

# Mortality Patterns and Public Health in Hamilton, Canada, 1900–14

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Article abstract

In recent years a wide-ranging debate has focused on the origins and extent of the decline in mortality rates in Britain in the 18th century and in North America during the closing decades of the 19th century. Some historians suggest that the decrease was tied to a general improvement in living standards and in particular to better nutrition while others point to municipal public health measures carried out by vigilant medical health officers.

This paper examines the experience of Hamilton, Ont., during a period of extreme urban and industrial expansion, 1900-14. The evidence, both qualitative and quantitative, suggests that these years were not a "golden age" of public health: the health of Hamiltonians did not improve, and, in fact, mortality rates increased. Moreover, infants and children of the working class were the most obvious casualties of an inhospitable environment that hurt those least able to exert any degree of control over their circumstances. Public health was not a popular cause in the city, and as a consequence, much of the minimal progress that did occur was either fortuitous or the result of the exertions of one man, Dr James Roberts, the crusading medical health officer.

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**Abstract**

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***This paper examines the experience of Hamilton, Ont., during a period of extreme urban and industrial expansion, 1900-14. The evidence, both qualitative and quantitative, suggests that these years were not a "golden age" of public health: the health of Hamiltonians did not improve, and, in fact, mortality rates increased. Moreover, infants and children of the working class were the most obvious casualties of an inhospitable environment that hurt those least able to exert any degree of control over their circumstances. Public health was not a popular cause in the city, and as a consequence, much of the minimal progress that did occur was either fortuitous or the result of the exertions of one man, Dr James Roberts, the crusading medical health officer.***

**Résumé**

***Ces dernières années, un débat de grande envergure a porté sur l'origine et l'importance de la baisse du taux de mortalité en Grande-Bretagne au XVIII<sup>e</sup> siècle, et en Amérique du Nord durant les dernières décennies du XIX<sup>e</sup> siècle. Certains historiens ont attribué cette baisse à une amélioration des conditions de vie en général et, en particulier, à une meilleure alimentation des gens, tandis que d'autres l'ont***

As George Porter, treasurer of the Canadian Public Health Association, observed in 1911 "mortality tables (do) not make popular reading." Newspaper accounts of individual births, marriages, and deaths were routinely "read at breakfast for their personal interest," but, as Porter had learned, "very few people ever waded through such returns when they embrace a whole country, province or nation."<sup>1</sup> Porter's frustration with the apathy to mortality statistics as a yardstick for the quality of public health was echoed by George Whipple, the leading American sanitarian of the time and a world authority on typhoid fever, who also believed that, for the nation's welfare, mortality statistics should appear in local newspapers "with as much regularity as the records of the weather bureau, - not as headlines to appear only when there is an epidemic of some disease, but in such a way that the reader would come to look at these rates as a matter of course, and notice whether the figures were high or low." An enlightened public could then take pride in low mortality rates or, more importantly, recognize escalating figures as an indication of "something . . . wrong that needs to be corrected."<sup>2</sup>

For the most part, even the messages from the most eminent public health professionals were unheeded, and mortality records, compiled for widespread dissemination, remained limited to an annual tally usually issued to the local newspaper by the regional or civic medical health officer. In the past decade, however, detailed mortality statistics collected by diligent public health officials at the turn of the century have aroused more enthusiasm among urban, social, and economic historians than men such as Porter or Whipple were able to generate at the time. In particular, recent scholarship, by addressing the possible connection between decreasing morbidity and mortality and the effectiveness of public health reforms within the larger urban reform movement (1885-1920), has revealed a rich vein of insights into the quality of urban life, especially from a social structural perspective. Research in

North America has focused for the most part on the decline in mortality in the United States (which appears to have begun in the 1880s) and in Canada (beginning in the decade after 1900) and has yielded a variety of feasible explanations for the sources of the decrease; some of these theories challenge the conventional assumption that mortality in England and Wales from the 18th to the 20th century was the consequence of "a rising standard of living, of which the most significant feature was improved diet," and was not related to the energy of modern scientific medicine and the accompanying public health and sanitary reform.<sup>3</sup> Edward Meeker, for example, agrees that perhaps too much credit has been given to the medical profession and modern medical discoveries as agents of change affecting mortality patterns in the U.S.A., but he also suggests that Americans owed their improving health to the combination of better diet, housing reform, clean water, and more stringent public health measures.<sup>4</sup> Likewise, Judith Leavitt's analysis of public health in Milwaukee during the 19th century, which underscores the importance of civic intervention, "demonstrates that Milwaukee's mortality declined during the very years that the city waged vigorous sanitation and disease prevention campaigns."<sup>5</sup> On the other hand, Gretchen Condon and Eileen Crimmins-Gardner examined mortality rates for specific causes of mortality in American cities in 1890 and 1900 and were forced to accept a more circumscribed conclusion when they failed to find a link between decreases in mortality attributable to tuberculosis, diphtheria, typhoid, and diarrhoeal disease (the leading causes of death in the late 19th-century America) and any specific public health measures. They suggest therefore that although improved public health practices cannot be ignored, as catalysts stimulating a decline in mortality, their role was limited and the explanation for lower mortality lies elsewhere (perhaps, for instance, in an examination of per capita income).<sup>6</sup> In a subsequent investigation of patterns in turn-of-the-century Philadelphia,

*imputée à des mesures favorisant la santé publique, prises à l'échelle municipale par des directeurs de la santé particulièrement vigilants.*

*Le présent article examine la situation de la ville d'Hamilton, en Ontario, durant une période de très grande croissance urbaine et industrielle, soit de 1900 à 1914. Les preuves dont on dispose, tant au point de vue qualitatif que quantitatif, laissent supposer que ces années ne furent pas un «âge d'or» pour la santé publique. En effet, la santé des résidents d'Hamilton ne s'est pas améliorée au cours de cette période; en fait, le taux de mortalité a augmenté. De plus, il semble que ce sont les bébés et les enfants de la classe ouvrière qui ont le plus clairement souffert d'un milieu hostile, particulièrement nuisible aux êtres ayant le moins d'influence sur leurs conditions de vie. La santé publique n'était pas une cause populaire dans cette ville et, par conséquent, une grande partie des progrès minimes qui y ont été accomplis l'ont été par accident ou ont résulté de l'effort d'un seul homme, le Dr James Roberts, directeur et champion de la santé publique.*

Condrón concluded that the city's declining mortality could not be explained by any one single factor, but rather by a variety of "coexisting and complexly-interrelated causes." Other studies of urban public health have identified ethnicity, class, and population density as factors contributing to variations in mortality patterns.<sup>7</sup> Simon Sretzer recently re-examined McKeown's thesis and concluded that those diseases clearly related to poor sanitation (not airborne diseases) were responsible for the largest share of the decrease in mortality in Britain. Consequently, the public health movement, working through local governments, must be recognized as the prime mover in decreased mortality.<sup>8</sup>

In Canadian historiography, the literature on public health has been derived primarily from qualitative sources and principally in relation to the history of social reform — especially the motives, agendas, and impact of "middle-class meddlers"<sup>9</sup> whose class interests may have dictated their perceptions of the public good.<sup>10</sup> These contributions<sup>11</sup> have taken shape within a conceptual framework largely devoid of a sense of the patterns of morbidity and mortality characteristic of late Victorian and Edwardian society in Canada, or of the probable explanations for continuity and change in those patterns. Even though some sources for examining mortality may be both incomplete and inconsistent, statistics can contribute to a more comprehensive and accurate interpretation of this aspect of Canadian social history. What follows, then, is an attempt, using statistical evidence pertinent to Hamilton, Canada, ("the Birmingham of Canada") to provide a detailed case-study of mortality patterns in an urban-industrial environment and to assess the impact of public health reform on the incidence of death and disease, with some particular reference to the experience of women and children from 1900 to 1914.

