, which means that the prevalence of a modern disease's indicators in ancient bones or teeth does not necessarily mean it was experienced as such (or at all) by its carriers (Roberts and Manchester 2010). Health historians therefore may benefit from linking subjective descriptions of ill health with pathologies they encounter underground rather than make claims about a community's health solely based on modern biomedical parameters.

Locating healthscaping spatially likewise offers major advantages. The analysis of space as a tool linking the particular to wider processes provides a fruitful way to explore the different manifestations and evidential forms of healthscaping and shores up sometimes invisible connections between seemingly disparate processes. It also helps to frame analyses of power in terms of tactics and strategies that are not inherently ascribed to a dichotomy between political underclass and hegemonic elites (Scott 1985; De Certeau 1988). Actor-Network Theory (ANT) can serve as a further interpretative framework to push against an assumed political center and periphery and traditional foci of hierarchies of agency (Latour 2007). Material artifacts and physical systems, including waste disposal and drainage, were not the passive and stable foundation of social and political negotiations, but a dynamic, unpredictable and impactful part of them. A multiscale approach therefore allows to connect routine policies, practices and their objects, and ANT helps to map their complex interplay.

Finally, other than certain biological and material deposits, most human remnants straddle a traditional divide between prescriptive and descriptive sources. That is, they may indicate actual as well as desired behaviors, lived as well as ideal experiences. For instance, alongside the nutritional data to be collected from skeletal remains, the location, orientation and position of a body at a formal burial makes claims about the person's and society's piety and cosmology. The point may seem obvious most historians, but it is worth stating to avoid presenting a research agenda based on a false epistemological premise.

### Provincializing Europe

Societies developed preventative programs, almost by definition, wherever humans gathered in groups that sought to support and extend life and gain some control over their environments, be it spiritual, mental or material, which was often the *raison d'être* of such gatherings in the first place. The inclusive methodology we propose seeks to help buttress this claim, which historians, archaeologists, religious studies scholars and others interested in health in premodern Europe and the pre- or non-colonial world have struggled to mainstream. The challenge stems in part from a lingering contention that public health history began with modernity, conventionally defined, or restricted itself to western European cities and in response to the population growth and environmental degradation of the Industrial Revolution. There is ample support for revising the standard chronology and geography behind these claims, but at the same time, we cannot ignore the path we ourselves have traveled by, working comparatively within western Europe's most urbanized regions. It is on this basis that we deliberately, if tentatively, constructed our methodology. Grounded in our own research, including through digital analytical methods, and aided by a broad reading of secondary sources, excavation reports and some primary sources in translation hailing from other regions, we are strongly convinced that public, community or group hygiene is far more than an original European "export product." Yet in doing so we run at least one new risk of perpetrating epistemic violence. For, how do we "provincialize Europe," to follow Dipesh Chakrabarty's call, when it comes to public health in earlier eras? How do we hone emic or authentic local perspectives across the globe, not only for its own sake, but also in order to illuminate transregional and cross-cultural exchanges, in this case of prophylactic knowledge and practice,

without imposing a Eurocentric perspective and flattening the landscape unduly (Polanco 2019; Mundy 2021)?

Fostering an approach with a nuanced global applicability requires a two-fold intervention. First, it means adopting a wide definition of healthscaping that stresses contingency and power indeterminacy, including the role played by nonhuman animals and matter itself, as explored in Actor-Network Theory and in studies of animals in premodernity (Fariás and Bender 2012; Müller 2015; Taylor 2018). This serves to create significant room for detecting preventative interventions beyond those privileged by a traditional approach and a Euro-American epistemology. Such a shift may foreground the quotidian, ritualistic and material-infrastructure (including landscapes) over episodes of crisis, be they war, epidemics or famine. This redefinition has already made it possible to analyze practices of preserving group health in novel ways and created new tools for comparative work. For example, in the eyes of ancient Greeks and Romans, as well as among numerous Islamic and Christian communities in Byzantium, the Eastern Mediterranean and western Europe, the prophylactic potential of pious works such as religious processions and donating and maintaining both civic and religious sites, dovetailed with pragmatic responses to health risks such as water shortage and air pollution. Indeed, the physical and spiritual were two components that merged seamlessly for some societies in their pursuit of community wellbeing (Ibn Ridwān, Dols and Jamāl 1984; Horden 2008; Stearns 2011). To separate these two aspects and dub one – the pragmatic – as scientific, modern or forward-looking, and the spiritual other as archaic and failed, undermines a historical understanding of communal health.<sup>4</sup>

### **Galenism as a Eurasian framework**

While the proposed approach lends itself to developing different case studies and broad comparisons in the future, its relevance already emerges from an exploratory glance at the medical paradigm of Galenism (also known as humoralism or Hippocratic medicine), prevalent for millennia across Europe, Byzantium and the vast Islamic world, stretching from Iberia to India. Galenism's wide scope and influence illustrates the benefit of identifying links in perceptions of health and preventative practices across cultures (García-Ballester et al. 2002; Jouanna 2012). Galenism defined individual health as a state of humoral balance. Yet that equilibrium had to be

sustained within a dynamic and intertwined physical, social and spiritual environment as well. Health in Galenic cultures, that is civilizations where humoralism operated as a major medical paradigm, was thus seen as a relative and relational state of being and as such always in the making, both at the individual and group level. There was no fixed point from which the health of a person, let alone a community, could be established. We would therefore argue, along with Joel Kaye (2014), that health among Galenic cultures is best understood, not in terms of a static state of equilibrium, e.g., between the four humors of a body, but rather as a complex and dynamic systems balance with the extra-bodily world. This ongoing negotiation is what Christian scholars termed *aequalitas* or even *pax*, in the sense of a positive state of tranquility, Muslim physicians named *تـاـلـا* (i'tidal); and Jewish thinkers referred to as *שווי* (shiwuy) or *מיצוץ* (mitsu'a). Inca medicine likewise put much emphasis on notions of balance and harmony, viewing illness as linked with immorality, and therefore healing with morally redemptive efforts (Guerra 1966; Mendoza 2003).

