Medical Cartography in Southern Ontario, 1880–1920

A Records Perspective

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ABSTRACT This article examines the context of the creation and use of medical cartographic records in late-19th- and early-20th-century Ontario and suggests that disease maps be recognized not just as records of medical practice or public health administration but additionally as records of data management practices and technologies of liberal government. Disease mapping occurred primarily in the context of municipal and provincial public health departments, which used wall-mounted cloth pin maps as data management tools. In contrast, printed disease maps were used in educational outreach work to encourage individual self-regulation and self-surveillance. Public health authorities sought to use disease maps as tools of governmentality to re-orient individuals and to encourage them to view themselves as members of a larger population that could be improved through changed individual conduct. By examining the origins and functions of disease maps in Ontario, this article contributes to our foundational knowledge of the history of records and record-making, particularly the longer history of data management practices and techniques. As a contribution to archival literature, it offers a deeper understanding of the public role of cartographic records in the recent past, specifically, of the role of such records in the development of liberal government in a settler colonial state.

RÉSUMÉ Cet article explore le contexte de création et l'utilisation de documents cartographiques médicaux à la fin du XIXe et début du XXe siècle en Ontario et avance que les cartes des maladies pourraient être reconnues non seulement comme des documents liés à la pratique médicale ou à l'administration de la santé publique, mais également comme des documents sur la gestion des données et les technologies d'un gouvernement libéral. Les cartes des maladies étaient produites principalement dans les organismes de santé publique municipaux ou provinciaux, lesquels utilisaient des cartes apposées à un mur et des punaises comme outil de gestion des données. À l'opposé, les cartes des maladies imprimées étaient utilisées comme outils de sensibilisation pour encourager l'autorégulation et l'autosurveillance des individus. Les autorités de santé publique ont cherché à utiliser les cartes comme instrument de gouvernementalité afin de réorienter les individus et les encourager à se percevoir eux-mêmes comme membre d'une population plus large pouvant être réformée grâce à des changements de comportement individuels. En explorant les origines et les fonctions des cartes des maladies en Ontario, cet article contribue à la connaissance fondamentale de l'histoire des documents et de la production documentaire, particulièrement la longue histoire des pratiques et techniques de gestion des données. En guise de contribution à la littérature archivistique, il offre une compréhension approfondie du rôle des documents cartographiques dans l'histoire récente, particulièrement du rôle de ce type de document dans le développement d'un gouvernement libéral comme état colonisateur et colonial.

An abundance of English-language scholarship on the history of medical cartography originates from the fields of cartographic studies, medical history, and cultural studies. Scholars such as Tom Koch and Pamela Gilbert have offered nuanced analyses of disease maps as medical and social texts in the contexts of Britain, the Indian subcontinent, and the United States. Less attention seems to have been paid, however, to medical cartography in Canada. In this article, I endeavour to take a records perspective on disease maps from approximately the 1880s to the 1920s, with a focus on Southern Ontario. My initial questions are modest: Who was making disease maps and in what capacity? What was the immediate context in which they were created and used? What purposes have they served?

Preliminary research suggests that disease mapping in Ontario began only in the 1880s and occurred overwhelmingly in the context of municipal and provincial public health departments.[1] The Toronto Department of Public Health, like others in this period, was concerned predominantly with the control of infectious disease. Wall-mounted pin maps of disease incidence were a centralized data-management tool that public health staff used to plan and coordinate action. These objects seem to have been imbued with symbolic value as testaments to the need for public health intervention. Pin maps were ephemeral components of complex, networked public health information systems, while printed disease maps might be seen as outputs of such systems. While some maps were produced for professional and official internal use, others were designed and distributed directly to the public, enabling the public to watch those who watched them and also encouraging the public to view themselves as part of a larger population that could be improved through modified conduct.

Taking a granular records approach to disease maps in late-19th- and early-20th-century Ontario adds nuance and substance to existing Foucauldian analyses of disease maps "as an aspect of governmentality," that is, as instruments of power and a means of controlling populations.[2] Jenna Murdock Smith has argued that, in the early 20th century, the Ontario Provincial Board of

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1   While disease maps date back to Hippocrates, "most cartographic historians agree that thematic cartography generally, and especially medical cartography, began in the early nineteenth century." Medical cartography began somewhat later in Canada. Pamela K. Gilbert, *Mapping the Victorian Social Body* (Albany: State University of New York Press, 2004), 13–14. See also Susan Schulten, *Mapping the Nation: History and Cartography in Nineteenth-Century America* (Chicago: University of Chicago Press, 2012), 1–2.

2   Agnes Arnold-Forster, "Mapmaking and Mapthinking: Cancer as a Problem of Place in Nineteenth-Century England," *Social History of Medicine* (October 2018): 2.

Health's tuberculosis exhibition functioned as a "device of governmentality" through which the board "attempted to cultivate a reflexive and self-watching individual who would regulate his/her own behaviour according to certain hygienic standards and, in turn, demand the same conduct of others."[3] In an examination of sanitation reform in Toronto during approximately the same period, Chris Hurl traces the relationship between the expansion of civic authority and civic records, suggesting that "the increasingly careful documentation of waste work on maps and tables . . . contributed to the impression that civic authority encompassed urban space" and both represented and united otherwise "disparate communities."[4] Disease maps combined and intensified both of the above phenomena. They represented the expansion of civic and provincial authority while inducing members of the settler public to govern themselves in specific ways, persistently orienting the individual viewer as a member – or non-member – of the larger settler population.

By examining the origins and functions of disease maps in late-19th- and early-20th-century Ontario, this article contributes to our foundational knowledge of the history of records and record-making, particularly the longer history of data management practices and techniques. It serves as a resource to practitioners working with such records in comparable jurisdictions; and as a contribution to archival literature, it offers a deeper understanding of the public role of cartographic records in the recent past, specifically, of the role of medical cartographic records in the emergence of liberal government. A richer contextualization of disease maps suggests that they should be recognized not just as records of medical practice or public health administration but additionally as records of data management practices and techniques of liberal governmentality.[5]

3   Jenna Murdock Smith, "Next Stop, 'Sunshine Station': The Ontario Provincial Board of Health and the Exhibition of Tuberculosis, 1908–1929," *Scientia Canadensis: Canadian Journal of the History of Science, Technology and Medicine/Scientia Canadensis: Revue canadienne d'histoire des sciences, des techniques et de la médecine* 34, no. 2 (2011): 67.

4   Chris Hurl, "From Scavengers to Sanitation Workers: Practices of Purification and the Making of Civic Employees in Toronto, 1890–1920," *Labour/Le Travail* (2017): 103.

5   Here, liberal governmentality is understood as a "mode" of governmentality that (in contrast to "police" forms of governmentality) aims to govern "from a distance." Liberal governmentality involves "the constitution of political subjectivities designed to be self-observing and self-governing." Patrick Joyce suggests that public archives and public maps are each examples of a "political technology of liberal governmentality." Patrick Joyce, "The Politics of the Liberal Archive," *History of the Human Sciences* 12, no. 2 (1999): 35–37, 41. See also Patrick Joyce, *The Rule of Freedom: Liberalism and the Modern City* (London: Verso, 2003), 35–61.
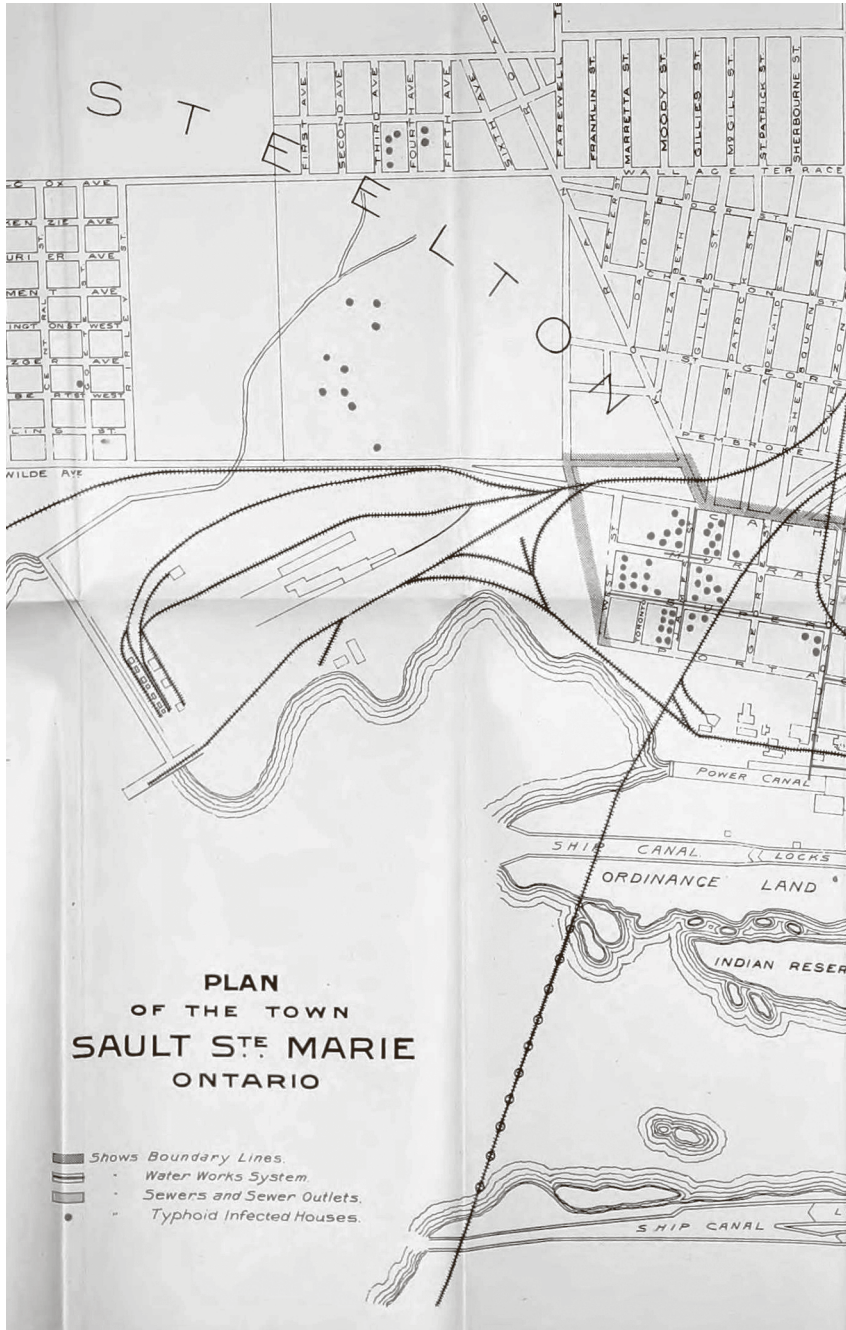
FIGURE 1

