

HISTORICAL AND PRESENT-DAY TUBERCULOSIS IN
HAMILTON, ONTARIO:
A PUBLIC HEALTH FOCUS

BY

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Abstract

Tuberculosis is one of the oldest diseases known to human kind. This research focussed on this disease because of its historical and present-day significance in public health. Data were collected from the Hamilton Board of Health's Annual Reports from 1905 to 2000, the Hamilton Board of Health's Minutes from 1884 to 1949 and the Hamilton Health Association's Annual Reports from 1907 to 1974. Three movements of public health—sanitary, germ and "new"—were the frameworks for data analysis. Over the course of the public health eras, tuberculosis surveillance, treatment, prevention and responsibility were found to shift according to changes in ideas associated with public health. The Hamilton tuberculosis data were also found to support the ideas and theories associated with each epoch in public health, such as the sanitary movement's link between health and the environment, the germ era's "lifestyle" theory and the "new" public health's emphasis on community. The Hamilton tuberculosis experience also illuminated an intricate relationship between tuberculosis education, surveillance and responsibility. This study of tuberculosis in Hamilton is not only historically interesting but, as tuberculosis continues today as a public health issue, some of the efforts undertaken in Hamilton at the turn of the 20th century are being resurrected in Hamilton at the start of the 21st century.

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Chapter 1 Introduction

Tuberculosis is one of the oldest known diseases affecting the human race (Dubos and Dubos, 1952). It has been found in all cultures and geographic areas in the world.

Tuberculosis has claimed more human lives than any other known disease. A few short decades ago, it was thought that this disease could be overcome through advances in medicine, such as chemotherapy. Unfortunately, this has not been the case. In the mid-1990s, according to the World Health Organization, tuberculosis was estimated to infect approximately 1.7 billion people worldwide; to kill an estimated 3 million individuals a year; and is expected to infect 300 million people per year (Turnock, 1997; Farmer 1999).

Hamilton has not been exempt from the scourge of tuberculosis. During most of the 1800s, the disease gravely impacted Hamilton's citizens. By the turn of the 20th century, however, strides were being made in Hamilton to combat tuberculosis. Efforts to this effect included the building of the Mountain Sanatorium, the opening of the Downtown Dispensary of the Sanatorium, tuberculosis educational campaigns, the passing of city by-laws requiring milk pasteurization, the banning of public expectoration and the institution of school medical inspection. By the middle of the 20th century tuberculosis activities in Hamilton included mass surveys of the citizens of Hamilton, workers in industry, secondary school students, welfare recipients and their children, the elderly, staff of the Board of Education, prisoners and the unemployed.

The past fifty years have witnessed a drop in tuberculosis case rates in Hamilton. Unfortunately, the 1990s witnessed a reversal of this trend—tuberculosis rates increased for the first time in many decades. At the start of the new millennium, tuberculosis case rates in Hamilton have continued to increase. It is expected that in the future the number of individuals with tuberculosis in Hamilton will continue to rise.

1.1 Objectives of This Research

The origins of this thesis began with an interest in tuberculosis in Hamilton and in public health. As literature was reviewed it became evident that the Hamilton tuberculosis experience coincided with movements in public health and public health theories.

The objectives of this thesis are as follows:

1) *To explore tuberculosis surveillance, prevention and treatment methods in Hamilton from both historical and present-day perspectives.*

The methods of tuberculosis surveillance, treatment and prevention have changed greatly since the late 19th century, as has the rationale behind the efforts. Investigating these activities over the past one hundred years offers a clear picture of the nature of tuberculosis surveillance, prevention and treatment and provides the substance for Objective 3.

2) *To gather historical and present-day statistics on tuberculosis in Hamilton.*

The statistics provide a testament to the medical efforts surrounding tuberculosis.

Changes in treatment approaches were also occasionally reflected in the statistics. The statistics also aided in filling out the picture of tuberculosis in Hamilton.

3) *To examine how surveillance, prevention and treatment methods for tuberculosis in Hamilton have coincided with movements in and theories of public health.*

The surveillance, prevention and treatment of tuberculosis did not take place in a vacuum but were affected by prevailing attitudes and general social movements. This historical investigation could not be complete without analyzing the context in which the tuberculosis movement occurred.