As already mentioned, Galenic ideas about etiology and practices of disease prevention and harm reduction existed far beyond western Europe, and well before the proliferation of cities there, which offers an already solid basis for proposing alternative geographies and chronologies of public health history. Indeed, crucial to our overall argument is the well-established fact that Galenism originated outside western Europe and continued to inform its neighbors in the Byzantine Empire and throughout the Islamic world for nearly two millennia, including in central Asia and the Indian Peninsula, centuries prior to the translation of medical works into Latin. To offer but one example: the religious office of the Islamic market inspector (*muhtasib*), designed to promote good morals on the khalif's behalf, deliberately enforced health-related policies as part of its mission. Among others, the muhtasib ensured that public retail spaces were kept accessible, safe and clean, that goods flowed smoothly into the city and sold at the right price, that artisans worked safely, and that local physicians were present and well trained. A full survey of market inspectors across the Islamic world remains a desideratum, but as a staple office dating to at least the ninth century, it presents one major vector for the transmission of preventative ideas and practices grounded in Galenic medicine (Glick 1992; Al-Shayzari 1999; Ghabin 2009).

From a health perspective, therefore, “the Galenic era” or “the Galenic World” and their successors is a

far more adequate analytical framework for European, Mediterranean, Middle Eastern and Central- and Southeast Asian history than customary divisions into ancient, medieval and modern periods. Nor was this era, from a preventative-health perspective, a stagnant one, as implied by a common division of the history of health and the environment into three eras, one of which stretching from Ancient Greece to the 1890s (Berridge and Gorsky 2012). What is more, the humoral or elemental balance at the heart of the Galenic paradigm has parallels in other cultures as well, lending itself to further comparative analysis. To clarify, Ayurveda, Shinto and other natural-philosophical traditions informing medical cultures in Asia and elsewhere are by no means another form of Galenism. Yet their common approach to individual and communal health as the product of moral and physical systems or indeed a cosmos, creates much scope for studying these medical cultures side by side, including their impact on community prophylactics. It may furthermore be possible to trace exchange and influence among them via religious, commercial and military interaction (Yoeli-Tlalim 2010, 2019; Akasoy, Burnett, and Yoeli-Tlalim 2010).

### **Rural and mobile communities**

A careful global turn in early public health history would also benefit immensely from leaving city walls behind. Itinerant groups that spent many days outside cities, not to mention sedentary agricultural laborers, were majority populations across the world until quite recently. They have admittedly left far fewer written documents behind (with the exception, in Europe, of rural monasteries), but their preventative programs can sometimes be reconstructed through archaeological evidence, environmental data, elite observers' impressions (including art), law codes and medical guides, fiscal and court records and the occasional ego document. One striking but under-researched example are miners. Mining communities worked and resided predominantly in the countryside, and thanks to their combined economic importance and physical impact have often left rich traces behind. Since mines are ubiquitous sites, well beyond Europe, their records (or those kept about them by their owners) allow us to observe what specific dangers miners faced above and below the ground and how they managed their environments to address these threats. Air shortage, risk of flood, collapsing rock and sudden darkness, for instance, were recognized as major hazards and dealt with through

elaborate programs of ventilation, drainage, timber support, mobile lamps, guiding ropes and protective gear. Furthermore, smelting and other metallurgical processes above the ground, where miners and their families often lived, caused what contemporaries too saw as pollution, and were handled among others by careful zoning and waste disposal practices grounded in local topographies and hydrology (Geltner and Weeda 2021; Geltner 2021). Most of the evidence for these preventative programs currently comes from across Europe, but it is plausible, given the similarity in technologies and locations, that future studies for additional areas are possible. Indeed, given well-attested resource extraction across Africa, India and Latin America, tracing healthscaping among miners in these regions may provide a unique view of local theory and practice.

Compared with the relatively obscure if sedentary miners, other non-urban groups promoted health and fought disease on the move, generating abundant records. Armies, navies, courts, merchants and pilgrims, for instance, were vulnerable itinerant communities that straddled the urban-rural divide and have accordingly developed preventative practices suitable for changing environments and limited transportation capacity. Ample sources, both written and material, demonstrate that these groups thought long and hard about the best times and manner of embarking on their journeys; where to situate and how to zone their camps; ensuring access to provisions on land and sea according to the traveling population, climactic zone and season; and what kind of medicine and medical knowledge to carry with them, and in what form. Military manuals, pilgrims' guides, (portable) medical almanacs, ego documents, letters and chronicles illuminate some of these communities' deeper prophylactic pasts, while skeletal, environmental and other material remains furnish sometimes additional and sometimes unique data on relevant groups and sites (Geltner 2019a). These groups, too, are hardly singular to Europe, and tracing their prophylactic programs may establish additional bridgeheads for cross-cultural studies grounded in local documents of practice. Whatever their assemblage of documented communities, different cultures and world regions can be studied from a preventative health perspective.