Plan of the town of Sault Ste. Marie, Ontario. Source: Drs. Charles Hodgetts and R.W. Bell, "Report on Typhoid Fever and Sanitary Conditions of Sault Ste. Marie," in The Sanitary Journal of the Provincial Board of Health of Ontario (Canada), Being the Twenty-Fifth Annual Report for the Year 1906 *(Toronto: L.K. Cameron, 1907), 194.*

Nineteenth-Century Medical Cartography

In the 18th and 19th centuries, a combination of technological developments accelerated the creation and distribution of low-cost printed maps of towns, cities, and nations in Europe and North America.[6] As maps became common in businesses, publications, and classrooms, an "evolving map culture" emerged that prompted an expectation of and "demand for maps in official scientific documents."[7] As well as traditional maps of roads, rivers, and borders, the early 19th century saw the proliferation of *thematic* maps, which represented "particular types of information or relationships" and were "less about location and navigation than analysis or distribution."[8] In addition to disease, thematic maps represented crime, education, poverty, temperature, and demography. *Sanitary* maps mapped suspected sites of disease (such as cesspools and marshes), showing already-visible or all-too-perceptible issues, whereas *disease* maps purported to reveal the unseen, to make visible the invisible relationships between disease incidence and location or environment. For example, the Boston Board of Health's 1878 map of the city's odours featured the locations of sewage and offensive trades and the areas affected when the wind blew in certain directions. Adhering to the miasmatic theory of disease, the board felt that it was mapping "a dynamic disease hazard, the local airs that carried the stench that generate disease."[9] In contrast, disease maps in this period put forward hypotheses about the relationships between suspected factors, such as

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6   These were, namely, the development of trigonometric and accurate surveying methods that brought a mathematical, scientific basis to mapping. The spread of choropleth and isopleth techniques meant that mapmakers could use shades or colours to show increased incidence or darker and lighter tones to indicate density. As well, there was a transition from copperplate (pattern engraving) to lithographic printing, enabling more cost-effective printing and duplication in journals. Lithography supported more experimentation and revision with maps, which facilitated the development of new mapping techniques. Schulten, *Mapping the Nation*, 79–85; Tom Koch, *Disease Maps: Epidemics on the Ground* (Chicago: University of Chicago Press, 2011), 41; Richard Pearce-Moses, "Choropleth Map" and "Isopleth Map," in *A Glossary of Archival and Records Terminology* (Chicago: Society of American Archivists, 2005), accessed February 23, 2019, https://www2.archivists.org/glossary/terms.

7   Koch, *Disease Maps*, 41, 44. See also Gilbert, *Mapping the Victorian Social Body*, 206 n8; Jo Guldi, "The Tangible Shape of the Nation: The State, the Cheap Printed Map, and the Manufacture of British Identity, 1784–1855," in *The Objects and Textures of Everyday Life in Imperial Britain*, ed. Janet C. Myers and Deirdre H. McMahon (London: Routledge, 2017), 34.

8   Gilbert, *Mapping the Victorian Social Body*, 13–14. See also Schulten, *Mapping the Nation*, 1–2.

9   Tom Koch, *Cartographies of Disease: Maps, Mapping, and Medicine* (Redlands, CA: ESRI Press, 2005), 173.

FIGURE 1   *Detail*

municipal water and sewage infrastructures. For example, the map of Sault Ste. Marie in Figure 1 represents typhoid-infected houses, water works systems, and sewers and sewer outlets. Appearing alongside photographs and text, the map further supported and evidenced the authors' theories regarding the causes of the outbreak. I will return to this map later in the article, when I take a closer look at the population(s) represented on the map.

Sanitary and medical maps such as the one above were made not by trained cartographers but by physicians and sanitary reformers, who repurposed published maps and plotted data onto them. To compare disease prevalence across locales, medical mapmakers depended on an additional intellectual development – advanced methods of statistical analysis – and on an information infrastructure for gathering and publishing vital statistics. As Thomas Koch observes, across Britain and North America, "data was increasingly aggregated at the jurisdictional level most directly responsible for citizen health and welfare," such as municipal or provincial health boards.[10] As datasets grew "too large to easily manipulate in tables alone," maps became an increasingly necessary technology by which to manage and interpret data.[11] Thus, government-produced statistics both enabled and necessitated the production of thematic maps as a data management practice.

Nineteenth-century medical practitioners espoused competing theories of disease causation, and maps were a means by which to hypothesize and advocate.[12] As Koch argues, "inherent in the map is a theory of the disease."[13] Practitioners used maps as analytical tools, but as microbiology contributed to the ascendance of germ theory in the 1880s, investigators increasingly had a default culprit – water – and a means of testing it for bacterial contamination. Koch suggests that, toward the end of the century, maps became less analytic and more descriptive. Physicians used maps not to reach but to communicate an

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10   Koch, *Disease Maps*, 45. For a discussion of how the fabrication of vital statistics through obligatory civil registration was a means by which states produced a "social body," see Gilbert, *Mapping the Victorian Social Body* and Bruce Curtis, "Sanitary Medicine and the Social Body: The Case of National Civil Registration and Statistics in Canada, 1855–75," *Canadian Bulletin of Medical History* 21, no. 1 (2004): 73.

11   Koch, *Disease Maps*, 122.

12   Schulten, *Mapping the Nation*, 90. Maps were considered "the most reliable and revealing ways to represent the range of possible influences in an outbreak." Ibid., 87.

13   Koch, *Cartographies of Disease*, 23.

already-established conclusion, and the rhetoric of the map was "based on the truth claims of cartography in this period."[14]

Medical Cartography in Canada

Initially, a dearth of vital statistics hindered whatever impulses sanitarians and physicians may have had to use medical statistics in any form.[15] Historian Geoffrey Bilson asserts that "statistical work was rare in mid-century and no one appears to have tried to map an epidemic."[16] After Confederation, there was "an intense flurry of activity in matters of vital statistics and civil registration at the imperial, federal, provincial, and municipal levels," marked by the 1871 census.[17] While the requisite data to support medical cartography was lacking, anglophone practitioners would have certainly been exposed to disease maps. A substantial proportion of physicians completed their medical training in Britain; moreover, from the 1870s onward, Canadian journals published articles, reviews, and conference reports referring to the use of maps by British and American medical communities.[18]

Early Public Health in Canada: Inspect, Investigate, Educate

The sanitary movement that arose in Great Britain in the 1830s and 1840s slowly influenced reformers in Canada, where public health departments and vital statistics materialized in the 1880s. The *Public Health Act of Ontario* estab-

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14   Gilbert, *Mapping the Victorian Social Body*, 61. As Gilbert observes, "The mere existence of the map itself could have a powerful legitimating effect." Ibid., 63.

15   While sanitary reformers and others advocated for the development of medical statistics, outside of Quebec, there was "no substantial system" of vital statistics "in the first half of the 19th century." Curtis, "Sanitary Medicine and the Social Body," 81.

16   Geoffrey Bilson, *A Darkened House: Cholera in Nineteenth-Century Canada* (Toronto: University of Toronto Press, 1980), 157. There were, however, always sanitarians and reformers calling for medical statistics, and upon its establishment in 1867, the Canadian Medical Association did create a statistics committee.