During the first decade of the 20th century, the health of the population of Hamilton showed little evidence of the benefits that

have been attributed to the vigour of the public health movement elsewhere in North America. In fact, the health of Hamiltonians underwent a brief period of decline in spite of the determination of Dr James Roberts, one of North America's most aggressive and informed public health officers. Public indifference, demographic and environmental factors, and the social structure of the city all contributed to the inability of Hamilton's health department and civic reformers to improve environmental conditions in their attempt to reduce morbidity and mortality. Moreover, it appears that in Hamilton, as elsewhere in western societies where the phenomenon has been studied, neither annual nor long-term fluctuations in health were especially amenable to short-term, limited remedies. The advent of a golden age of public health in Hamilton awaited the coalescence, on a broad front and over a long period of time, of a combination of ecological, social, economic, political, technical, and medical initiatives.

At the turn of the century, Hamilton was a thriving industrial centre, of about 50,000. Its proximity to the Cataract Power Company's generating plant and its advantageous geographical position on rail and shipping lines made it a very attractive location for foundries as well as cotton and woollen mills. In 1910, when the major Canadian steel-producing companies amalgamated as the Steel Company of Canada, the head office was located in Hamilton. Two years later, Dominion Foundries also moved to the city. These heavy industries together with the subsidiaries of American enterprises such as International Harvester and Westinghouse and the satellite companies that sprang up to service them, held out the prospect of employment to a steady influx of British and European immigrants. At the height of Hamilton's growth between 1911 and 1913,<sup>12</sup> nearly 15,000 immigrants flocked into the city. They joined the substantial industrial working class concentrated in Wards 5, 6, 7, and 8 in the north-east end, an area of low land adjacent to Burlington Bay near the



*Russian Lodging House. United Church of Canada Archives, Toronto*

sewage outlet, and the site of the industrial complex and its transportation corridor. The more prosperous middle and upper classes, on the other hand, resided in Wards 1 and 2 in the southern part of Hamilton, against the base of the Niagara escarpment and well away from the "dark satanic mills." The city continued to be characterized, as it had been 20 years before, by "residential segregation."<sup>13</sup> In 1910, for example, the per capita value of taxable real property in Ward 2 was \$1,157, some three times those in Wards 6, 7, and 8 with values of \$451.10, \$384.20, and \$399.98 respectively<sup>14</sup>. Moreover, a rough estimate of the population density in each ward for the same year indicates that Wards 1 and 2 also recorded the lowest density, with approximately 4,000 and 5,000 persons per square mile. Ward 8, just annexed by the city and populated only on the western edge, also had a relatively

low density. At the opposite extreme, Wards 3 and 4 appear to have supported about 10,000, and Ward 5 nearly 13,000. Wards 6 and 7 with 16,000 had the highest densities, ratios which exceeded Boston's 12,358 in 1900.<sup>15</sup>

Contemporary newspaper and health department accounts of a pressing housing shortage substantiate the impression of overcrowding that statistics imply. Every new home was either sold or rented as soon as it was ready for occupancy. Small houses were divided to accommodate two or three families; even the well-to-do rented out rooms in "their large well situated" homes to "desirable parties."<sup>16</sup> Living conditions in the east end, in particular, had become deplorable; in numerous cases, one-room "shanties, constructed of rough boards, small and unhygienic, with the interior many times

less inviting than the outsides" served as home to a dozen or more immigrant workers.<sup>17</sup> In 1910 the medical health officer, James Roberts, had denigrated the industrial east end as "a rapidly growing district where overcrowding is very much in evidence, and the careless tendencies of the population are intensified by lack of sewerage. Here there is ample need for the Health Department to exercise constant watchfulness if epidemics and high death rates are to be avoided."<sup>18</sup> It had become all too obvious to Roberts that the consequences of rapid unchecked industrial expansion and the influx of population had exacted a high social and environmental price on his territory. Part of the toll was an apparent increase in the city's reported mortality.

In 1900 Hamilton's mortality rate of 15.4 per 1,000 population (see Table I) had stood

midway between the provincial average (12.7) and the average for the urban centres of Ontario (17); a similar pattern persisted for the next three years.<sup>19</sup> Neither civic nor provincial health officials seemed unduly alarmed by these figures even though they recognized that in the previous decade mortality levels in the United States had started to decline so that by 1900 reported mortality from many diseases was lower in the U.S.A. than in Ontario.<sup>20</sup> Table III compares Hamilton's mortality from selected diseases with mortality patterns in Buffalo, Cleveland, and Detroit, its sister industrial cities on the Great Lakes; also noting the average for 26 American cities and the average for urban areas of Ontario. In Hamilton only mortality attributable to whooping cough and genito-urinary disease were lower than elsewhere. On the other hand, mortality from tuberculosis was higher in Hamilton and urban Ontario than in Buffalo, Cleveland, or Detroit and, in fact, more closely approximated American levels for 1890. These data, drawn as they are from just one year, are useful only for the purpose of providing a temporal and geographical baseline for the analysis that follows. Nevertheless, the similarity between overall mortality patterns in Canadian and American cities is all the more noteworthy because James Roberts and his fellow public health professionals in Canada frequently argued that the high mortality they identified as a feature of the American cities could be attributed to the social and moral disorder endemic to their southern neighbour.

In 1900 tuberculosis, the cause of one in eight of Hamilton's deaths, was the city's single greatest killer. Taken together, stillbirths and infant mortality accounted for another 20 per cent. Respiratory, nervous, and circulatory system disease respectively explain 12, 11, and 8.5 per cent of the deaths, while contagious diseases - notably typhoid and diphtheria - were responsible for 7 per cent. At a time when death from an untreatable ailment was a legitimate cause for anxiety, all Hamiltonians might realistically

fear becoming one of the next year's mortality statistics. But, in fact, the city's deaths were not distributed evenly, either demographically or geographically. There were clearly discernible differences in the death rates among the various wards. For example, in 1900 the mortality rate in Ward 1 (11.1) was more than 30 per cent lower than in Ward 5 (15.7) which recorded the highest rate. This variation was not an isolated phenomenon; the following year Ward 5 registered the highest mortality rate from typhoid and tuberculosis, the two diseases that public health specialists of the day equated with overcrowding, inadequate sanitation, and poverty.<sup>21</sup> But, in 1900, few Hamiltonians seemed disturbed if Wards 4, 5, 6, and 7, home to most of the city's recent arrivals from eastern Europe and its working classes, claimed a disproportionate share of the city's mortality. It would, in retrospect, be interesting to know whether, as William McNeill has implied, in Hamilton a harmful environment plagued a relatively healthy immigrant population that may not have been quite as resistant to certain diseases as long-term urban dwellers,<sup>22</sup> or, conversely, whether Hamilton's new arrivals more closely approximated their collective image as carriers of filth, ignorance, and immorality who brought disease with them to contaminate their new environment. The evidence available for Hamilton lends itself to the former interpretation.<sup>23</sup> Hamilton's reported mortality rate rose from 15.4 in 1900 to 20.6 in 1910 before it dropped again in 1914 to 12.8. Diphtheria, whooping cough, nervous and respiratory system ailments, and infant mortality contributed to the city's escalating death rate while the apparent improvement in the city's collective health after 1910 seems to be attributable for the most part to a downward trend in mortality from contagious disease, nervous and respiratory ailments, and some components of infant mortality. A comparison of mortality from individual diseases for 1900 and 1914 confirms that in 1914 Hamilton's mortality had dropped in every category except whooping cough, an unpredictable illness

that even today frequently defies accurate diagnosis and medical treatment. Over the 15-year span mortality from tuberculosis decreased by 50 per cent and smaller decreases were recorded in mortality from nervous and respiratory ailments as well as cholera infantum and other digestive illnesses. Yet, paradoxically and inexplicably, in the face of this apparent improvement in the overall health of Hamiltonians, stillbirths rose by at least 35 per cent, a circumstance all the more puzzling because of the decline in infant mortality from other causes. While it may be an outcome of more accurate registration, the apparent rise in stillbirths, coinciding as it does with the rapid industrial and demographic expansion of Hamilton, may provide some evidence of the inadequate care and nutrition of pregnant women or of unidentified environmental hazards to women either in the workplace or within the home. None the less, Hamilton mortality on the eve of World War I was lower than in 1900, principally because of fewer deaths attributable to tuberculosis and contagious diseases. Moreover, most of the improvement had occurred after 1910; in the first decade of the century, the health of Hamiltonians had appeared to deteriorate.