### **Conclusion**

In recent decades, the notion that public health is an exclusively modern Euro-American achievement, subsequently exported or imposed upon other populations

with varying degrees of “success,” has been thoroughly revised, mostly by historians of western European cities. This state of affairs lends itself to promoting a global turn in the history of communal health in pre- or non-industrialized societies. It may seek to investigate healthscaping practices outside the context of colonial and imperial stagism and stimulate transregional research, including the transmission and appropriation of preventative theory in relation to local policies and practices. Both goals are realizable by pursuing a multi-disciplinary methodology, a blueprint for which this article has sketched. It stresses that a successful turn toward a more inclusive, diverse and potentially interconnected global history of health relies on fostering a conversation between different disciplines and methods. Developing a multiscale approach also resonates with an environmental and behavioral turn in contemporary public health studies, namely away from a narrow focus on epidemiology and (access to) biomedical care, and toward more participatory, emic-cultural understandings of community health and wellbeing.

While the approach proposed here is by no means exhaustive, it is already clear that no individual researcher would be able to cover even a fraction of the possible evidential basis for a given region. And that is precisely why turning healthscaping into a global and comparative endeavor requires sustained cooperation. A convincing, granular but uneven picture has begun to emerge of how some past societies tried to ensure that cities were places where health could bloom. That much of this historiography concerns western European cities and highly urbanized regions is certainly no accident; but it should not serve as an indication of one region’s civilizational forte, let alone buttress any claim of a normative imperative when it came to healthscaping. Even within western Europe cities display different ideas and practices reflecting the resources at their disposal, socio-economic relations, micro-climate, geological profile and so forth. And just as historians would be wise to avoid judging these cities’ achievements by the yardsticks of biomedicine, including engaging in retrodiagnoses, so should they jettison the same type of stagism from studies of urban healthscaping elsewhere. Instead, carefully and critically building on existing methodologies, and engaging more deliberately with the comparisons and interdisciplinary research outlined above, historians can trace local paths, one city, community and region at a time. In doing so they would be making a major step to comparing public-health vernaculars across regions and around the world.

## Notes

1. We have not explored the possible role of charms, amulets and invocations in this context, but they can certainly be relevant sources.
2. B. Harvey, *Living and dying in England, 1100-1540: The monastic experience* (Oxford: Clarendon Press, 1993); R. Gilchrist, *Sacred heritage: Monastic archaeology, identities, beliefs* (Cambridge: Cambridge University Press, 2020), pp. 71-109. See also L.A. Gregorika and S. Guise Sheridan, “Ascetic or affluent? Byzantine diet at the monastic community of St. Stephen’s, Jerusalem from stable carbon and nitrogen isotopes,” *Journal of Anthropological Archaeology*, 32 (2013), 63–73; L. Kanckle et al., “From field to fish: Tracking changes in diet on entry to two medieval friaries in northern England,” *Journal of Archaeological Science: Reports*, 22 (2018), 264–84.
3. And see the dedicated website: <http://www.indexofcare.org/About.aspx>.
4. For instance, C. Arcini et al., “Living conditions in times of plague,” in P. Lagerås, ed, *Environment, society and the Black Death: An interdisciplinary approach to the late-medieval crisis in Sweden* (Oxford and Philadelphia: Oxbow, 2016), p. 131, lament that responses to plague in Sweden, as compared with Italy, tended to focus “merely” on religious observance and left preventative practices as regards burials, for instance, unchanged and thus lethal.

## Acknowledgments

The authors gratefully acknowledge the essay’s critical discussion by Lola Digard, Léa Hermenault, Claire Weeda, Taylor Zaneri and the journal’s anonymous reviewers.

## Disclosure statement

There are no competing interests to declare.

## Funding

This research was funded by the European Research Council, Grant no. 724114. Project title: Healthscaping Urban Europe: Biopower, Space and Society, 1200–1500.

## ORCID

G. Geltner  <http://orcid.org/0000-0001-7827-1298>  
J. Coomans  <http://orcid.org/0000-0002-1224-7866>

## References

- Addyman, P. V. 1989. The archaeology of public health at York, England. *World Archaeology* 21 (2):244–64. doi: 10.1080/00438243.1989.9980104.
- Agresta, A. 2020. From purification to protection: Plague responses in late medieval Valencia. *Speculum* 95 (2): 371–95. doi: 10.1086/707682.