17   Curtis, "Sanitary Medicine and the Social Body," 84.

18   For example, "Book Notices," *Canada Lancet* 5, no. 3 (1872): 156; "Reviews and Book Notices," *Sanitary Journal* 1, no. 11 (1875): 349; "Book Notices," *Sanitary Journal* 2, no. 9 (1876): 288; "American Public Health Association," *Sanitary Journal* 2, no. 11 (1876): 327–34; "The Relation of Sewer Gases to Typhoid Fever," *Sanitary Journal* 8, no. 3 (1877): 123; "Book Notices," *Sanitary Journal* 8, no. 3 (1877): 138; "Croup Caused by Miasma," *Sanitary Journal* 3, no. 4 (1877): 173–74; "Books and Pamphlets Received," *Sanitary Journal* 3, no. 6 (1878): 294.

lished the province's first permanent provincial board of health in 1882, just after the federal *Census and Statistics Act* instituted the 1881 census as well as "the collection of mortality statistics in cities with populations over ten thousand."[19] Funding was contingent upon the establishment "of an active Local Board of Health with a permanent, salaried medical health officer,"[20] thus prompting Toronto city council to appoint its first permanent medical officer of health (MOH) in 1883.[21] The following year, the province passed a *Public Health Act* requiring physicians and householders to report specified communicable diseases within 24 hours. The public health department took legal action against physicians who failed to report, quickly improving compliance.[22] Provincial law similarly required notification regarding common infectious diseases within 12 hours. Through the 1920s, municipal and provincial public health departments would predominantly focus on containing and preventing infectious disease and developing complex, multi-sited data collection and management systems.[23]

Toronto's first four medical officers of health each had professional experience in Britain and ties to "the American public health crusade."[24] Accordingly, they modelled their work on that of their British and American counterparts. The department's main duties were to inspect residential and commercial sites, investigate complaints and reports of disease, make recommendations, and educate the public. In 1885, the MOH oversaw "a single secretary, six borrowed policemen, and six summer employees."[25] The MOH dispatched the police-

19   Heather MacDougall, "Public Health and the 'Sanitary Idea' in Toronto, 1866–1890," in *Essays in the History of Canadian Medicine*, ed. Wendy Mitchinson and D. McGinnis (Toronto: McClelland and Stewart, 1988), 81. Following Confederation, "interested citizens, notably Toronto's medical elite," lobbied for public health services. After failing at the municipal level, they turned to the province. The provincial board of health's mandate "encompassed the supervision of specific preventive efforts at the municipal level as well as disease prevention and control in the central sphere." Ibid.

20   Ibid.

21   Ibid.

22   Heather MacDougall, *Activists and Advocates: Toronto's Health Department 1883–1983* (Toronto: Dundurn Press, 1990), 117.

23   "An Infectious Idea: 125 Years of Public Health in Toronto," City of Toronto, February 28, 2019, Internet Archive, https://web.archive.org/web/20190228070154/https://www.toronto.ca/city-government/accountability -operations-customer-service/access-city-information-or-records/city-of-toronto-archives/whats-online/web -exhibits/an-infectious-idea-125-years-of-public-health-in-toronto/.

24   MacDougall, *Activists and Advocates*, 16.

25   MacDougall, "Public Health and the 'Sanitary Idea' in Toronto," 85.

men-turned-health-inspectors throughout the city with questionnaires, and they reported their findings daily.[26] Five years later, seven inspectors and a professional supervisor had replaced the borrowed policemen and were supported by office clerks.[27] Within a few decades, these numbers had increased to "seventy sanitary inspectors, one public health nurse, a part-time city analyst," and satellite staff at the isolation hospital.[28] With the power only to recommend but not to enforce reforms, the public health department aimed to improve the city through "education rather than coercion."[29] Thus, the department put a great deal of effort into producing literature in support of campaigns and interventions, and throughout the 1910s and 1920s, it published monthly health bulletins featuring statistical summaries.[30] Murdock Smith observes that, at the provincial level as well, "education was singled out as the Board's primary concern."[31]

Pin Maps on Office Walls: Interactive Data Management

Public health departments appear to have created and used maps in two modes and forms: firstly, as real-time, interactive tracking and data management tools (pin maps) and, secondly, as analytical and communicative texts (printed maps). In many local public health departments, the wall-mounted pin map was a crucial information management technology and a symbolic object imbued with the mission and rationale for the entire public health enterprise. A detailed description of an ideal map appears in the *Public Health Journal* in 1911:

> A map is an effective aid in the work of city health officials. It should
> be drawn on heavy cloth so that it will stand the wear for which it is
> intended, and made large enough to show every street, alley, crook and
> turn with exactness. . . . By means of characters, or by small flags, the
> exact location of each case of contagious disease may be indicated as

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26 MacDougall, *Activists and Advocates*, 16.

27 MacDougall, "Public Health and the 'Sanitary Idea' in Toronto," 85.

28 MacDougall, *Activists and Advocates*, 25, 30. The city's board of education additionally introduced nurse and medical inspectors into schools to report the incidence of disease among students.

29 Ibid., 19. It should be noted that the public health department was under-resourced, politically embattled, and often mistrusted or loathed by the public.

30 Ibid, 100.

31 Murdock Smith, "Next Stop, 'Sunshine Station'," 72.

it is reported. . . . If the map becomes thickly dotted with flags in one
section of the city, the authorities would at once know that such locality
is in an unsanitary condition and an investigation would be made.[32]

Dr. Charles Hastings, Toronto's fourth medical officer of health from 1912 to
1930, achieved international renown and termed vital statistics recordkeeping
as "the bookkeeping of public health."[33] A feature article in the *Globe* introduces
Hastings through the *health map*:

> On the wall of the general office of the Department of Health, in the
> basement of Toronto's City Hall, there hangs a big map of the city,
> into which there have been thrust a seemingly enormous number of
> pins with colored heads, some red, some yellow, some black and some
> mottled. Viewed from a distance it looks like a huge sheet of fly-paper
> on which a multitude of flies have been caught. In reality it is the city's
> disease barometer, the gauge of civic health, for each pin represents a
> house in which some one of those four dangerous disorders – scarlet
> fever, diphtheria, typhoid, and tuberculosis – holds sway.
>
> In the private office next door there sits a tall gentleman with white,
> curly hair who is deeply interested in this extraordinary pin-strewn map.[34]

A profile of Eunice Dyke, the city's first public health nurse and the head of
the department's tuberculosis division, suggests that the public health depart-
ment had separate pin maps for its various divisions: "She is practically a general
of a small staff of officers, with a map of the enemy's quarters always in view.
On this map pins are stuck in apparently innumerable quantities, but each pin
represents a spot in the city where there is tuberculosis. The pins are changed
from time to time, as a patient dies or recovers or moves from the city."[35]

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32   C.J.H. "City Health Maps," Letter to the Editor, *Public Health Journal: State Medicine and Sanitary Review* 2, no. 4 (1911): 181.

33   W.A. Craick, "Little Sketches of Busy Men," *Globe*, May 24, 1913, A3. A portrait of Hastings in a local paper described his role as tripartite: supervising the infectious disease hospital, overseeing the city's public health inspectors, and maintaining records of vital statistics.

34   Craick, "Little Sketches of Busy Men."

35   "Strenuous War on the White Plague: Toronto's Campaign is Well Organized," *Globe*, March 2, 1912, 21. See also Marion Royce, *Eunice Dyke: Health Care Pioneer* (Toronto: Dundurn Press, 1996): "On the wall of Miss Dyke's

Such militaristic metaphors were common for the time, not only due to the First World War but also in light of the popular characterization of bacteriologists and laboratory researchers as "microbe hunters." Dyke herself wrote that, "for the sake of new nurses, the cases were 'pegged out' on a map of the city. This has proved such an educative factor that a larger map has been provided for the general office."[36] Public health officials reported the same uses of pin maps in Vancouver,[37] Winnipeg,[38] and Windsor, suggesting the prevalence of this practice.[39] Day-to-day activities and interventions such as follow-up visits, quarantine, and fumigation were all coordinated with reference to pin maps. Pin maps also informed program development: the public health departments in both Toronto and Vancouver added child welfare clinics "in the most needy districts as shown by a mortality pin map of the city."[40]

A 1917 article in the *Canadian Nurse* underscores the perceived symbolic value of the pin map as the technological core of public health work and as a guiding light for the work yet to be done:

> I have sometimes tried to imagine the immensity of the field of the
> undone bedside nursing by picturing to myself a last edition of any
> City Directory, with pin heads protruding from the book's edge,

office a map of the city, with routing tacks that indicated where infant deaths occurred, provided a key to areas where intensive work was needed." Ibid., 47.

36 Eunice H. Dyke, RN (Superintendent Tuberculosis Visiting Nurses), "Report of the Tuberculosis Visiting Nurses of Toronto," *Canadian Nurse* 8, no. 7 (1912): 376.

37 "We have a map of the city and district in the office, on which we peg each case of communicable disease as it appears, using coloured map-pins for the different cases." Norah E. Armstrong, RN, "The North Vancouver Health Unit," *Public Health Nurses' Bulletin* 1, no. 8 (1931): 51 (Issued by the Provincial Board of Health, British Columbia).

38 Esyllt Wynne Jones, *Influenza 1918: Disease, Death, and Struggle in Winnipeg* (Toronto: University of Toronto Press, 2007), 46.

39 As the medical officer of health for Windsor reported to the provincial board of health, in 1914, the team of four inspectors met with him each morning in their office in city hall, where "a map of the city is kept on the wall with colored pins indicating the number and places of contagious disease." Dr. G.R. Cruickshank, "Annual Report [for Windsor]," in *Thirty-Third Annual Report of the Provincial Board of Health of Ontario for the Year 1914* (Toronto: Ontario Department of Health, 1915), 259.

40 Alan Brown and George Campbell, "Infant Mortality," *Canadian Medical Association Journal* 4, no. 8 (1914): 704; Enid Forsythe, "Child Welfare Clinics," *Canadian Nurse* 13, no. 6 (1917): 622. They are mentioned also in Cynthia R. Comacchio, *Nations Are Built of Babies: Saving Ontario's Mothers and Children, 1900–1940* (Montreal: McGill-Queen's University Press, 1993), 49.

FIGURE 2

Map of Montreal.
Source: T.A. Starkey,
"Epidemic Diarrhea,"
Montreal Medical Journal
33, no. 7 (1904): 500.