Another approach to the study of mortality in Hamilton is to examine patterns of mortality among specific age groups from particular causes in order to determine whether any age segment of the population might have been the beneficiary of lower mortality. To do this, data were compiled for the years 1900, 1905, 1910, and 1914 for seven age groups: infants, children aged 1 to 4 and 5 to 14, young adults 15 to 29, adults 30 to 49, and 50 to 69, and the elderly (over 70). In 1900 in Hamilton 70 per cent of infant mortality resulted from stillbirths, digestive disease (including cholera infantum, a commonly fatal diarrhoeal ailment that struck infants especially in summer), malformations, and what was simply termed "debility." Fifteen years later the percentage of deaths from the same causes had risen to 77 per cent, in spite of a 33 per cent decrease in mortality

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from digestive ailments, which the Health Department of course linked to a city-wide clean milk campaign begun in 1910. Reported infant deaths from tuberculosis had also dropped, but these particular data are suspect because deaths from tuberculosis in its many guises were often deliberately misreported as debility or pneumonia to spare the family from the social stigma attached to the dreaded disease. Hamilton's infant mortality fell from 218.3 (stillbirths included) in 1900 to 156.4 (stillbirths included) in 1914, but these 15 years were also characterized by sharp fluctuations in infant mortality. Whatever progress there had been in reducing infant mortality occurred after 1910, corresponding with the city's clean milk campaign. Before World War I, there were no major breakthroughs in other aspects of infant health care.

Nor did the sources of mortality among young children change perceptibly over these 15 years with the single exception of mortality from tuberculosis which, in 1900, comprised 12 per cent of the total mortality among this age group, but in 1914 was responsible for less than 4 per cent. For young children mortality attributable to contagious diseases remained constant (28.9 per cent in 1900 and 27.2 per cent in 1914). Deaths from diphtheria decreased from 15 per cent in 1900 to 10 per cent in 1914, indicative perhaps of the future permanent lower mortality from this disease which was, by 1914 in Hamilton, only beginning to respond to more accurate diagnosis and treatment. In contrast, the annual mortality from contagious disease among school children aged 5 to 14 fluctuated, and no consistently lower percentage can be documented during this period. In fact mortality from contagious disease appears to have risen from 25 per cent of the total in 1900 to 34 per cent in 1905 (this increase was exclusively attributable to diphtheria), then fell to 16.8 per cent in 1910, before soaring again in 1914 to 24.5 per cent. Nevertheless, among Hamilton school children, mortality from

contagious disease was lower than the average for children in Ontario's urban areas, which was recorded as 37 per cent in 1900, 29 per cent in 1905, 50 per cent in 1910, and 49.7 per cent in 1914. The somewhat reduced mortality among Hamilton school children in 1910 and 1914 may have been one of the benefits derived from the implementation of a hotly debated school medical inspection program instigated by Dr Roberts in 1909.

Among young adults aged 15 to 29, tuberculosis consistently was the greatest killer. "The white plague" killed nearly half (42.5 per cent) of the young adult Hamiltonians of both sexes who died in 1900, 32.9 per cent in 1905, 37 per cent in 1910, and 40.2 per cent in 1914. The most significant decrease in mortality among this age group occurred in contagious diseases, which followed a consistently downward course from 13.8 per cent in 1900 to 2.2 per cent in 1914. In 1900 no deaths were recorded from complications of childbirth, specifically blood poisoning, puerperal fever, and convulsions, but in 1914 seven deaths were attributed to these causes. While this increase cannot be interpreted as a trend, if

there were equal numbers of male and female deaths in this age group, these seven deaths would represent 15 per cent of all deaths among Hamilton women aged 15 to 29, a circumstance which, with the increases in stillbirths, raises some question about the quality of prenatal and maternal care in the city.

Data examined for Hamiltonians aged 30 to 49 also point to declining mortality from tuberculosis (27 per cent in 1900 and 16 per cent in 1914). Mortality from cancer, digestive, and nervous ailments rose. Among adults aged 50 to 69 mortality from tuberculosis also fell while the reported mortality from circulatory problems rose from 15.2 per cent to 24.7 per cent, and the percentage of deaths from genito-urinary problems, especially Bright's disease, which until the introduction of dialysis defied successful treatment, more than doubled. The only noteworthy variation in mortality among the elderly was a rising percentage of deaths from circulatory ailments, probably because of more accurate diagnoses (from 9 per cent in 1900 to 30 per cent in 1914), while the percentage of deaths simply due to



*Scottish and Irish Homes on Cannon Street West. n.d. United Church of Canada Archives, Toronto.*

“old age” dropped, a pattern which was repeated in all urban areas of Ontario.

In short, from 1900 to 1914, most of the decrease in the percentage of deaths from specific causes for various age groups in Hamilton occurred with reference to tuberculosis, contagious diseases, and, among infants, digestive ailments. Stillbirths, most components of infant mortality, and accidental deaths rose, as did (possibly) complications of childbirth and circulatory ailments among the elderly, although this may merely reflect better diagnoses. Provincial data, as well, seem to support the conclusion that the distribution of deaths attributable to any one specific cause remained remarkably constant for most age groups.

A final method of analyzing mortality patterns in Hamilton is to examine all the statistics relevant to mortality for a single year. In this case the data for 1910 have warranted a reconstruction of the distribution of mortality by geographical location within the city and, in a less satisfactory way, by age, sex, and occupation.<sup>24</sup> It must be acknowledged, however, that the selection of 1910 for this intensive investigation may somewhat prejudice the outcome of a micro-analysis because that year, which marked the onset of a period of accelerated growth, was scarcely a typical year in Hamilton's demographic development.<sup>25</sup> But at the same time an investigation of 1910, when mortality levels apparently peaked, exposes the city's health problems during a crucial growth cycle when concomitant socio-economic forces gained momentum and temporarily overwhelmed the city's limited capacity and willingness to regulate social and environmental conditions.

This detailed examination of mortality in Hamilton employs data pertinent to the 1,055 deaths that occurred in the city from 1 Jan. 1910 to 31 Dec. 1910. The cases were coded for age, sex, cause of death, address, and occupation of the deceased (or the