- Akasoy, A., C. Burnett and R. Yoeli-Tlalim, eds. 2010. *Islam and Tibet: Interactions along the Musk Routes*. London: Ashgate.
- Alexandre, P. 1987. *Pierre Alexandre, Le climat en Europe au Moyen Age. Contribution à l'histoire des variations climatiques de 1000 à 1425, d'après les sources narratives de l'Europe occidentale* [The climate in Europe in the Middle Ages. Contribution to the history of climatic variations from 1000 to 1425, according to narrative sources from Western Europe]. Paris: École des hautes études en sciences sociales.
- Ali, A., and David L. K. 2015. Disease Prevention and Health Promotion: How Integrative Medicine Fits. *American Journal of Preventive Medicine* 49(5): Supplement 3: S230–40. <https://doi.org/10.1016/j.amepre.2015.07.019>.
- Al-Shayzari, A. R. 1999. *The book of the Islamic market inspector* [Nihāyat al-Rutba fī Talab al Hisba (The utmost authority in the pursuit of Hisba)]. Trans. R. P. Buckley. Oxford: Oxford University Press.
- Alverson, K. D., R. S. Bradley, and T. F. Pedersen. 2003. *Paleo climate, global change, and the future*. Berlin: Springer.
- Amrith, S. S. 2006. *Decolonizing international health: India and Southeast Asia, 1930-1965*. Houndmills: Palgrave Macmillan.
- Anastasiou, E., and P. D. Mitchell. 2013. Human intestinal parasites from a latrine in the 12th century Frankish castle of Saranda Kolones in Cyprus. *International Journal of Paleopathology* 3 (3):218–23. doi: [10.1016/j.ijpp.2013.04.003](https://doi.org/10.1016/j.ijpp.2013.04.003).
- Appuhn, K. 2009. *A forest on the sea: Environmental expertise in Renaissance Venice*. Baltimore: The John Hopkins University Press.
- Arcini, C., D. Price, M. Cinthio, and L. Drenzel. 2016. Living conditions in times of plague. In *Environment, society and the Black Death: An interdisciplinary approach to the late-medieval crisis in Sweden*, ed. P. Lagerås, 104–40. Oxford: Oxbow.
- Armus, D., and P. F. Gómez. 2021. *The Gray Zones of Medicine: Healers and History in Latin America*. Pittsburgh: University of Pittsburgh Press.
- Arnold, D. 1993. *Colonizing the body: State medicine and epidemic disease in nineteenth-century India*. Berkeley: University of California Press.
- Arnold, E. F. 2007. Engineering miracles: Water control, conversion and the creation of a religious landscape in the medieval Ardennes. *Environment and History* 13 (4): 477–502. doi: [10.3197/096734007X243177](https://doi.org/10.3197/096734007X243177).
- Baker, P. A., H. Nijdam, and K. van 't Land, eds. 2012. *Medicine and space: Body, surroundings and borders in Antiquity and the middle Ages*. Leiden: Brill.
- Basberg Neumann, C., and I. B. Neumann. 2018. *Power, culture and situated research methodology: Autobiography, field, text*. London: Palgrave Macmillan.
- Bayless, M. 2012. *Sin and filth in medieval culture: The devil in the Latrine*. New York: Routledge.
- Berridge, V. 2016. *Public health: A very short introduction*. Oxford: Oxford University Press.
- Berridge, V., and M. Gorsky, eds. 2012. *Environment, health and history*. London: Palgrave Macmillan.
- Bhattacharya, S. 2018. Global and local histories of medicine: Interpretative challenges and future possibilities. In *A global history of medicine*, ed. M. Jackson, 243–62. Oxford: Oxford University Press.
- Biow, D. 2006. *The culture of cleanliness in Renaissance Italy*. Ithaca: Cornell University Press.
- Campopiano, M. 2013. Rural communities, land clearance and water management in the Po Valley in the central and late Middle Ages. *Journal of Medieval History* 39 (4): 377–93. doi: [10.1080/03044181.2013.834644](https://doi.org/10.1080/03044181.2013.834644).
- Chakrabarty, D. 2000. *Provincializing Europe: Postcolonial thought and historical difference*. Princeton: Princeton University Press.
- Conesa, M., and N. Poirier, eds. 2019. *Fumiers ! ordures ! gestion et usage des déchets dans les campagnes de l'occident médiéval et moderne*. Toulouse: Presses universitaires du Midi.
- Coomans, J. 2021. *Community, urban health and environment in the late medieval Low Countries*. Cambridge: Cambridge University Press.
- Coomans, J., and L. Hermenault. 2022. An economy of movement: Public works and spatial strategies in late medieval Ghent. *Journal of Urban History*.
- Cornet, A. 2011. *Politiques de santé et contrôle social au Rwanda (1920-1940)*. Paris: Éditions Karthala.
- Crook, T. 2016. *Governing systems: Modernity and the making of public health in England, 1830–1910*. Berkeley: University of California Press.
- Davis, K. 2008. *Periodization and sovereignty: How ideas of feudalism and secularization govern the politics of time*. Philadelphia: University of Pennsylvania Press.
- Davis, K. 2018. From periodization to the autoimmune secular state. *Griffith Law Review* 27 (4):411–25. doi: [10.1080/10383441.2018.1669266](https://doi.org/10.1080/10383441.2018.1669266).
- De Certeau, M. 1988. *The practice of everyday life*. Trans. S. F. Rendall. Berkeley: University of California Press.
- Dean, T. 2011. Natural encounters: Climate, weather and the Italian Renaissance. *European Review of History: Revue Européenne D'histoire* 18 (4):545–61. doi: [10.1080/13507486.2011.590186](https://doi.org/10.1080/13507486.2011.590186).
- Deforce, K. 2017. The interpretation of pollen assemblages from medieval and post-medieval cesspits: New results from northern Belgium. *Quaternary International* 460: 124–34. doi: [10.1016/j.quaint.2016.02.028](https://doi.org/10.1016/j.quaint.2016.02.028).
- Deligne, C. 2003. *Bruxelles et sa rivière: genèse d'un territoire urbain (12e-18e siècle)* [Brussels and its river: Genesis of an urban territory (12th-18th century)]. Turnhout: Brepols.
- DeWitte, S. N. 2016. The anthropology of plague: Insights from bioarcheological analyses of epidemic cemeteries. *The Medieval Globe* 1 (1):97–123. doi: [10.17302/TMG.1-1.5](https://doi.org/10.17302/TMG.1-1.5).
- Fariás, I., and T. Bender. 2012. *Urban assemblages: How Actor-Network Theory changes urban studies*. London: Routledge.
- Farley, T., and D. Cohen. 2005. *Prescription for a healthy nation: A new approach to improving our lives by fixing our everyday world*. Boston: Beacon Press.
- Fay, I. 2015. *Health and the city: Disease, environment and government in Norwich, 1200-1575*. Woodbridge: York Medieval Press.