> each pin to mark the address of a home where skilled bedside care has been given in case of illness. Only by means of pin maps and other graphic devices can the distribution and trend of a work make itself understood in relation to the community's need as a whole. Only in some such way can graduate nurses grasp the need for a wider distribution of the inestimable benefits of their service.[41]

Montreal's voluntary League for the Prevention of Tuberculosis described its pin map similarly as a tool that both *supported* its work and explicitly *argued* for its necessity: the map "has been hung in its offices to demonstrate the need of further work in the city. It is an ordinary street map of the city of Montreal, bristling with black-headed pins, each pin representing the scene of death of a case of tuberculosis."[42]

Pin Maps to Spot Maps

Pin maps were ephemeral, interactive tools – part of larger, complex systems of vital statistics collection, mandatory disease notification, public health inspection, data management, and clinical services. Public health staff recorded information in forms, files, and card indexes, and then tracked and represented data graphically in charts, tables, and maps. Printed and drawn maps were a more stable output of these information management systems, and their creation appears to have often been more temporally distant from the phenomena they represented than that of pin maps. I speculate that public health departments might have transformed pin maps into spot maps, where cases were also marked at the level of the city block. The pin map, a dynamic data-management object, was thus reconfigured into a printed text that could be reproduced and distributed widely. A typical example of a spot map is the map of epidemic diarrhea in Montreal in 1903 (see Figure 2).

The *Toronto Daily Star* published a somewhat crudely drawn spot map in 1911 (Figure 3) in order to assuage Torontonians' fears of an oncoming typhoid epidemic. The map was intended to demonstrate that there was a limited outbreak in neighbourhoods that obtained water from the Humber River rather

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41   Isabel W. Lowman, "Organized Neighborhood Nursing Part II," *Canadian Nurse* 13, no. 6 (1917): 302.

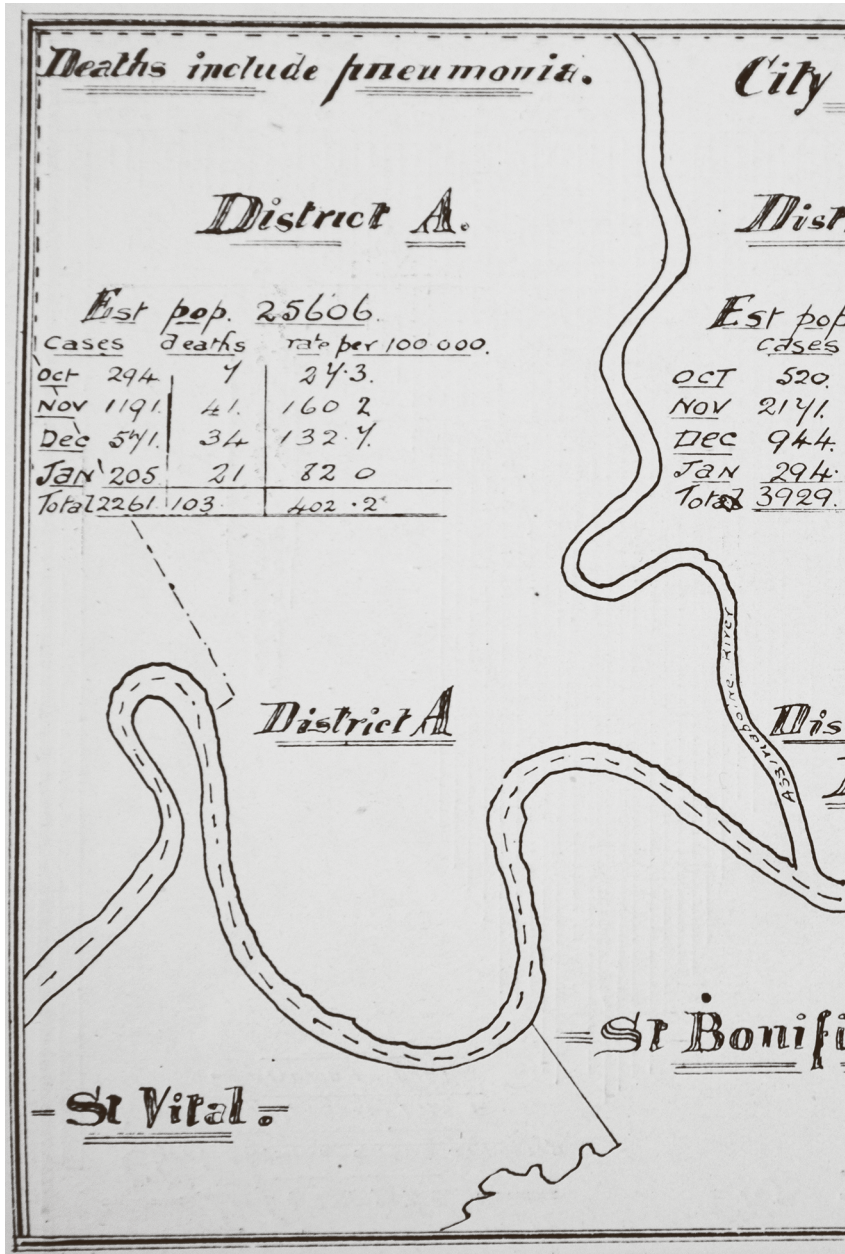42   "Quebec Medical News," *Canada Lancet* 38, no. 7 (1905): 654.

FIGURE 4

Influenza deaths, city of Winnipeg, 1918.
Source: City of Winnipeg Archives, Committee on Public Health and Welfare, Reports *(A714 File 10).*

than from the city's supply. This seemingly crudely drawn map suggests how a pin map could be manually transposed, published, and widely distributed.

In contrast is the Winnipeg Department of Health's abstract spatial representation of the 1918 influenza epidemic (see Figure 4), which features tabulations instead of street views in order to facilitate statistical comparisons "at a glance."[43] During the 1918 influenza epidemic, Winnipeg public health officials tracked the epidemic's reach using a pin map, which they referred to as a "spot system." With the benefit of reports delivered by telephone, they added yellow-headed pins to the map hourly.[44] While a spot map could be based directly on a pin map, the map above is based on multiple acts of data aggregation and calculation. A single individual may have drawn any of these maps, but each was cumulatively brought into being by the inspectors, public health nurses, volunteers, householders, clerks, and medical officers of health who produced, reported, and managed case data throughout epidemics.

An examination of public health departments' use and description of maps lends additional weight and nuance to Pamela Gilbert's observation that "medical mapping was, in the nineteenth century, increasingly related to intervention by a state."[45] Gilbert reads maps as "primarily cultural documents," suggesting that they were part of a tendency toward describing and managing the urban social poor, their health, and their bodies.[46] As can be seen above, public health departments used pin maps to coordinate day-to-day interventions (follow-up visits, inspections, or fumigation) as well as larger interventions (opening clinics in new neighbourhoods or advocating for specific sanitary reforms). These maps, whether pin maps, spot maps or more abstracted representations,

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43 A common expression used with reference to the efficacy of mapping. See, inter alia, *First Annual Report of the Provincial Board of Health of Ontario, Being for the Year 1882* (Toronto: n.p., 1883), xvii, April 27, 2010, Internet Archive, https://archive.org/details/annualreportofpr01prov/page/n3/mode/2up; *Fifth Annual Report of the Provincial Board of Health of Ontario, Being for the Year 1886* (Toronto: n.p., 1887), xxxvii, April 27, 2010, Internet Archive, https://archive.org/details/annualreportofpr57prov/page/n41.

44 "This record-keeping system, which divided the city into four districts, was described in the *Winnipeg Tribune*. 'A large map of the city clearly showing each street and apartment block is used. Yellow-headed pins designate the location on streets where patients are. As each new case is telephoned or otherwise reported to the department, a clerk places another pin on the map.' Thus, 'department officials can tell at a glance exactly where every flu case is located. . . . [city health officials] know hour by hour' the location of influenza cases, it was claimed. This was also known as the 'spot system.'" Jones, *Influenza 1918*, 46.

45 Gilbert, *Mapping the Victorian Social Body*, xvii. Similarly, Thomas Koch emphasizes that maps were often used to prompt action and government policy in a way that impacted lives. Koch, *Disease Maps*, xiii.

46 Gilbert, *Mapping the Victorian Social Body*, 27.

can be regarded as evidence of the interactions between individuals and public health departments, which were perhaps the most intrusive and invasive mode of societal surveillance in late-19th- and early-20th-century Canada.

While we know of the pin map primarily through written accounts and descriptions, this dynamic data visualization and management tool was recorded and preserved through another contemporary technology: photography. Where the pin map was used to collate data on disease incidence over time, the camera was used to fix this collation in and across time, perhaps in preparation for public consumption. At the City of Toronto Archives, the records of the Toronto Department of Public Health include photographic prints and glass plate negatives of several pin maps, some of which have been digitized.[47] While the images are black and white, some feature keys (themselves pinned to the maps); on one map, infant deaths due to intestinal ailments are marked by red pins, those due to respiratory ailments by black and white pins, those due to tuberculosis by purple, and those due to syphilis by yellow.[48] These images were created by City Photographer Arthur S. Goss, who was also tasked with documenting slum conditions, health conditions, and the laboratory and clinic work of the Department of Public Health in order to rally support for reform.[49]

"Health Maps" and Self-Governance

In a study of smallpox hospitals in London, England, Matthew Newsom Kerr suggests that disease maps were not just an instantiation of government power over the governed but also part of a process by which the public was encouraged to "view itself as a natural population" and to participate in this governance. Kerr argues that disease maps were "emblematic of the biopolitics of government" in

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47 City of Toronto Archives, Fonds 200, Former City of Toronto Fonds, Series 372, Dept. of Public Works photographs, Subseries 100, Item 123, Department of Public Health – map of health services, and Item 124, Department of Public Health — map of deaths under 1 year June to September 1922; City of Toronto Archives, Fonds 200, Series 372, Subseries 32, Item 479, infant mortality map, 1916, Item 592, infant mortality map, Item 601, still-births and premature-births map, Item 629, smallpox map of Greater Toronto and suburbs, 1919–1920 (film neg.), and Item 776, infant mortality map.