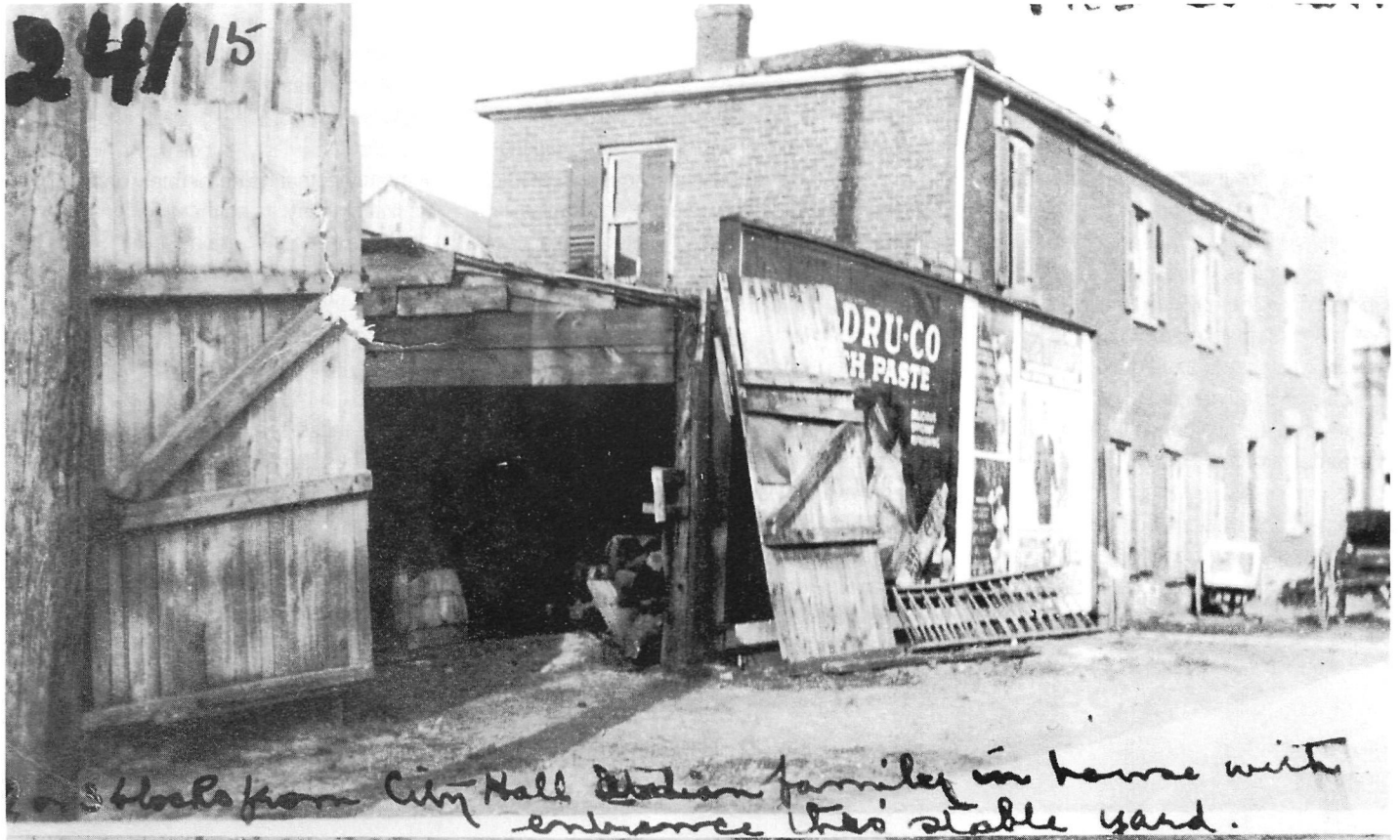
deceased parents). Some cases could not be given a geographic location because the death had occurred in a charitable institution, such as the Aged Women's Home or the Salvation Army House of Refuge; moreover, 75 persons who died, many of them elderly, simply had no reported address, a circumstance which suggests that during 1910 the city may have been home to a large floating population of vagrants. Nevertheless, 888 cases were located within a ward of the city and were assigned a ward code.

This limited analysis for 1910 is all the more interesting because it seems to demonstrate how figures could be manipulated by a medical health officer to produce the most politically desirable mortality rates. Although the number of reported deaths could not be altered, utilizing different population figures might produce a higher or lower mortality rate, and conflicting estimates of Hamilton's size were easy to find. For example, the registrar general of Ontario reported Hamilton's population for 1910 as 56,155, but the city assessment department recorded the population on 1 Oct. 1910 as 73,538.<sup>26</sup> The registrar general had earlier admitted that because of enumeration errors his department's mortality rates could be based on low population estimates and might be as much as 3 per 1000 too high.<sup>27</sup> On the other hand, the numbers generated by Hamilton's assessment department are even more suspect. Assessment figures published in October 1909 recorded Hamilton's population as of 1 Oct. 1909 as 67,268.<sup>28</sup> When new assessment data was released the following year, with the estimated population on 1 Oct. 1910 as 73,538, the figure for 1909 was given as 70,350.<sup>29</sup> Hamilton's mortality rate for 1910, which Dr Roberts reported at 13.8, seems to have been based on the 1,021 deaths in the city from 1 Nov. 1909 to 31 Oct. 1910, as well as the highest population estimate available - 73,538. This estimate permitted Roberts to compare his city's rates favourably with the provincial rate for the previous year (14.6) - a

figure that included stillbirths. What Roberts failed to disclose was that in his calculations he had omitted stillbirths which, if included, would have driven the city's mortality rate to 20.6. Roberts later acknowledged that all too-frequently mortality calculations might be inaccurate; that he deliberately chose to misrepresent the situation himself in 1910 may indicate that, in the face of a potential public health crisis, it was expedient for him to put a better face on the situation for the public.

Infant mortality was the largest single component of Hamilton's death rate for 1910. It was, and continues to be, a global concern. By the turn of the century infant mortality was widely accepted by public health reformers in Great Britain and North America as a sensitive indicator of the quality of environmental conditions, such as housing, sanitation, nutrition, and pure water. Because inadequate housing, overcrowding, and indifference to proper sanitation seemed to increase the incidence of, in particular, gastrointestinal ailments and cholera infantum, two leading causes of infant deaths,<sup>30</sup> infant mortality appealed to many public health reformers as a pressing social problem that might be amenable to medical intervention and environmental improvement.<sup>31</sup> Conversely, excessive infant mortality was increasingly interpreted by public health professionals as evidence of civic negligence and as proof of the presence of “those causes and conditions which in the long run determine a degeneration of race, . . . of the existence of evil conditions in the homes of the people.”<sup>32</sup> Although infant mortality in Hamilton had dropped by 25 per cent in the first decade of the 20th century, it remained a crucial issue, all the more so to middle-class reformers because falling birth rates among Anglo-Saxon Canadians aroused fears of race suicide.<sup>33</sup>

If statistics from death certificates for the calendar year 1910 and the births recorded by the registrar general are utilized,



*Italian Home with Entrance from the Stable Yard. United Church of Canada Archives, Toronto*

Hamilton's infant mortality rate was 116.4, and 167.1 if stillbirths are included. Figures from the registrar general for the year from 1 Nov. 1909 to 30 Oct. 1910 are slightly higher, at 125.7 and 176.1 respectively. These figures are confirmation of a marked drop in the city's infant mortality rate, which had been reported in 1900 as 172.5, excluding stillbirths. Yet this progress in ameliorating the infant death rate was of very recent origin; the rate had fluctuated during the decade and only two years earlier infant mortality had been reported as 158.3, excluding stillbirths (see Table II). But, appalling as these statistics are, infant mortality in Hamilton was, in fact, lower than the provincial urban average for 1910 (168.7, excluding stillbirths) or than that of Montreal, where during this

period approximately one in three babies died before its first birthday.<sup>34</sup> Hamilton's record, however, becomes less exemplary if it is compared with Australia and New Zealand, which in 1910 reported rates of 75 and 63 respectively (excluding stillbirths), or even with England and Wales, where extensive campaigns against infant mortality had been waged since 1900 and the reported rate had dropped to 105.<sup>35</sup>

More than 30 per cent (234) of Hamilton's recorded deaths in 1910 occurred among babies under one year of age. Seventy per cent of these babies died in the first six months of life, many from pneumonia, which had no effective medical treatment; one in four did not survive the first month, often from

the effects of prematurity (for babies born before full term, survival was a matter of luck and proper care). Although there are no estimates of births by ward to allow a description of infant mortality by ward in the conventional way, it is, none the less, noteworthy that the lowest percentage of infant deaths was recorded in Wards 1 and 2 which also had the lowest percentage of the total population. On the other hand, Wards 5, 6, and 8, where 35.9 per cent of Hamilton's population resided, accounted for almost half of the city's infant deaths. A more detailed examination by specific cause substantiates these ward-to-ward disparities in infant mortality and also identifies an interesting anomaly in the city's patterns of infant mortality. In Hamilton in 1910 29 per cent of



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all infant deaths were the result of cholera infantum. Surprisingly, Wards 1 and 2, essentially middle-class wards, did not have the lowest ratio of deaths from cholera infantum or diarrhoeal disease. In fact, nearly half of the infant deaths in Ward 2 were attributed to intestinal illness, and the lowest percentage of infant mortality from digestive ailments (19 per cent) was recorded in Ward 4, a working-class ward. A plausible explanation of the higher mortality from cholera infantum in the more affluent areas of a city was offered at the time by the medical health officer for Fort William, Ont., who realized that women in the more prosperous areas of Fort William had abandoned breast-feeding for the more convenient and modern, but less hygienic, bottle. The result was an increase in infant mortality.<sup>36</sup> It seems possible that the middle-

class mothers of Wards 1 and 2 had similarly adopted the more socially acceptable and highly promoted, but less sanitary, practice of bottle-feeding<sup>37</sup> and in so doing had reduced their infants' chances of surviving the first year of life. At the same time, most working-class mothers probably continued breast-feeding because it was more economical and efficient.<sup>38</sup> Perhaps it was this inequitable distribution of cholera infantum that stimulated middle-class women such as Adelaide Hunter Hoodless, whose own lives had been touched by the death of a child from cholera infantum, to organize Hamilton's clean milk campaign in 1910.<sup>39</sup> In spite of the apparent universality of cholera infantum, the fact nevertheless remains that Ward 2, the most affluent district of Hamilton with the highest average per capita values for taxable real property and a low population density,

had the lowest overall infant mortality rate, and that Wards 6 and 8 with high infant mortality were neighbourhoods with low property values and a high population density.<sup>40</sup>