- Few, M. 2015. *For all of humanity: Mesoamerican and colonial medicine in Enlightenment Guatemala*. Tucson, University of Arizona Press.
- Galanaud, P., A. Galanaud, and P. Giraudoux. 2015. Historical epidemics cartography generated by spatial analysis: Mapping the heterogeneity of three medieval “plagues” in Dijon. *PLoS One* 10 (12):e0143866. doi: 10.1371/journal.pone.0143866.
- Gammage, B. 2011. *The biggest estate on earth: How Aborigines made Australia*. Crows Nest, NSW: Allen & Unwin.
- García-Ballester, L., J. Arrizabalaga, M. Cabré, and L. Cifuentes, eds. 2002. *Galen and Galenism: Theory and medical practice from antiquity to the European Renaissance*. Burlington: Ashgate.
- Geltner, G. 2013. Healthscaping a medieval city: Lucca’s Curia Viarum and the future of public health history. *Urban History* 40 (3):395–415. doi: 10.1017/S0963926813000321.
- Geltner, G. 2019a. In the camp and on the march: Military manuals as sources for studying premodern public health. *Medical History* 63 (1):44–60. doi: 10.1017/mdh.2018.62.
- Geltner, G. 2019b. *Roads to health: Infrastructure and urban wellbeing in later medieval Italy*. Philadelphia: University of Pennsylvania Press.
- Geltner, G. 2020. The path to Pistoia: Urban hygiene before the Black Death. *Past & Present* 246 (1):3–33. doi: 10.1093/pastj/gtz028.
- Geltner, G. 2021. Kinetic health: Ecologies and mobilities of prevention in Europe, c. 1100–1600. *Mobilities* 16 (4): 553–68. doi: 10.1080/17450101.2021.1886572.
- Geltner, G., and C. Weeda. 2021. Underground and over the sea: More community prophylactics in Europe, 1100–1600. *Journal of the History of Medicine and Allied Sciences* 76 (2):123–46. doi: 10.1093/jhmas/jrab001.
- Ghabin, A. 2009. *Hisba, arts and craft in Islam*. Wiesbaden: Harrassowitz Verlag.
- Gilchrist, R. 2020. *Sacred heritage: Monastic archaeology, identities, beliefs*. Cambridge: Cambridge University Press.
- Gläser, M. ed. 2004. *Lübecker Kolloquium zur Stadtarchäologie im Hanseraum IV: die Infrastruktur [Lübeck Colloquium on Urban Archaeology in Hanseatic Area IV: Infrastructure]*. Lübeck: Schmidt-Römhild.
- Glick, T. F. 1992. New perspectives on the Hisba and its Hispanic derivatives. *Al-Qantara* 13:475–89.
- Gómez, P. F. 2013. The circulation of bodily knowledge in the seventeenth-century Black Spanish Caribbean. *Social History of Medicine* 26:383–402. doi: 10.1093/shm/hkt014.
- Gómez-Dantés, O., and J. Frenk. 2020. La atención a la salud en Mesoamérica antes y después de 1519 [Health Care in Mesoamerica before and after 1519]. *Salud Pública de México* 62 (1):114–7. doi: 10.21149/10996.
- Green, M. H. 2020. The four Black Deaths. *The American Historical Review* 125 (5):1601–31. doi: 10.1093/ahr/rhaa511.
- Gregoricka, L. A., and S. G. Sheridan. 2013. Ascetic or affluent? Byzantine diet at the monastic community of St. Stephen’s, Jerusalem from stable carbon and nitrogen isotopes. *Journal of Anthropological Archaeology* 32 (1): 63–73. doi: 10.1016/j.jaa.2012.10.002.
- Groenewoudt, B., and J. Benders. 2013. Private and shared water facilities in rural settlements and small towns. Archaeological and historical evidence from the Netherlands from the medieval and post-medieval periods. In *Hierarchies in rural settlements*, ed. J. Klapste, 245–62. Turnhout: Brepols.
- Guerra, F. 1964. Maya medicine. *Medical History* 8:31–43.
- Guerra, F. 1966. Aztec medicine. *Medical History* 10 (4): 315–38.
- Hald, M. M., J. Mosekilde, B. Magnussen, M. Jensen Søe, C. Haarby Hansen, and M. Fischer Mortensen. 2018. Tales from the barrels: Results from a multi-proxy analysis of a latrine from Renaissance Copenhagen. *Journal of Archaeological Science: Reports* 20:602–10.
- Halsall, G. 1997. *Early medieval cemeteries: An introduction to burial archaeology in the post-Roman West*. Glasgow: Cruithne Press.
- Harvey, B. 1993. *Living and dying in England, 1100–1540: The monastic experience*. Oxford: Clarendon Press.
- Harvey, H. R. 1981. Public health in Aztec society. *Bulletin of the New York Academy of Medicine* 57 (2):157–65.
- Headrick, D. 1981. *Tools of empire: Technology and European imperialism in the nineteenth century*. Oxford: Oxford University Press.
- Ho, E. 2017. Inter Asian concepts for mobile societies. *The Journal of Asian Studies* 76 (4):907–28. doi: 10.1017/S0021911817000900.
- Hoffmann, R. 2014. *An environmental history of medieval Europe*. New York: Cambridge University Press.
- Holmes, C., and N. Standen. 2018. Introduction: Towards a global middle ages. *Past & present* 238:1–44.
- Horden, P. 2008. *Hospitals and healing from antiquity to the later Middle Ages*. Aldershot: Ashgate.
- Ibn Ridwān, A., W. D., Michael and S. J. ‘Adil. 1984. *Medieval Islamic medicine: Ibn Ridwān’s treatise on the prevention of bodily ills in Egypt*. Berkeley: University of California Press.
- Janick, J., M. Christine Daunay, and H. Paris. 2010. Horticulture and health in the Middle Ages: Images from the Tacuinum Sanitatis. *Horticultural Science* 45:1592–6.
- Jørgensen, D. 2008. Cooperative sanitation: Managing streets and gutters in late medieval England and Scandinavia. *Technology and Culture* 49 (3):547–67.
- Jouanna, J. 2012. Air, miasma and contagion in the time of Hippocrates and the survival of miasmas in Post-Hippocratic medicine (Rufus of Ephesus, Galen and Palladius). In *Greek medicine from Hippocrates to Galen*, ed. P. van der Eijk. 121–36. Leiden: Brill.
- Kanckle, L., J. Montgomery, D. R. Gröcke, and A. Caffella. 2018. From field to fish: Tracking changes in diet on entry to two medieval friaries in northern England. *Journal of Archaeological Science: Reports* 22:264–84.
- Karenberg, A. 2009. Retrospective diagnosis: Use and abuse in medical historiography. *Prague Medical Report* 110 (2): 140–5.
- Kaye, J. 2014. *A history of balance, 1250–1375: The emergence of a new model of equilibrium and its impact on thought*. Cambridge: Cambridge University Press.
- Kinzelbach, A. 2006. Infection, contagion, and public health in late medieval and early modern German imperial towns. *Journal of the History of Medicine and Allied Sciences* 61 (3):369–89. doi: 10.1093/jhmas/jrj046.