48 City of Toronto Archives, Fonds 200, Former City of Toronto Fonds, Series 372, Dept. of Public Works photographs, Subseries 100, Item 125, Department of Public Health – map of infant deaths summer 1919 [ca. 1919].

49 For deeper examinations of Goss's documentary work on behalf of the City of Toronto, see Janice R. Sandomirsky, "Toronto's Public Health Photography," *Archivaria* 10 (Summer 1980): 145–56; Anastasia Rodgers, "Constructing Beauty: The Photographs Documenting the Construction of the Bloor Viaduct," *Archivaria* 54 (Fall 2002): 72–91.

that they "invited residents to look upon themselves and conduct themselves in relation to the management of the population, at the level of the population, as if they were part of the population."[50] In Ontario, the Provincial Board of Health and Toronto Department of Public Health likewise produced and distributed maps that enabled the public to stand "on the side of inspection – knowing what surveillance knows, and knowing itself *as known by surveillance*."[51] Public health department maps and statistics were a means by which the public itself was induced to "see themselves as amenable to (self)-surveillance and (self)-regulation," as part of a population that could be modified through changed behaviour.[52] Legislation required householders as well as physicians to report a growing list of diseases, thus assigning the public a formal role in observing and reporting; in turn, published disease maps functioned as evidence of the work of public health departments, enabling the public to monitor and oversee the bodies that watched them.

Upon its formation in 1882, one of the Provincial Board of Health's first acts was to introduce a disease reporting system. The board divided the province into 10 districts and sent pre-stamped, standardized forms to physicians, requesting that they enter disease figures and mail the forms back weekly.[53] The board then compiled the results in its *Weekly Health Bulletin*, which it published in newspapers and sent to "municipal councils, newspapers, physicians and sanitarians in Toronto."[54] Recipients were encouraged to dispose of the bulletin in "the post office or some other conspicuous place, where it [would] be subject to the inspection of the many."[55] While the version published with the Provincial Board of Health's annual report was black and white (see Figure 5), those distributed to physicians for review and display were richly hued. Notably, the copies of the *Weekly Health Bulletin* held at the Archives of Ontario appear to have survived

50   Matthew L. Newsom Kerr, *Contagion, Isolation, and Biopolitics in Victorian London* (Santa Clara, CA: Palgrave Macmillan, 2018), 271.

51   Ibid. (emphasis added)

52   Ibid., 233–34.

53   *Second Annual Report of the Provincial Board of Health of Ontario, Being for the Year 1883* (Toronto: C. Blackett Robinson, 1884), xvi–xvii. For microfilmed images of the forms and correspondences sent to physicians, see Archives of Ontario, Provincial Board of Health, Series RG 62-12, Secretary of the Board of Health scrapbooks, 1882–1916, items 21–22.

54   *Fifth Annual Report of the Provincial Board of Health of Ontario, Being for the Year 1886*, xxxvii.

55   *First Annual Report of the Provincial Board of Health of Ontario, Being for the Year 1882*, xvii.

because their owner, Dr. Abraham Groves, opted not to distribute them among his contemporaries, instead saving 45 for posterity. Given the annotations on the backs of these documents – tallying fees, listing symptoms, and recording directions to an address – it seems that he might have kept them on his desk or close at hand while providing care.[56]

Disease surveillance systems were a hallmark feature of Victorian public health systems, but the emphasis on publishing weekly maps has particular significance. The board published the *Weekly Health Bulletin* "in the form of a map" because it was believed that this would be the most "attractive form" to capture the interest of non-specialists and avoid the "doom" of "the waste basket."[57] The board noted that "most foreign boards" printed circulars with small type and tables requiring close study, whereas a map afforded "comparisons of various diseases . . . at a glance."[58] In 1883, the board reported enthusiastic interest and "increasing demand" for the reports;[59] the following year, it reported a circulation of 500 copies per week and claimed that "very many individuals have applied to the Secretary for copies of the '*health map*' as it is commonly called."[60]

There was debate in medical journals about the utility of these maps, for some physicians alleged they were an unnecessary expense.[61] Meanwhile, the *Globe* lauded the maps for serving "the useful purpose of keeping the people's attention constantly fixed upon the causes of mortality in their midst. These weekly reports seem to be of the most extended character, and to have been crowned with a success as unusual as the method of a weekly map is novel and popular."[62] The New York–based *Medical News* likewise commended the bulletin, predicting that it would "do much towards directing the attention of the profession and public to sanitary science."[63]

56 Groves was a physician in Fergus, Ontario. Archives of Ontario, Provincial Board of Health Weekly Health Bulletins Series, Abraham Groves Fonds, 1882–1883.

57 *First Annual Report of the Provincial Board of Health of Ontario, Being for the Year 1882*, xvii.

58 Ibid.

59 *Second Annual Report of the Provincial Board of Health of Ontario, Being for the Year 1883*, xvi.

60 *First Annual Report of the Provincial Board of Health of Ontario, Being for the Year 1882*, xvii.

61 See criticism in "Ontario Board of Health Map," *Canada Lancet* 15, no. 3 (1882): 92. For defence, see "Ontario Board of Health Map," *Canada Lancet* 15, no. 5 (1883): 171.

62 "Prevention of Disease: First Report of the Provincial Board of Health," *Globe*, March 28, 1883, 6.

63 "Canada (From our Special Correspondent)," *Medical News* 41, no. 25 (1882): 698. The article described the map
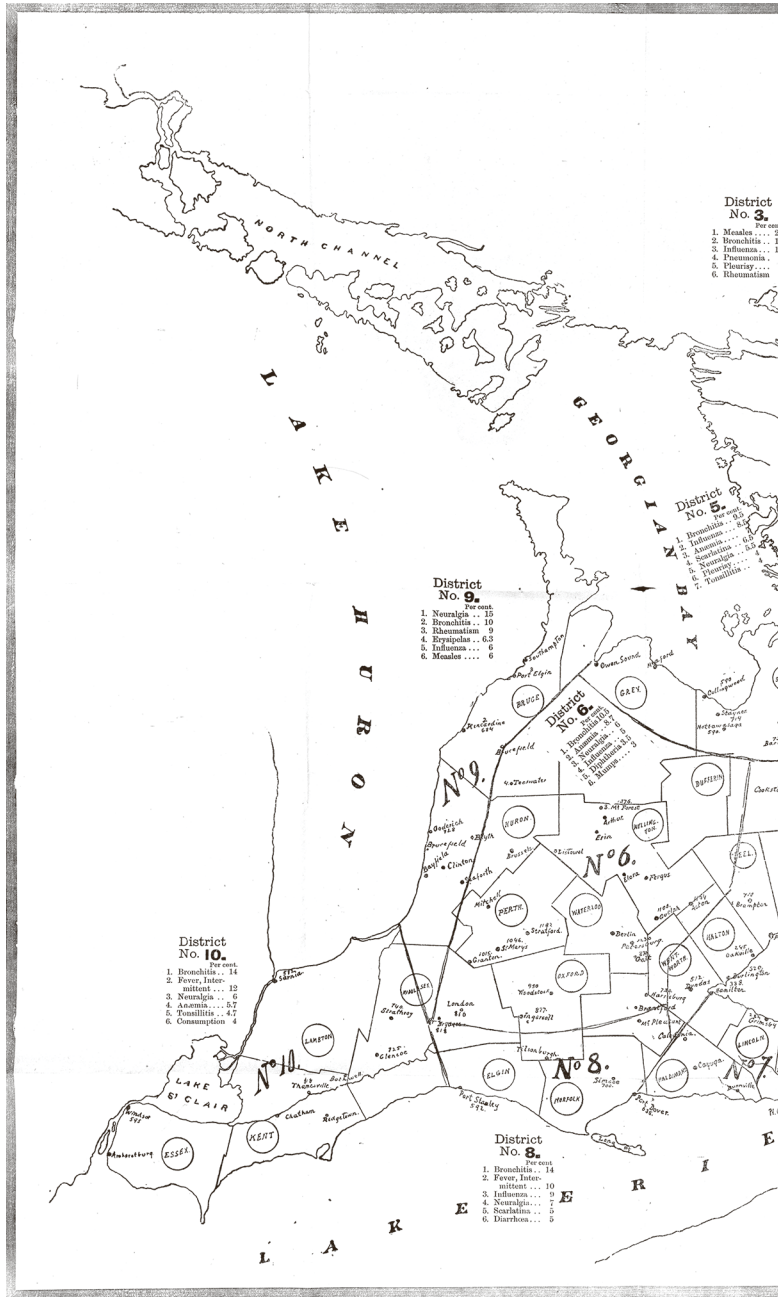
FIGURE 5

The Ontario Provincial Board of Health's Weekly Health Bulletin. *Source: "Explanation of the Map Issued by the Provincial Board of Health Illustrating the Weekly Prevalence of Disease throughout the Province,"* Annual Report of the Provincial Board of Health, Being for the Year 1882 (Toronto: n.p., 1883), 112.

APPENDIX D.

WEEKLY HEALTH BULLETIN

For Week Ending SATURDAY, FEBRUARY 17th, 1883.

Issued by the Provincial Board of Health of Ontario.

WITH WEATHER REPORT SUPPLIED FROM THE METEOROLOGICAL DEPARTMENT.