If a baby born in Hamilton lived to celebrate its first birthday, its chances for survival to adulthood began to improve. In 1910 children aged one to four were at less risk from life-threatening disease than infants. Fifty-five deaths, 6 per cent of the city's mortality which was coded by ward, occurred in this age category and one in three of these deaths was attributed to a contagious disease. Respiratory ailments accounted for 29 per cent of the deaths and circulatory and nervous diseases combined for 25 per cent. Only 2 per cent of the mortality in this age group was attributed to



Old Stable Remodelled and Used for Housing. United Church of Canada Archives, Toronto

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tuberculosis. The geographic distribution of mortality among children one to four was similar to that for infants. Together Wards 1 and 2 recorded 7.5 per cent of the total deaths, while Ward 8 alone had 27.3 per cent. But again any conclusions must be circumscribed by the absence of age-specific population data that could corroborate the impression that mortality among young children was disproportionately higher in working-class Hamilton.

Hamilton assessment records do, however, provide tallies of young persons aged 5 to 21 by ward; hence, a rudimentary analysis of age-specific mortality for this particular group was possible. Usually this segment of any population is the healthiest, and in Hamilton in 1910 only 64 deaths (7 per cent of the city's total) occurred among the 17,162 persons aged 5 to 21 (approximately 24 per cent of the total population). The major cause of death for both sexes was tuberculosis, which accounted for a quarter of the deaths; 20 per cent of the deaths resulted from a contagious disease and 15 per cent from accidents. Again, the highest mortality occurred in Ward 8, with a rate of 48, more than double the 22.6 for Ward 1. Wards 5, 6, and 7 all recorded mortality rates in excess of 40, suggesting a possible correlation between high mortality (especially from tuberculosis) and high population density, overcrowded housing, and inadequate sanitation. Moreover, an analysis of mortality by ward for the entire adult population, aged 16 to 59, although it is not age-specific, corroborates the impression that Wards 5, 6, 7, and 8 accounted for a disproportionate share of both general mortality and mortality from tuberculosis.

Perhaps the most reliable indicator of a probable link between socio-economic circumstances and mortality is an analysis of differential mortality from ward to ward based on specific causes of deaths, data which have been used to good effect elsewhere.<sup>41</sup> In Hamilton, these estimates of mortality rates ranged from lows of 85.5 and 84.8 in

Wards 1 and 2 to highs of 138.3 and 140.9 in Wards 5 and 6. Predictably, mortality rates from specific diseases also differed from ward to ward. For example, mortality from contagious diseases was highest in Ward 8 (14.6) and lowest in Ward 1 (3.8) while mortality from tuberculosis was highest in Ward 5 (15.1) and lowest in Wards 1 and 4 (5.1 and 5.0). Even the incidence of cancer, a disease now considered to be at least partially environmentally induced, was lowest in Ward 1 and highest in Ward 6. Similarly, respiratory ailments, in particular pneumonia, which may derive from air pollution, produced higher mortality levels in Wards 4 to 8 and lower rates in Ward 1. This analysis, restricted as it may be, identifies mortality differentials, both per 10,000 of population and within specific categories of disease, which seem to correlate with the socio-economic condition of the occupants of the wards. In short, the lowest mortality rates in Hamilton in 1910 were found among that segment of the population least exposed to overcrowding and environmental blight and living in areas with the highest per capita property value. Conversely, higher mortality rates seem to have been consistent with residence in a ward with dense populations, low property values, and proximity to the industrial zone of the city. Within this context the high rates of infant mortality, and to a lesser extent mortality among young children and stillbirths in the city's working-class wards emerge as the striking features of Hamilton's mortality because of the possible nexus between these particular health problems and the quality of life in the city as measured by adequate nutrition and housing, satisfactory sanitation facilities, clean water and milk, acceptable childcare, and all the other ingredients for a relatively risk-free existence.

By 1912, Hamilton's mortality had begun to drop and the city's death rate of 14 per 1,000 population, based on the registrar general's reports, had moved closer to the provincial average (12.5) than to the overall urban mortality (15.8) and approximated the levels

of a decade earlier. In 1914 Hamilton's mortality rate of 12.8 matched the provincial average. Nevertheless, it is important to recognize that when general mortality rates were decreasing throughout the western world, mortality rates in Ontario, in its cities, and in Hamilton in particular were, in fact, still rising. And even though the magnitude of the increase may have been more apparent than real - depending on the trustworthiness of the records - disease, mortality, and their ecological causes remained ever-present problems in an urban setting. Like concerned citizens of other North American cities, in the early years of the 20th century Hamiltonians were caught up in the drive to improve and control both the environment and the social and cultural circumstances of their community. However, public health became just one of many issues addressed by civic officials, progressive men and women, and the press in their efforts to initiate reforms designed to improve the quality of life in the expanding industrial city. How much attention and money, relative to other concerns, public health matters received, except during outbreaks of epidemic disease, was largely dependent on the influence of the medical health officer, who, as a civic employee, was charged with the frequently contradictory duties of identifying and treating the perceived catalysts of ill-health and mortality in the city and, at the same time, of assuming the mantle of apologist for one of "the most healthful cities on the continent."<sup>42</sup>

Until 1905 when James Roberts, a 27-year-old McGill graduate, was appointed as medical health officer, Hamilton's health officer had usually been little more than a compliant caretaker whose public duties were confined to recording and quarantining cases of contagious diseases while he carried on a private practice to supplement his inadequate stipend. Roberts, on the other hand, was a zealot who eagerly took up the challenge as a full-time guardian of public health and launched a course of public health reform that embraced, to a greater or lesser extent, most of the problems and most

of the solutions characteristic of public health reform in North America after 1900.

As the foregoing analysis suggests, Hamilton in 1905 offered substantial scope for Roberts to apply whatever progressive public health measures he might have assimilated. Public apathy, civic criticism, and budgetary constraints, however, restricted Roberts's ability to be an innovator. Civic officials and business interests apparently did not subscribe to the dictum of George Whipple that investments in public health would pay "not only in the satisfaction of having clean and healthful cities to live in, not only in the joy of having relieved the suffering and saved the dying, but in ... hard cash."<sup>43</sup>

Consequently, sanitary improvements, such as a modern sewage disposal plant and stringent milk and food inspections, that might have compensated for some of the more adverse effects of urbanization, were often rejected by politicians and ratepayers, especially before 1910, leaving the Health Department to struggle with the containment, if not the eradication, of contagious diseases by traditional methods such as scavenging and the inspection of privy vaults. Similarly, the city's water supply and the water filtration and storage systems, for many years suspected by the Health Department as the major source of typhoid, frequently aroused public controversy, but not civic action. For example, in the summer of 1906 the quality of the public water supply became suspect. When the Provincial Board of Health investigated the source of the effluents flowing into Coal Oil Inlet, in the north-east section of the city, the inspectors ordered the removal of, among other potential pollutants, accumulated scrapings from cattle cars on the Grand Trunk Railway property, as well as five vats of decomposing swill, solid manure, and "liquid filth" at the Stroud livestock pens and the Freeman fertilizer works. The sewage disposal works and the storm sewer that emptied into the inlet were also designated as nuisances to be cleaned up.<sup>44</sup> When Roberts insisted on enforcing the orders against the owners of the businesses

implicated in this disaster (a serious typhoid epidemic - 99 cases and 11 deaths - struck the city at the same time), he was privately threatened, and members of the city council tried to persuade him to withdraw his allegations about the contamination of the city's water supply.<sup>45</sup>