- Kodesh, N. 2008. Networks of knowledge: Clanship and collective well-being in Buganda. *The Journal of African History* 49 (2):197–216. doi: [10.1017/S0021853708003629](https://doi.org/10.1017/S0021853708003629).
- Latour, B. 2007. *Reassembling the social: An introduction to Actor-Network-Theory*. Oxford: Oxford University Press.
- Leven, K.-H., et al. 2004. At times these ancient facts seem to lie before me like a patient on a hospital bed”—Retrospective diagnosis and ancient medical history. In *Magic and rationality in ancient Near Eastern and Graeco-Roman medicine*, ed. H. F. J. Horstmanshoff, 369–86. Leiden: Brill.
- Little, L. K. 2011. Plague historians in lab coats. *Past & Present* 213 (1):267–90.
- Marnef, G., and A. L. van Bruaene. 2018. Civic religion: Community, identity and religious transformation. In *City and society in the Low Countries, 1100–1600*, ed. M. Boone 131–49. Cambridge: Cambridge University Press.
- Matsui, A., M. Kanehara, and M. Kanehara. 2003. Palaeoparasitology in Japan: Discovery of toilet features. *Memórias Do Instituto Oswaldo Cruz* 98 (suppl 1): 127–36. doi: [10.1590/S0074-02762003000900019](https://doi.org/10.1590/S0074-02762003000900019).
- Mendoza, R. G. 2003. Lords of the medicine bag: Medical science and traditional practice in ancient Peru and South America. In *Medicine across cultures: History and practice of medicine in non-Western cultures*, ed. H. Selin, 225–57. Dordrecht: Springer. doi: [10.1007/0-306-48094-8\\_12](https://doi.org/10.1007/0-306-48094-8_12).
- Miller, T. S. 1985. *The birth of the hospital in the Byzantine Empire*. Baltimore: Johns Hopkins University Press.
- Mordechai, L., and M. Eisenberg. 2019. Rejecting catastrophe: The case of the Justinianic Plague. *Past & Present* 244 (1):3–50. doi: [10.1093/pastj/gtz009](https://doi.org/10.1093/pastj/gtz009).
- Morrison, S. S. 2008. *Excrement in the late Middle Ages: Aacred filth and Chaucer's fecopoetics*. New York: Palgrave Macmillan.
- Müller, M. 2015. Assemblages and actor-networks: Rethinking socio-material power, politics and space. *Geography Compass* 9 (1):27–41. doi: [10.1111/gec3.12192](https://doi.org/10.1111/gec3.12192).
- Mundy, B. E. 2021. No longer home: The smellscape of Mexico City, 1500–1600. *Ethnohistory* 68 (1):77–101. doi: [10.1215/00141801-8702360](https://doi.org/10.1215/00141801-8702360).
- Musa, G. J., P.-H. Chiang, T. Sylk, R. Bavley, W. Keating, B. Lakew, H.-C. Tsou, and C. W. Hoven. 2013. Using GIS as a public health tool—From cholera to cancer. *Health Services Insights* 6:111–6.
- Newfield, T. P. 2012. Epizootics and the consumption of diseased meat in the Middle Ages. In *Religione e istituzioni religiose nell'economia europea, 1000-1800* [Religion and religious institutions in the European economy, 1000-1800], ed. F. Ammannati, 619–39. Florence: Firenze University Press.
- Opsomer, C. 1991. *L'art de vivre en santé. Images et recettes du moyen âge. Le Tacuinum Sanitatis (manuscrit 1041) de la Bibliothèque de l'Université de Liège* [The art of healthy living. Images and recipes from the Middle Ages. The Tacuinum Sanitatis (manuscript 1041) from the Library of the University of Liège]. Liège: Éditions Du Perron.
- Ortiz de Montellano, B. 1990. *Aztec medicine, health, and nutrition*. New Brunswick: Rutgers University Press.