DIAGRAM C—
Showing Weather Report reduced to an average for each District.

Diagram A—Showing Area of Prevalence.

No. of District.	TEMPERATURE.		Rain & Snow, in inches.	Direction of Wind.	Height above sea level, in feet.
	Highest.	Lowest.			
1	51.00°	−6.00°	0.48	wt-NE	230
2	47.00°	−14.00°	1.24	st-E	350
3	46.50°	−5.50°	0.94	s-st	430
4	43.80°	−1.20°	0.97	swt-NE	500
5					680
6	50.00°	−6.33°	1.72	swt-E	1000
7	53.00°	1.00°	0.74	sw	400
8	54.00°	−5.50°	0.72	wt-NE	620
9	49.00°	4.00°	1.75	sw-sE	750
10	58.00°	1.00°	0.96	swt-E	660

District No. 2.
Per cent.
1. Bronchitis ..12.5
2. Influenza 7.5
3. Mumps 7
4. Anæmia 6.7
5. Neuralgia .. 6.5
6. Scarlatina .. 6
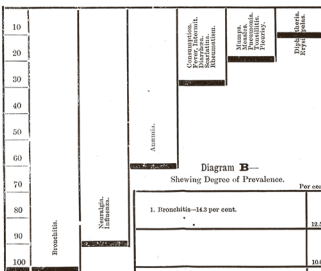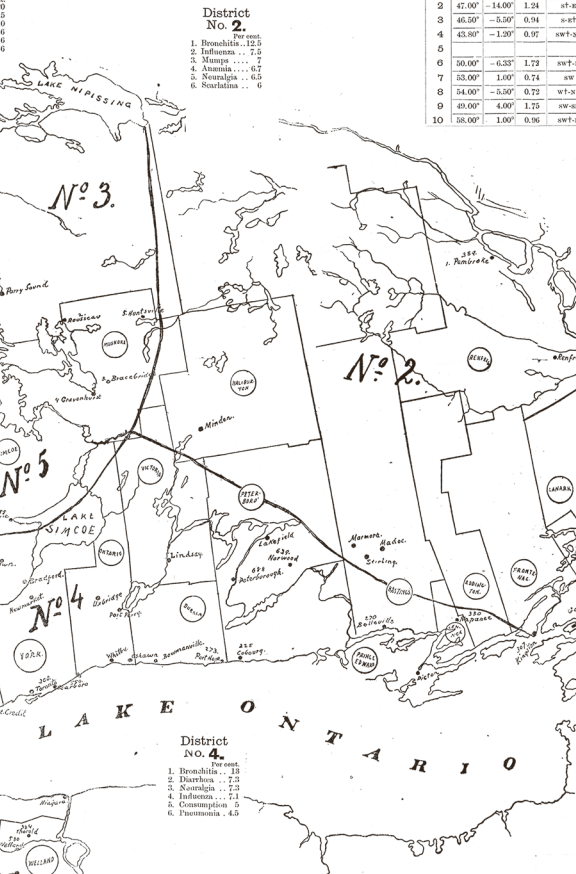
Diagram B—
Shewing Degree of Prevalence.
Per cent.

1. Bronchitis—14.3 per cent.   14.3

2. Neuralgia.
3. Influenza—6.5 p.c.
4. Anæmia.

5. Fever, Int.—4.3 p.c.   10. Consumption.
6. Tonsilitis.   11. Measles—2.9 p.c.
7. Pneumonia—3.7p.c.   12. Mumps.
8. Rheumatism.   13. Scarlatina—2.5 p.c.
9. Diarrhœa—3.5 p.c.

14. Diphtheria—2.2p.c.   18. Pleurisy.
15. Accidents.   19. Erysipelas.
16. Heart Disease.   20. Erysipelas—1.3 p.c.
17. Whooping Cough.

District No. 1.
Per cent.
1. Bronchitis .. 20
2. Consumption 8
3. Influenza .. 4.7
4. Neuralgia .. 4
5. Anæmia ... 3.5
6. Diarrhœa ... 3

District No. 4.
Per cent.
1. Bronchitis .. 18
2. Diarrhœa .. 7.3
3. Neuralgia .. 7.3
4. Influenza .. 7.1
5. Consumption 5
6. Pneumonia .. 4.5

District No. 7.
Per cent.
1. Bronchitis .. 20
2. Neuralgia ... 7
3. Influenza ... 6
4. Fever, Intermittent. 5
5. Anæmia 4.5
6. Rheumatism 4

Explanation of and Remarks upon the Map.

1. The six diseases most prevalent in the ten Districts are seen to be arranged in their order of prevalence, while at the same time the percentage which each disease is of the whole reported for its District is shown.

2. Diagram A shows the comparative area of prevalence of each of the 16 diseases which have appeared amongst the first six in one or more of these Districts. Thus Bronchitis appears in 10 out of 10 or — 100 according to the scale, while Erysipelas appears only once—and so on for all the others.

3. Diagram B shows the degree of prevalence of diseases occurring throughout the various areas of the Province. The comparison is made by taking the total number of cases of any one disease, and finding the percentage of it as compared with the total number of cases of all diseases recorded for the week.

The diseases are arranged in order of prevalence, those in any given space having a percentage equal to or higher than that figure placed opposite the space in the column to the right. Thus, as will be seen in the diagram, Bronchitis has a percentage greater than 12½ per cent., while Erysipelas has a percentage less than 2½ per cent.

The information supplied in Diagram B of earlier Bulletins being of great importance, as supplying data concerning the localised degree of prevalence of any disease, can be readily obtained by a study of the various Districts in which any particular disease occurs.

4. Diagram C shows the averages for the various headings as deduced from the Report supplied by the Toronto Observatory.

As remarked in the Report, the weather of the week began with a low barometer and moderate temperatures. This was soon followed, however, by a rapid change when the pressure increased 0.800 inches and the temperature fell. Thereafter the pressure again diminished, the wind remaining in the E. and S.-E. until Friday when it became westerly with a rapidly rising barometer and falling temperature. The sky during the week was mostly overcast, there being much mist and fog, especially in Districts VI. and VIII. The rainfall has been much beyond the average, one place in District VI. having recorded 3.08 inches in 25 hours.

The differences from the average temperature for the several days are :—11th, +1.86°; 12th, −3.87°; 13th, −8.66°; 14th, +1.88°; 15th, +15.17°; 16th, +3.30°; 17th, +3.00°.

It will be at once noticed, on comparing the Bulletin of this with that of the previous week, that while the former showed much regularity and an unusually great degree of cold, this shows rapid changes and a temperature on the whole considerably above the average. But these changes have not been such as to reduce diseases of the respiratory organs to any extent. Thus Bronchitis and Influenza show exactly the same percentage degrees of prevalence as last week ; while along with these two, Neuralgia and Anæmia curiously maintain not only the same order but the same total degree as the four most prevalent diseases of that week. While we again notice the high degree of prevalence of Fever Intermittent (4.5 per cent.) we are reminded by one correspondent in District VII. of a probable explanation of its continued prevalence in the fact that the subsoil soakage into the wells carries vegetable organic materials into the well-water.

While the reports of this week have many points of interest, the one of greatest moment is the increased number of correspondents reporting Zymotic diseases, principal among which are Measles, Mumps, Scarlatina and Diphtheria. Though the percentage to the total diseases reported is not increased yet this is due to the increased numbers of cases of disease reported, especially of Bronchitis. To show the very serious nature of these diseases an illustration may be given of what 2.2 per cent. of Diphtheria means. The Health Report of the city of Boston for January gives an average of about 49 cases of this disease reported per week and about 20 deaths due it alone. Now it is pretty accurately calculated that one-twentieth of all the diseases actually existing in this Province is reported to this Board. Hence we get the following comparison, taking this number of reports as representing the average prevalence of Diphtheria over the whole Province :—

Boston = 1 case in 10,000 of population—50 per cent. of deaths.
Ontario = 6 cases " " 50 " "

Adopting the Boston mortality rate fill all cases of disease are reported) we would have 3 deaths in every 10,000 occurring weekly from Diphtheria alone. To point the moral as to the ways in which the disease may be spread and the precautions to be taken, Dr. Morell Mackenzie, in the British Medical Journal, has just reported an outbreak of the disease at Hendon which has been directly traced to milk bearing the germs of the disease, the cans having been washed with water containing sewage.

DR. P. H. BRYCE, M.A.,
SECRETARY.

P.S.—Please post this map, after perusal, in the town Post Office.

While compulsory disease notification protocols feature heavily in the history of public health, Ontario expanded the duty to report to include the duty to map, codifying a recordkeeping best practice into law.[64] A 1912 regulation required municipalities and medical health officers to maintain maps of all reported cases of tuberculosis and typhoid fever.[65] This formalization of the role of maps in bureaucratic recordkeeping perhaps reflects the perceived value of maps as analytical tools and records as much as it reflects a growing expectation that scientific reports include maps.[66]

Disease Maps for Educational and Outreach Purposes

The Toronto Public Health Department, like the provincial board and voluntary health associations, performed education and outreach work using a variety of media. The aim of this work was to educate the public, prompt individual action, and encourage popular support for interventions.[67] As one example, the Canadian Association for the Prevention of Tuberculosis created exhibits featuring "maps, charts, statistics and photographs" and sent them upon request "to be used in instructing school children, or to be used at health lectures, at county fairs, and at various educational conventions."[68] Each of these visual media made truth claims grounded in positivist notions of objectivity. As Kara A. Quann suggests

format in detail, offering an example of the sort of interpretation that could be easily gleaned "at a glance": "In district No. 3, the Muskoka region, 8 per cent of the cases reported were gonorrhoea. The word 'Lumbermen,' printed across this region probably explains the fact." See also "Correspondence," *Canadian Journal of Medical Science* 7 (December 1882): 398.