The Coal Oil Inlet controversy established Roberts's reputation as a crusader for improved public health, a position which he enhanced with his subsequent campaign for a new isolation hospital separated from the city hospital, which lacked the appropriate facilities to treat contagious diseases. His endorsement of an isolation hospital was based on a variety of considerations. While a patient's treatment and recovery were of primary importance, Roberts also believed that the social and economic consequences of contagious illnesses for the patient's family were equally pressing. For example, only 55 of the 147 cases of scarlet fever reported in a six-month period during 1905 and 1906 had been accommodated in the isolation wing of the hospital. Because the other victims had to be cared for at home, Roberts speculated that their families had:

sustained the loss of their liberty for a period of six weeks. ... The bread winners ... with other members of the family, who contribute to the weekly income, were compelled to submit to the inconvenience, the hardships and the monetary losses of seeking homes or boarding houses elsewhere ... The weekly incomes of the bread winner, even when augmented by additions from an older boy or girl, are not sufficient in a large percentage of cases to stand any avoidable strain, especially in these strenuous times, when working folk pay high rents for houses in poor repair, and have to depend on heavy coal bills to keep them tolerably happy.<sup>46</sup>

His humane commentary on the social and economic problems that sickness might pose for working-class families distinguishes

Roberts as one of the rare individuals in Hamilton who appreciated the hazards of day-to-day life confronting many Hamiltonians. But his assumption that "no right thinking man or woman, in this enlightened day would place the saving of human life in the balance against dollars and cents" was not shared by city council and, like most of his suggestions to improve the health of Hamiltonians, Roberts's submission for an isolation hospital went unanswered and contagious diseases continued to claim many lives and to distress the poor.<sup>47</sup>

In 1912, after seven years as medical health officer, during which time he had confronted and antagonized civic officials and local medical practitioners both privately and publicly over the city's reluctance to support his recommendations, Roberts conceded that Hamilton was no different from other North American cities; it had reached "the threshold of ... adult life, with the cancers and plague infections incident to the maturity of most urban communities."<sup>48</sup> His vigilance and determination to compensate for the deleterious effects of accelerated industrialization and urban growth had not been rewarded. As he put it, "nature (had) indeed smiled upon our city," but social and economic change and civic apathy in equal parts had bred an alarming increase in the mortality and ill-health of Hamiltonians. His task had become "at best, a thankless one," and "if the adverse criticism levelled at the medical health officer by those whom he will not permit to endanger the lives of their neighbours, finds an ever listening ear in official circles, and if in addition he is subjected to the petty intrigue and petty vindictiveness of the narrow minded and illiterate, and at the same time receives no real encouragement from the better and more altruistic elements in the community, the evolution of the Health Department to a place of maximum usefulness I fear will be slow and painful."<sup>49</sup> Quoting Ruskin, whom he admired, Roberts cynically concluded that "any interference which tends to reform and protect the health of the masses is viewed by



*No. 1 Eljida Street houses 23 Bulgarian Men in 13 Beds. United Church of Canada Archives, Toronto*

them as an unwarrantable interference with their vested rights in inevitable disease and death."<sup>50</sup> Given Roberts's impressions, it seems that in Hamilton neither the middle class nor the working class provided a receptive and involved forum for his plans to implement even the most conventional public health measures such as an isolation hospital.

If, as Gerald Grob has argued, a society's response to death and disease elucidates its underlying values,<sup>51</sup> then, in the seeming absence of any consistent concern on the part of the city's administrators for the quality of life in Hamilton, James Roberts was all the more remarkable in his role as professional bureaucrat enforcing often minimal standards of public health within the constraints of a restricted budget and as a

social reformer trying against great odds to advance those standards in the light of recent scientific experience elsewhere. Although Hamilton faced critical social and environmental problems resulting from urban and industrial expansion, the city fathers only reluctantly enlarged the function of its health department from perfunctory custodial care of the people's health to encompass vigorous, well-funded crusades against a variety of threats, real and potential, continuous or transitory, affecting the health of Hamiltonians. Even after 1912, when a broader Provincial Public Health Act established province-wide standards for municipal water and waste disposal systems and extended the authority of the medical health officer, who could now be removed from his position only by the provincial board,<sup>52</sup> the Hamilton Board of Education

challenged the clause which gave the medical health officer final authority over vaccination because it regarded Roberts as an "impetuous" person who sometimes acted too hastily.<sup>53</sup>

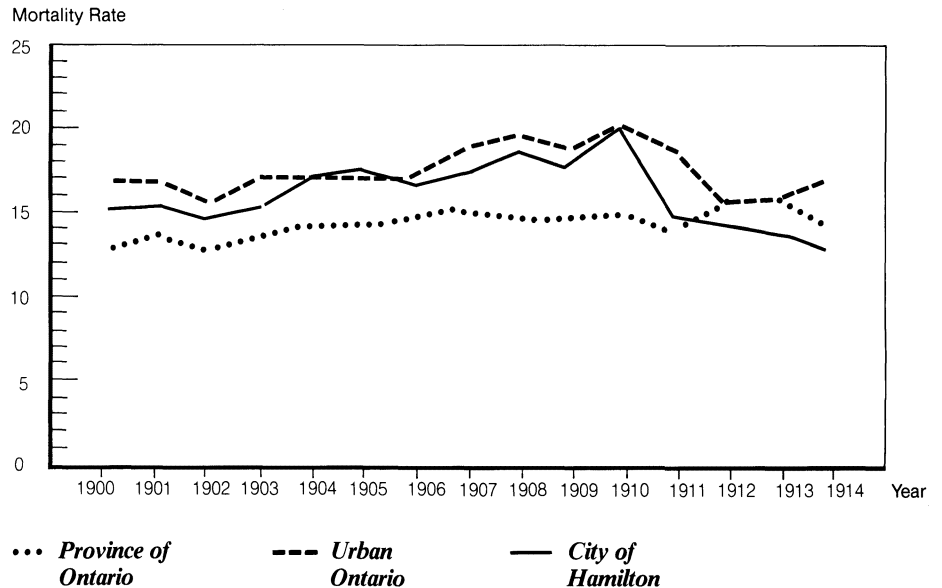
In Hamilton the period 1900 to 1914 was hardly a "golden age" of public health. Lower general mortality rates notwithstanding, a Hamiltonian, whose birth coincided with the enactment of the Ontario Public Health Act of 1884, and his children born in 1910 would, in childhood and as young adults at least, have been exposed to almost identical sources of disease and death. Moreover, although general mortality may have declined by 15 per cent, the geographic and categoric distribution of mortality remained much as it had been in 1900. Admittedly, 15 years may be insufficient time to view with

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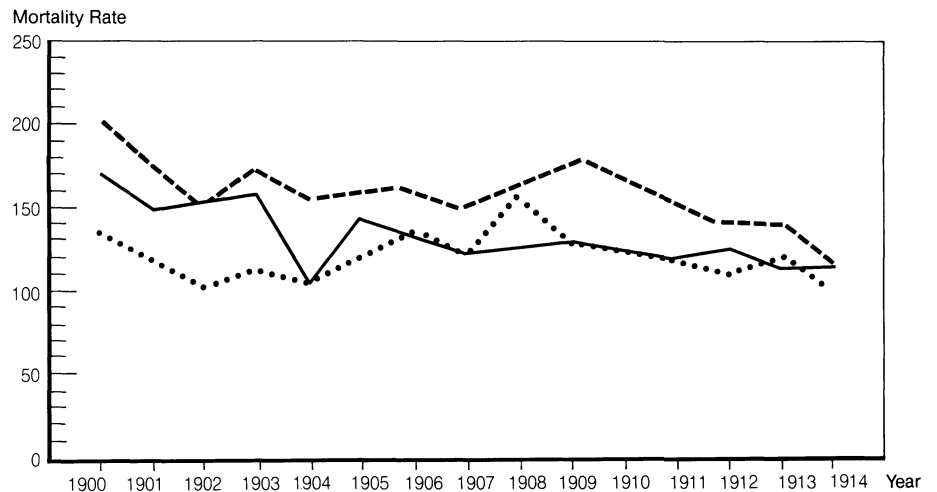
any certainty the changing health patterns of a large urban population, but, at the very least, this analysis of mortality from 1900 to 1914 exposes the unequal distribution of mortality and disease linked to an unhealthy environment in a turn-of-the-century city where any benefits from the application of the scientific and medical discoveries of the day appear to have been reaped by those who lived in favourable circumstances in the first place.