- Panhuysen, R. 2005. *Demography and health in early medieval Maastricht: Prosopographical observations on two cemeteries*. Amersfoort: Anthro.
- Petersone-Gordina, E., C. Roberts, A. R. Millard, J. Montgomery, and G. Gerhards. 2018. Dental disease and dietary isotopes of individuals from St Gertrude church cemetery, Riga, Latvia. *PLoS One* 13 (1):e0191757.
- Phillips, J. 2021. Who cared? Locating caregivers in chronicles of the 12th and 13th-century crusades. *Social History of Medicine* 34 (2):489–508. doi: [10.1093/shm/hkz100](https://doi.org/10.1093/shm/hkz100).
- Polanco, E. 2019. Tiçiyotl and Tiçih: Late postclassic and early colonial Nahua healing, diagnosis, and prognosis. Oxford Research Encyclopaedia of Latin American History, October 30. Accessed April 14, 2021. <https://doi.org/10.1093/acrefore/9780199366439.013.792>
- Porter, D. 1999. *Health, Civilization and the State: A History of Public Health from Ancient to Modern Times*. London: Routledge.
- Poulussen, P. 1987. *Van burenlust tot milieuhinder: het stedelijk leefmilieu 1500-1800* [From neighbors to environmental nuisance: The urban environment 1500-1800]. Kapellen: DNB/Pelckmans.
- Rawcliffe, C. 2010. The concept of health in late medieval society. In *Le interazioni fra economia e ambiente biologico nell'Europa preindustriale secc. XIII-XVIII* [The interactions between economy and the biological environment in pre-industrial Europe XIII-XVIII], ed. S. Cavaciocchi, 317–34. Florence: Firenze University Press.
- Rawcliffe, C. 2012. Sources for the study of public health in the medieval city. In *Understanding medieval primary sources: Using historical sources to discover medieval Europe*, ed. J. Rosenthal, 177–95. London: Routledge.
- Rawcliffe, C. 2013. *Urban bodies: Communal health in late medieval English towns and cities*. Woodbridge: Boydell Press.
- Roberts, C. A., and K. Manchester. 2010. *The archaeology of disease*. 3rd. ed. Cheltenham: The History Press.
- Roberts, C., F. Lee and J. L. Bintliff, eds. 1989. *Burial archaeology: Current research, methods, and developments*. Oxford: B.A.R.
- Rosen, G. 1958. *A history of public health*. New York: MD Publishers.
- Sabbionesi, L. 2019. *Pro maiore sanitate hominum civitatis et borgorum: lo smaltimento dei rifiuti nelle città medievali dell'Emilia Romagna* [Pro maiore sanitate hominum civitatis et borgorum: Waste disposal in the medieval cities of Emilia Romagna]. Sesto Fiorentino: All'Insegna del Giglio.
- Sabra, A. 2000. *Poverty and charity in medieval Islam: Mamluk Egypt, 1250-1517*. Cambridge: Cambridge University Press.
- Salguero, C. P., ed. 2017. *Buddhism and medicine: An anthology of premodern sources*. New York: Columbia University Press.
- Schoenbrun, D. L. 2006. Conjuring the modern in Africa: Durability and rupture in histories of public healing between the Great Lakes of East. *The American Historical Review* 111 (5):1403–39. doi: [10.1086/ahr.111.5.1403](https://doi.org/10.1086/ahr.111.5.1403).
- Scott, J. C. 1985. *Weapons of the weak: Everyday forms of peasant resistance*. New Haven: Yale University Press.
- Seetah, K. 2018. *Humans, animals, and the craft of slaughter in archaeo-historic societies*. Cambridge: Cambridge University Press.