64   Dr. Robert E. Wodehouse of Fort William, Ontario, recounts the District MOH's responsibilities: "The first duties undertaken as routine pertain to making complete sanitary surveys of all the organized municipalities in the several districts. Detailed reports with maps, sketches and photographs were obtained in duplicate; one set was forwarded to Head Office and the other was kept on file in the District Office. These surveys covered the following subjects in minute detail: actual populations, nationality of residents . . . how the vital statistics are kept . . . and finally the epidemiological history of the community, both as to man and animal." Robert E. Wodehouse, "Field Work of an Ontario District Medical Officer of Health," *Public Health Journal* 7, no. 4 (1916): 181.

65   "Synopsis of the New Regulations RE Health," *Toronto Daily Star*, August 9, 1912, 3; "Regulations for the Control of Communicable Diseases," *Annual Report of the Provincial Board of Health, 1912* (Toronto: n.p., 1913): 475, 493.

66   Guldi, "The Tangible Shape of the Nation," 34; Gilbert, *Mapping the Victorian Social Body*, 206 n8.

67   A classic example of this in Toronto is the *Report of the Medical Officer of Health: Dealing with the Recent Investigation of Slum Conditions in Toronto, Embodying Recommendations for the Amelioration of the Same* (Toronto: Department of Public Health, 1911), as is the commissioning of Arthur Goss to photograph slum conditions. See Sandomirsky, "Toronto's Public Health Photography," 145–55.

68   "Fifteenth Annual Report of the Executive Council of the Canadian Association for the Prevention of Tuberculosis" *Public Health Journal* 7, no. 10 (1916): 451–52.

in a study of cartographic archives at the Provincial Archives of Manitoba, maps were regarded as authoritative, and "the authority of cartography was derived from its technological and mathematical origins."[69] Public health departments leveraged this authority to encourage members of the public to regulate themselves – by adopting or abandoning certain forms of conduct – as well as to regulate other forms of conduct. Like public health exhibitions more generally (of which they were often an element), disease maps may be seen "as a device of governmentality"; unique among the elements of exhibitions, however, disease maps intrinsically performed an additional function of situating the viewer as a member of a population.

In a 1913 editorial in the *Public Health Journal*, HRH the Duke of Connaught recounted that, at the Royal Edward Institute of Montreal, he was shown a map that "marked with a black pin the place of each death which had taken place from tuberculosis. It was a most instructive object-lesson and if it has not already been done I should like to suggest that every city and large town should have similar maps made, photographed, and widely circulated among their children."[70]

The "object-lesson" that the Duke recommends is the use of a local disease map not just as an educational text but as an "orienting device"[71] – as a means by which to encourage children to recognize themselves as part of a larger population, a population as defined by government experts. An infant mortality map on the front cover of a 1919 public pamphlet provides such an object lesson for non-specialist Torontonians (Figure 6). The striking header, "Citizen Control of the Citizen's Business," hails readers as members of the population depicted and summons their participation in the "(self)-surveillance and (self)-regulation" requisite for modification of the social body.[72] Profoundly abstracted, this map has minimal "epidemiological usefulness"; instead, it exemplifies Matthew Newsom Kerr's claims about the purpose of a "population visualizing itself": "a crucial technique of liberal government, self-surveillance is self-regulation."[73]

69 Kara A. Quann, "Remapping Archives, Cartographic Archives in Theory and Practice at the Provincial Archives of Manitoba" (MA thesis, University of Manitoba, 2001), 38. See also Gilbert, *Mapping the Victorian Social Body*, 61.

70 Editorial, *Public Health Journal* 4, no. 4 (1913): 242–43.

71 Sara Ahmed, *Queer Phenomenology: Orientations, Objects, Others* (Durham, NC: Duke University Press, 2006).

72 Newsom Kerr, *Contagion, Isolation, and Biopolitics*, 233–34.

73 Ibid., 271.

Citizen Control of the Citizen's Business

TORONTO'S CITIZENS CAN CONTROL TORONTO'S AFFAIRS ONLY THROUGH FREQUENT, PROMPT, ACCURATE AND PERTINENT INFORMATION WITH REGARD TO TORONTO'S BUSINESS.

ISSUED BY THE
BUREAU OF MUNICIPAL RESEARCH
813-820 Bank of Hamilton Building, Toronto
Telephone: Main 3620.

White Paper No. 31   *October 6, 1919*

The Department of Public Health
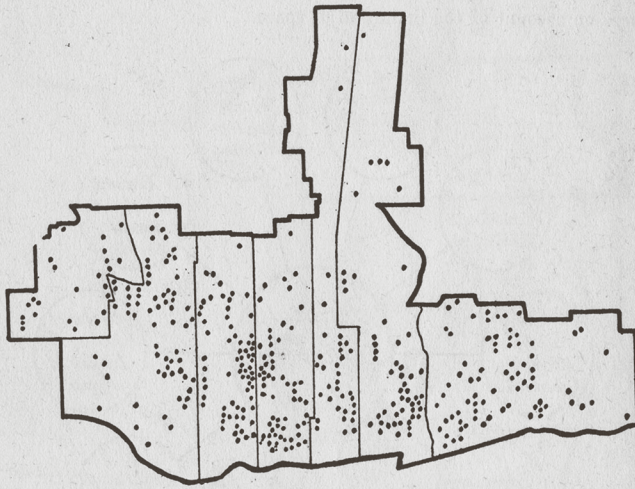
Infant Mortality Map
for the City of Toronto, for June, July, August and part
of September, 1919, showing how the Department keeps track
of the deaths of infants under two years of age. See page
4 for infant mortality statistics.

FIGURE 6   *Infant mortality map of Toronto, 1919.*
    Source: Bureau of Municipal Research, White Paper No. 31 *(Toronto: Bureau of Municipal Research,*
    October 6, 1919).

Settler Publics

The population represented and addressed in these maps and texts was predominantly white settlers. In Canada, the liberal order "cultivated its core of normal healthy white citizenship by marginalizing and excluding aboriginal bodies"[74] – a system with profound repercussions, and a phenomenon that is, in small ways, evidenced by the representations, gaps, and erasures in these maps. Several of the maps I have examined are suggestive of the broader trend of the time to remove and segregate individuals; as historian Maureen Lux retells, "isolation was . . . not a departure from liberal governance 'but central to its internal logic.'"[75] As one example, one pin map purporting to represent disease incidence by household in Toronto includes a mass of black pins that form an island in Lake Ontario – a representational distancing of the city's institutionalized population that far exceeded their physical remove, but underscored its social significance (Figure 7).

There is no further descriptive information for this item. Given that it is located in the public health department photo series, that it is materially identical to other pin maps, and that all the pins are the same tone and there is no pin colour key, I hypothesize that it is a map of one type of morbidity or mortality, most likely infant mortality or tuberculosis.

Returning to Figure 1, a second, closer look at the map of the 1906 typhoid epidemic in Sault Ste. Marie shows an "Indian Reserve" (now Whitefish Island Reserve of the Batchewana First Nation) that, according to the map, was unaffected by typhoid. Unaffected, uncounted, or uncountable? From 1905 to 1906, the island was expropriated for railway construction, and all Anishinaabe residents were forced to relocate.[76] Moving further back in time, the provincial board of health's *Weekly Health Bulletin* reports of disease incidence in the province are, in fact, representations of the settler communities located in the portions of Ontario southeast of the Bruce Peninsula. These maps, with their handwritten locales, erase and deny Indigenous presence. The history of First Nations health and healthcare under the Canadian settler state is a much larger

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74 Maureen K. Lux, *Separate Beds: A History of Indian Hospitals in Canada, 1920s–1980s* (Toronto: University of Toronto Press, 2016), 7.

75 Ibid., 9. Lux quotes Carolyn Strange and Alison Bashford, eds., *Isolation: Places and Practices of Exclusion* (London: Routledge, 2003).