In retrospect, many components of mortality in Hamilton or elsewhere were probably not sensitive to the specific public health measures advocated at the time. Consequently, the improvements in the health of Hamiltonians that accrued before 1914 were largely fortuitous and only infrequently (perhaps in the case of the decreased infant mortality from cholera infantum) the result of adequately planned and sustained intervention. Insofar as public health in Hamilton might have been responsive to human ministrations, the evidence suggests that local voluntarism (subject as it was to public apathy, political expediency, and private interests) was a poor substitute for legislative reform on a wider scale. The results of this largely quantitative demographic analysis tend to confirm the conclusions drawn by interested contemporary observers and by more recent historians of the era of progressivism and social reform. Among the victims, infants and children of the working class were the most obvious casualties of an inhospitable environment which harmed those least able to exert any degree of control over their situation. As the Babies' Dispensary Guild demonstrates, middle-class reformers became aroused over the high incidence of infant mortality only when their own babies seemed at risk from contaminated milk supplies (when middle- and working-class interests temporarily coincided). Until then, married women who worked in factories had, like working women throughout North America and Europe,<sup>54</sup> been blamed for the city's high infant mortality on the assumption

**Table I**  
*Annual Mortality per 1000 Population in Hamilton, Urban Ontario and the Province of Ontario, 1900 - 14.*



**Table II**  
*Infant Mortality per 1000 Live Births in Hamilton, Urban Ontario and the Province of Ontario, 1900 - 14.*



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that they deliberately neglected their children.<sup>55</sup> Before World War I the middle- and upper-class women of Hamilton may have been ready to "rock the cradle for the world,"<sup>56</sup> but they were largely oblivious to the plight of the city's working-class and immigrant population on their own doorstep, except to castigate them as the most likely carriers of contagious diseases.<sup>57</sup> Public health reform was not, apparently, a popular cause among Hamilton's social activists. The consequences of their indifference were all too evident. In 1913, when the Methodist Church's Department of Temperance and Moral Reform launched possibly the first extensive sociological survey of an urban centre ever undertaken in Canada, it selected Hamilton. The final report was especially critical of the city's health department, its mortality rates, its social services, and the limited progress of urban reform.<sup>58</sup> In sum, the case of pre-World War I Hamilton seems to provide a perturbing antithesis to Simon Sretzer's revisionist conclusion that "the history of mortality decline shows that committed local government, or its analogous parochial institutions, (could) have quite considerable potential and scope as an agency to promote health improvement and general social change."<sup>59</sup>

**Table III**  
***Comparison of Mortality for Selected Diseases per 100,000 Population, 1900***

Disease Category	Hamilton	Buffalo	Cleveland	Detroit	Average US Cities	Average Ontario Cities
Typhoid	30.4	25.0	48.2	18.9	33.8	32.6
Whooping Cough	1.9	8.2	8.4	8.1	13.2	7.6
Diphtheria	39.9	2.4	51.6	46.9	59.2	58.7
T.B.	205.2	131.7	131.8	125.0	218.1	227.5
Digestive Ailments	181.1	133.4	113	151.2	153.1	202.2
Respiratory	182.4	158.6	185.7	162.8	241.7	185.0
Cancer	81.7	56.2	54.0	68.3	65.8	69.2
Circulatory	131.1	113.8	130.7	119.7	134.1	120.2
Nervous	167.2	162.6	254.4	214	206.2	220.5
Genito-urinary	55.1	88.8	58.7	75.6	120.0	57.0
Old Age	98.8	35.5	55.0	57.4	45.7	114.9
Total	1174.8	940.2	1085.8	1045.3	1290.9	1295.4

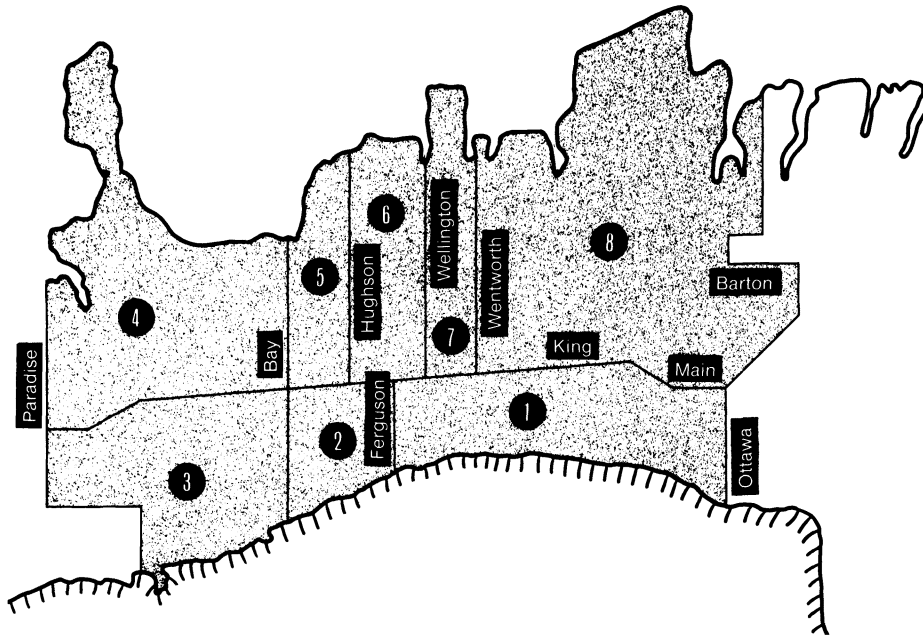
Sources: OSP, Registrar General Report, 1901; G. A. Condran and E. Crimmins-Gardner, "Public Health Measures and Mortality in U.S. Cities in the Late Nineteenth Century," *Human Ecology* 6 (1978).

**Table IV**  
***Mortality by Ward and Cause per 10,000 Population, Hamilton, 1910***

Cause	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8
Contagious	3.8	4.6	7.1	6.9	8.2	8.8	17	14.6
T.B.	5.1	6.2	10.6	5.0	15.1	8.8	9.7	6.7
Cancer	2.6	6.2	7.1	6.9	6.9	7.9	5.8	4.5
Stillbirths,								
Infancy	31.9	13.9	37.2	32.7	53.5	54.6	36.0	52.7
Respiratory	3.8	9.2	10.6	13.8	15.1	15.0	14.6	13.4
Accidents	1.3	6.2	2.7	5.0	9.6	4.4	-	5.6
General	6.4	12.3	8.0	3.0	6.9	10.6	10.7	9.0
Nervous,								
Digestive,	26.8	23.1	31.0	25.8	27.5	28.2	31.2	29.2
Circulatory								
Old Age	3.8	3.1	6.2	4.0	5.5	2.6	3.9	-
Total	85.5	84.8	120.5	103.1	138.3	140.9	113.6	125.8

Sources: Hamilton, *Death Certificates, 1910*; *City Directory, Hamilton, 1910*

**Ward Boundaries 1910 to 1919**



**Notes**

- 1 G.D.Porter, "Tuberculosis Mortality in Ontario," *Ontario Public Health Journal*, 2 (March 1911), 11
- 2 George Whipple, "The Uses of Vital Statistics in the Public Health Service," *Public Health Journal*, 4 (June 1913), 353.
- 3 Thomas McKeown and R.G.Record, "Reasons for the Decline of Mortality in England and Wales during the Nineteenth Century," *Population Studies*, 16 (1962), 120; Thomas McKeown, R.G. Record, and R.D. Turner, "An Interpretation of the Decline of Mortality in England and Wales During the Twentieth Century," *Population Studies*, 29 (1975), 390-91.
- 4 Edward Meeker, "The Improving Health of the United States, 1850-1915," *Explorations in Economic History*, 9 (1972), 353-73.
- 5 Judith W. Leavitt, *The Healthiest City: Milwaukee and the Politics of Health Reform* (Princeton, N.J. 1982), 7.
- 6 Gretchen Condrón and Eileen Crimmins-Gardner, "Public Health Measures and Mortality in U.S. Cities in the Late Nineteenth Century," *Human Ecology*, 6 (1978), 27-54.