- Skelton, L. J. 2015. *Sanitation in urban Britain, 1560–1700*. London: Routledge.
- Soens, T. 2018. Resilient societies, vulnerable people: Coping with North Sea floods before 1800. *Past & Present* 241 (1):143–77. doi: [10.1093/pastj/gty018](https://doi.org/10.1093/pastj/gty018).
- Squatriti, P. 1998. *Water and society in early medieval Italy: AD 400-1000*. Cambridge: Cambridge University Press.
- Squatriti, P., ed. 2000. *Working with water in medieval Europe: Technology and resource-use*. Leiden: Brill.
- Stearns, J. K. 2011. *Infectious ideas: Contagion in premodern Islamic and Christian thought in the western Mediterranean*. Baltimore: Johns Hopkins University Press.
- Storey, T., and S. Cavallo. 2013. *Healthy living in late Renaissance Italy*. Oxford: Oxford University Press.
- Strohm, P. 2008. Sovereignty and sewage. In *Lydgate matters: Poetry and material culture in the fifteenth century*, ed. L. H. Cooper and A. Denny-Brown, 57–70. New York: Palgrave.
- Taylor, A. L. 2018. Where are the wild things? Animals in Western medieval European history. *History Compass* 16 (3):e12443–12. doi: [10.1111/hic3.12443](https://doi.org/10.1111/hic3.12443).
- Tilley, L. 2015. *Theory and practice in the bioarchaeology of care*. Cham: Springer.
- van Berkel, M. 2017. Waqf documents on the provision of water in Mamluk Egypt. In *Legal documents as sources for the history of Muslim societies*, ed. M. van Berkel, L. Buskens and P.M. Sijpesteijn, 217–32. Leiden: Brill.
- van Bruaene, A. L. 2008. *Om beters wille: Rederijerskamers en de stedelijke cultuur in de Zuidelijke Nederlanden 1400-1650* [For better's sake: Chambers of rhetoric and urban culture in the Southern Netherlands 1400-1650]. Amsterdam: Amsterdam University Press.
- De Van Dam, F. 2020. *Het middeleeuwse openbare badhuis: fenomeen, metafoor, schouwtoneel* [The medieval public bathhouse: Phenomenon, metaphor, stage]. Hilversum: Uitgeverij Verloren.
- van Engen, J. H. 2008. *Sisters and brothers of the common life: The Devotio Moderna and the world of the later Middle Ages*. Philadelphia: University of Pennsylvania Press.
- van Oosten, R. 2015. *De stad, het vuil en de beerput: de opkomst, verbreiding en neergang van de beerput in stedelijke context* [The city, the dirt and the cesspool: The rise, spread and decline of the cesspool in an urban context]. Leiden: Sidestone Press.
- van Oosten, R. 2016. The Dutch great stink: The end of the cesspit era in the pre-industrial towns of Leiden and Haarlem. *European Journal of Archaeology* 19:704–27.
- van Tielhof, M., and P. van Dam. 2006. *Waterstaat in stedenland: Het hoogheemraadschap van Rijnland voor 1857* [Water management in urban lands: The Rijnland water board before 1857]. Utrecht: Matrijs.
- Vaughan, M. 1991. *Curing their ills: Colonial power and African illness*. Stanford: Stanford University Press.
- Vyazov, L. A., E. G. Ershova, E. V. Ponomarenko, K. Gajewski, M. S. Blinnikov and A. G. Sitdikov. 2019. Demographic changes, trade routes, and the formation of anthropogenic landscapes in the Middle Volga Region in the past 2500 years. In *Socio-environmental dynamics along the historical Silk Road*, ed. L. Emlyn Yang 411–51. Cham: Springer.
- Waite, G. 1987. Public Health in Pre-Colonial East-Central Africa. *Social Science & Medicine* 24 (3): 197–208.
- Weeda, C. 2019. Cleanliness, civility and the city in medieval ideals and scripts. In *Policing the urban environment*, ed. C. Rawcliffe and C. Weeda, 39–68. Amsterdam: Amsterdam University Press.
- Weeda, C. 2021. *Ethnicity in medieval Europe, 950-1250: Medicine, power and religion*. Woodbridge, Suffolk: Boydell.
- Wilson Bower, K. 2013. *Plague and public health in early modern Seville*. New York: Rochester University Press.
- Yeh, H.-Y., A. Pluskowski, U. Kalējs, and P. D. Mitchell. 2014. Intestinal parasites in a mid-14th century latrine from Riga, Latvia: Fish tapeworm and the consumption of uncooked fish in the medieval eastern Baltic region. *Journal of Archaeological Science* 49:83–9. doi: [10.1016/j.jas.2014.05.001](https://doi.org/10.1016/j.jas.2014.05.001).
- Yoeli-Tlalim, R. 2010. Tibetan “wind” and “wind” illnesses: Towards a multicultural approach to health and illness. *Studies in History and Philosophy of Biological and Biomedical Sciences* 41 (4):318–24. doi: [10.1016/j.shpsc.2010.10.005](https://doi.org/10.1016/j.shpsc.2010.10.005).
- Yoeli-Tlalim, R. 2019. Galen in Asia? In *A companion to the reception of Galen*, eds. B. Zipser and P. Bouras-Vallianatos, 594–608. Leiden: Brill.
- Zaneri, T., and G. Geltner. 2022. The dynamics of healthscaping: Mapping communal healthcare in Bologna, 1287-1383. *Urban History* 49 (1):2–27. doi: [10.1017/S0963926820000541](https://doi.org/10.1017/S0963926820000541).
- Zemon Davis, N. 2016. Physicians, healers, and their remedies in colonial Suriname. *Canadian Bulletin of Medical History* 33 (1):3–34.