76 Krista McCracken, "Public Spaces and Indigenous Land: Whitefish Island," Active History, April 20, 2015, June 5, 2019, Internet Archive, https://web.archive.org/web/20190605111757/http://activehistory.ca/2015/04/public -spaces-indigenous-land/; David T. McNab, *Circles of Time: Aboriginal Land Rights and Resistance in Ontario* (Waterloo, ON: Wilfrid Laurier University Press, 1999), 138.
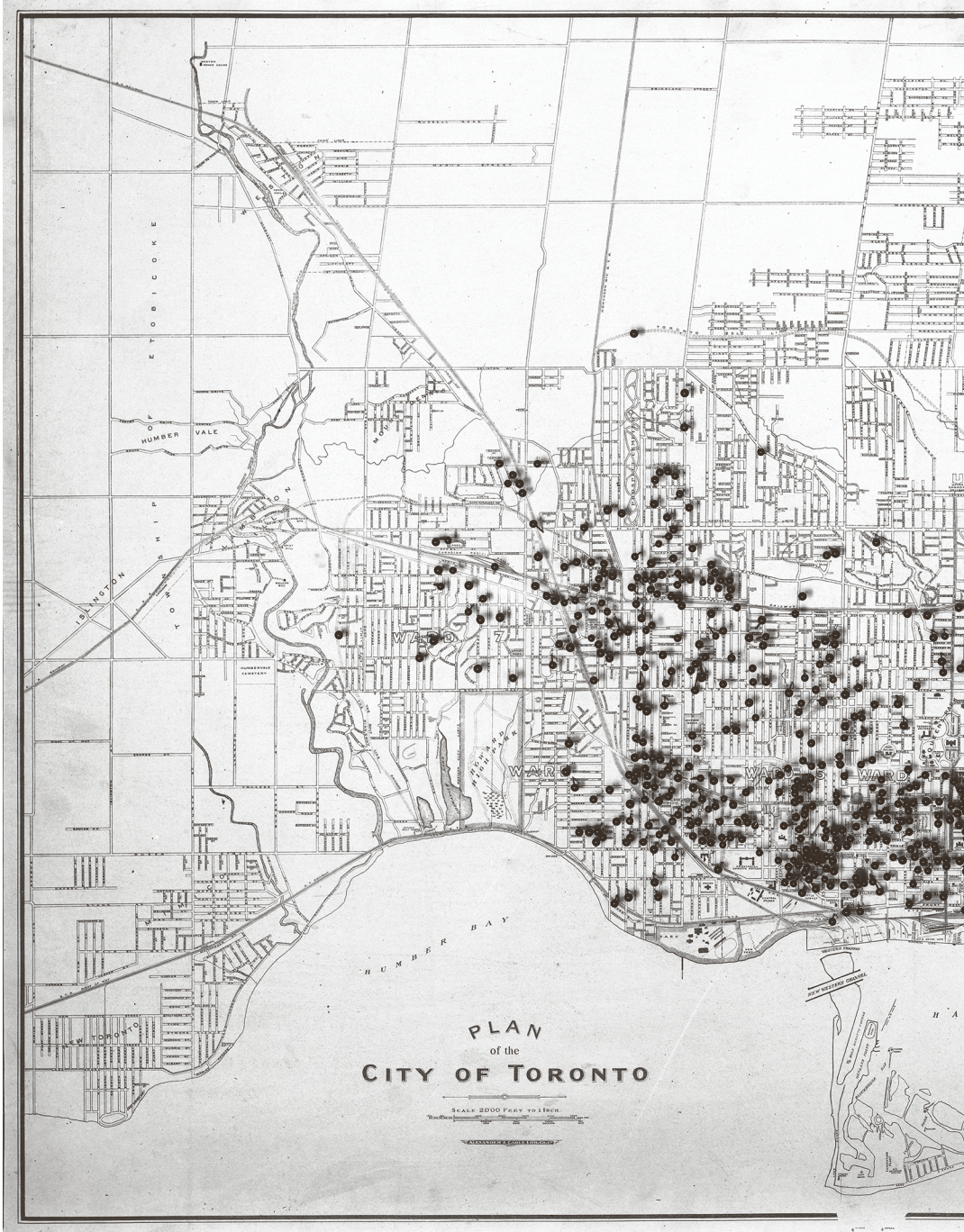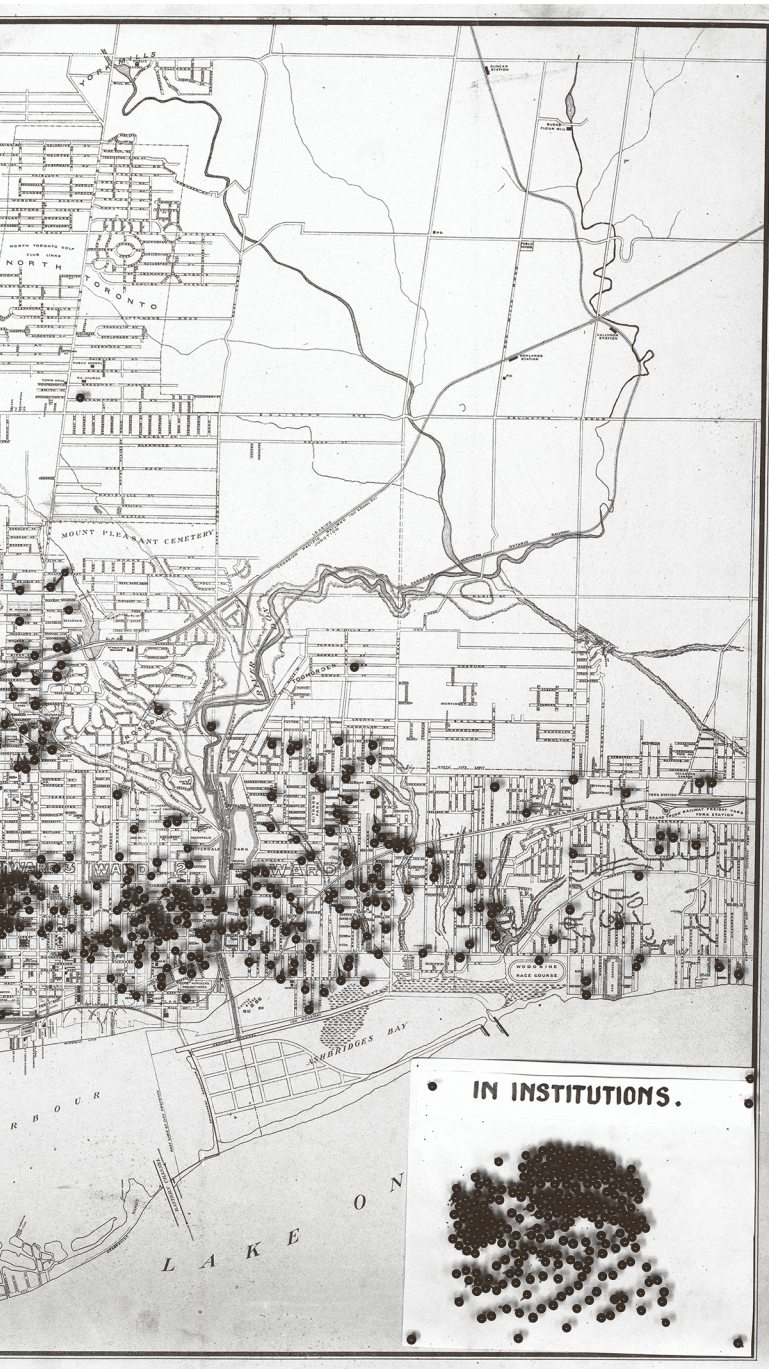
PLAN
of the
CITY OF TORONTO

SCALE 2000 FEET TO 1 INCH.

topic that deserves (and has received) greater attention;[77] likewise, the role of cartography in settler colonialism, resistance, and decolonization has been more fully addressed elsewhere.[78] What I wish to draw attention to here, with these few examples, is that if we accept that these disease maps re-oriented and encouraged "the public" to view themselves as part of a larger population that could be improved through modified conduct, this was true only for a specific public – the settler public. The late-19th-century and early-20th-century disease maps that I have come across emerge from distinct contexts, but they can be seen to share at least one common general purpose: the furtherance of settler society through strengthening its population base.

Concluding Thoughts

This study demonstrates that disease maps were created and used in multiple distinct ways within the municipal and provincial public health systems in Southern Ontario in the late 19th and early 20th century. Municipal public health departments used wall-mounted cloth pin maps internally, as data management tools in the course of their day-to-day activities and strategic planning, whereas they created and distributed printed disease maps in order to document their own organizational performance and educate external audiences. The provincial board of health's *Weekly Health Bulletin* and municipal publications suggest that disease maps, as well as the statistics-producing and surveillance-based information systems that they were created within, were not only a means of exerting governmental power over the governed but also part of a process by which the public was encouraged to participate in and perform self-surveillance

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77   For an overview of scholarship, see Mary Jane Logan McCallum, "Starvation, Experimentation, Segregation, and Trauma: Words for Reading Indigenous Health History," *Canadian Historical Review* 98, no. 1 (2017): 96–113. For recent work on segregation of Canadian healthcare services, see Lux, *Separate Beds*.

78   Some examples from a wide range of scholarship include John Rennie Short, *Cartographic Encounters: Indigenous Peoples and the Exploration of the New World* (London: Reaktion Books, 2009); Martin Brückner, ed., *Early American Cartographies* (Chapel Hill, NC: University of North Carolina Press, 2011); Jeffers Lennox, *Homelands and Empires: Indigenous Spaces, Imperial Fictions, and Competition for Territory in Northeastern North America, 1690–1763* (Toronto: University of Toronto Press, 2017); Joe Bryan and Denis Wood, *Weaponizing Maps: Indigenous Peoples and Counterinsurgency in the Americas* (New York: Guilford Publications, 2015); James R. Akerman, ed., *Decolonizing the Map: Cartography from Colony to Nation* (Chicago: University of Chicago Press, 2017).

and self-regulation. While one might certainly question how many individuals in fact viewed these records, the point remains that government agencies intended the settler public to accept these maps as evidence of the activities of the nascent public health infrastructure, to derive lessons from the maps, and to modify their own behaviour in response. Disease maps, like the public health exhibitions they were sometimes featured in, were thus created and used as "devices of governmentality."[79] Unique among the media featured in such exhibitions, disease maps re-oriented and encouraged individuals to view themselves as part of a larger population that could be improved through modified conduct. In this context, disease maps must be recognized not just as records of medical practice or public health administration but also as records of data management practices and technologies of liberal government.

BIOGRAPHY Renée Saucier is an archivist at the Archives of Ontario and volunteers at the ArQuives: Canada's LGBTQ2+ Archives. She has previously worked for the Ontario Jewish Archives as well as the University of Toronto Libraries' web archiving program. She has a graduate degree in information studies with a specialization in archives and records management. Her areas of interest include the social history of medicine and technology, web archiving and community archives.

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79   Murdock Smith, "Next Stop, 'Sunshine Station'," 67.