- 7 See C. R. Koppes and W. P.Norris, "Ethnicity, Class, and Mortality in the Industrial City: A Case Study of Typhoid Fever in Pittsburgh, 1890-1910," *Journal of Urban History*, 11 (May 1985).
- 8 Simon Sretzer, "The Importance of Social Intervention in Britain's Mortality Decline c. 1850-1914: A Reinterpretation of the Role of Public Health," *Social History of Medicine*, 1 (April 1988), 1-38.
- 9 Paul Bator, "Saving Lives on the Whole Sale Plan: Public Health Reform in the City of Toronto, 1900-1930" (unpublished Ph.D. thesis, University of Toronto, 1979), 331.
- 10 See, for example, Richard Allen, "The Social Gospel and the Reform Tradition in Canada, 1890-1928," *Canadian Historical Review*, 49 (December 1968), 381-99; Alan Artibise, *Winnipeg* (Montreal, 1975); Suzann Buckley, "Ladies or Midwives? Efforts to Reduce Infant and Maternal Mortality," in *A Not Unreasonable Claim: Women and Reform in Canada, 1880s-1920s*, ed. Linda Kealey, (Toronto, 1979), 131-50; Terry Copp, *The Anatomy of Poverty* (Toronto, 1974); Michael Piva, *The Condition of the Working Class in Toronto, 1900-1920* (Ottawa, 1979); Neil Sutherland, *Children in English-Speaking Canada* (Toronto, 1976).
- 11 For a preliminary report of a more comprehensive analysis of infant mortality in Montreal encompassing cultural factors, see Patricia Thornton, Sherry Olson, and Quoc Thuy Thach, "Infant Mortality in Montreal in 1860: The Roles of Culture, Class and Habitat," *Shared Spaces/Partage de l'espace*, no. 9 (September, 1987).
- 12 John C. Weaver, *Hamilton. An Illustrated History*, (Toronto, 1982), 93.
- 13 Michael Doucett, "Working Class Housing in a Small Nineteenth Century City: Hamilton, Ontario 1852-1881 in *Essays in Canadian Working Class History*, ed. G.S. Kealey and Peter Warrian (Toronto, 1976), 99.
- 14 City of Hamilton, *Assessment Roll*, 1910.
- 15 B. L. Pierce, "Society and Labor in An Expanding City," in *The Urbanization of America: An Historical Anthology*, ed. A.M. Wakstein (Boston, 1970), 247.
- 16 *Hamilton Spectator*, 15 May 1905.
- 17 *Spectator*, 18 Oct. 1905.
- 18 Hamilton Board of Health, *Annual Report*, (hereafter ARHBH), 1909-10, 21.
- 19 The population figures used in estimating the mortality rates for Hamilton have been drawn from the Province of Ontario, *Sessional Papers* and Office of the Registrar General, *Reports*.
- 20 Condrón and Crimmins-Gardner.
- 21 Province of Ontario, *Sessional Papers* (hereafter OSP), 1902, No.36, 96-97; *Spectator*, 16 Aug. 1901.
- 22 See William H. McNeill, *Plagues and Peoples* (New York, 1976), 64-66.
- 23 See Leavitt, *The Healthiest City*, 36, for an analysis of the relationship between ethnicity and mortality and morbidity. She concludes that while ethnicity may have been a factor in a high incidence of contagious disease, the physical characteristics of immigrant neighbourhoods "helped to define the quality of life and contributed to the excess of mortality experienced by the inhabitants."
- 24 These data were obtained from the records of the City of Hamilton which were, at the time (1981) accessible to the public. These records have now been moved and access has been restricted. At no time was there any attempt to record other than numerical data in order to protect the privacy of individuals.

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- 25 Weaver, 93.
- 26 *Spectator*, 4 Oct. 1910.
- 27 *OSP*, 1909, no.19, 18.
- 28 *Hamilton Herald*, 1 Oct. 1909.
- 29 *Spectator*, 4 Oct. 1910.
- 30 George Rosen, *A History of Public Health* (New York, 1958), 342.
- 31 See Harvey Levenstein, "'Best for Babies' or 'Preventable Infanticide'? The Controversy over Artificial Feeding of Infants in America, 1880 - 1920," *The Journal of American History* 70: 1 (June 1983), 84.
- 32 Sir John Simon, quoted in *ARHBH*, 1909-10, 6.
- 33 Carol Bacchi, *Liberation Deferred? The Ideas of the English-Canadian Suffragists, 1877-1918* (Toronto, 1983), 104-6.
- 34 Terry Copp, *The Anatomy of Poverty* (Toronto, 1974), 93.
- 35 *Seventy-third Annual Report of the Registrar-General of Births, Deaths and Marriages in England and Wales* (London, 1910); 1912 as cited in Emma Duke, "Infant Mortality: Results of a Field Study in Johnstown, Pa.," (United States' Children's Bureau, Pub.no.9, Washington, D.C., 1915) as cited in *Children and Youth in America: A Documentary History*, Vol. 2, 1866-1932 (Cambridge, Mass., 1971) ed. R. H. Bremner, 967.
- 36 R. Wodehouse, "Vital Statistics Pertaining to Infant Mortality," *Public Health Journal*, 2 (August 1911), 363.
- 37 See Levenstein for a discussion of the hazards for the bottle-fed infant.
- 38 Carol Dyhouse, "Working-Class Mothers and Infant Mortality in England, 1895-1914," *Journal of Social History*, 12 (winter 1978), 255.
- 39 Ruth Howes, "Adelaide Hunter Hoodless," in *The Clear Spirit* (Toronto, 1966), ed. M. Q. Innis, 106-7; Cheryl MacDonald, *Adelaide Hoodless, Domestic Crusader* (Toronto, 1986), 18.
- 40 City of Hamilton, *Assessment Roll*, 1910.
- 41 See Condron and Crimmins-Gardner, for example.
- 42 *OSP*, 1902, no.36, 94.
- 43 George Whipple, *Typhoid Fever. Its Causation, Transmission and Prevention* (New York, 1905), 285, as cited in E. Meeker, "The Social Role of Return on Investment in Public Health, 1880-1910," *Journal of Economic History*, 24 (June 1974), 419.
- 44 *OSP*, 1908, no. 36, 55.
- 45 *Spectator*, 21 Sept., 1 Oct., 1906.
- 46 *ARHBH*, 1905-6, 10.
- 47 *ARHBH*, 1905-6, 13.
- 48 *ARHBH*, 1912, 19.
- 49 Hamilton City Council, *Minutes*, 14 July 1914.
- 50 *Hamilton Times*, 24 Jan. 1915
- 51 Gerald Grob, "The Social History of Medicine and Disease in America: Problems and Possibilities," *Journal of Social History*, 10 (July 1977), 396.
- 52 J.T. Phair, "Public Health in Ontario," in *The Development of Public Health In Canada* (Toronto, 1940), ed. R. D. Defries, 212.
- 53 *Spectator*, 20 Feb. 1912.
- 54 Dyhouse, 251.
- 55 *OSP*, 1902, No.36, 94.
- 56 Lottie McAlister, *Clipped Wings* (Toronto, 1899), 279, as cited in Wayne Roberts, "Rocking the Cradle for the World," in *A Not Unreasonable Claim*, ed. Kealey, p.18.
- 57 *Hamilton Times*, 28 June 1913.
- 58 *Report of a Preliminary and General Social Survey of Hamilton, April, 1913, made by the Department of Temperance and Moral Reform of the Methodist Church and the Board of Social Service and Evangelism of the Presbyterian Church in co-operation with the Community Council of Hamilton*, (Toronto, 1913), 35-45.
- 59 Sretzer, 37.