1.2 Contributions of This Research

This research contributes to the literature on tuberculosis and on public health in a number of ways:

1) There is no one piece of literature that has synthesized the historical information on tuberculosis contained in the Hamilton Board of Health's¹ Annual Reports and Minutes

¹ There have been many name changes since the inception of the original Board of Health in 1884. The Board of Health existed from 1884-1921, Department of Health from 1922-1954, Health Department from 1955-1967, Hamilton-Wentworth Health Unit from 1968-1973, Hamilton-Wentworth Regional Health Unit from 1974-1976, Board of Health, Hamilton-Wentworth Region from 1977-1978, Hamilton-Wentworth Regional Board of Health from 1979-1985, The Regional Municipality of Hamilton-Wentworth, Department of Public Health Services from 1988-1990, Hamilton-Wentworth Department of Public Health Services from 1991-1994, Hamilton-Wentworth Regional Public Health Department from 1995-1997, and Social and Public Health Services Division, City of Hamilton and Region of Hamilton-Wentworth from 1999-2000. Due to missing Annual Reports (1986 and 1987), it is unknown when the name of the

and the Hamilton Health Association's Annual Reports. Books have been written on Hamilton's Mountain Sanatorium, but these books only briefly discuss tuberculosis in the City of Hamilton.

2) After a thorough literature review, it was evident that nowhere in the literature had there been a systematic account of how the surveillance, treatment and prevention of tuberculosis related to the theories of and movements in public health. Some literature discussed the early tuberculosis movement and public health but none discusses how present-day tuberculosis prevention, surveillance and treatment relates to public health today.

1.3 Chapter Overview

The nature of this study is primarily historical. In order to make sense of the data, the most logical approach was to follow a time line and then discuss the data according to categorical themes.

Chapter 2 is devoted to data-collection methodology. Detailed descriptions of the Board of Health's Minutes² and Annual Reports³ and the Hamilton Health Association's

Social and Public Health Services Division, City of Hamilton and Region of Hamilton-Wentworth from 1999-2000. Due to missing Annual Reports (1986 and 1987), it is unknown when the name of the Hamilton-Wentworth Regional Board of Health changed to The Regional Municipality of Hamilton-Wentworth, Department of Public Health Services.

² References to the Board of Health's Minutes are written as (Minutes, year).

³ References to the Board of Health's Annual Reports are written as (Annual Report, year). For the sake of simplicity, all the Board of Health's Annual Reports are named Annual Report even though the actual title of a particular Report may vary.

Annual Reports⁴ are given. Also contained in the chapter are specific accounts of data collection, problems encountered with the data and methods to overcome these difficulties.

Chapter 3 outlines the disease of tuberculosis from medical and social perspectives. Descriptions of the disease, its treatment and statistics are included in this section.

Chapter 4 discusses three movements of public health: sanitary, germ⁵ and “new”. The first part of the chapter discusses definitions, the function and theories of public health. The second half of this chapter reviews the public health movements and outlines the basic ideas, principles and treatment approaches associated with each era.

Chapter 5 explores the sanitary movement. Expanding on the ideas of the previous chapter, evidence taken from the Hamilton experience is offered and discussed.

Chapter 6 is dedicated to the germ epoch. This particular chapter is broken down according to sub-headings—surveillance, education, regulation and responsibility—and the Hamilton tuberculosis data are employed to investigate these topics.

Chapter 7 profiles the “new” public health movement in the same fashion as the preceding two chapters. Once again, the Hamilton data are employed as illustration.

Chapter 8 offers a summary of the public health movements. A discussion of the theories of public health with a view to the Hamilton tuberculosis data ensues.

⁴ References to the Hamilton Health Association’s Annual Reports are written as (HHA, year).

⁵ In some literature the germ movement is titled the bacteriological movement. For matters of simplicity, the former term will be used in this thesis.

Conclusions, future directions for tuberculosis in Hamilton and the contributions of this thesis are also provided.

Chapter 2 Methodology

The data collected for this thesis were taken from a number of sources: Minutes from the Hamilton's Board of Health⁶, Annual Reports of the Hamilton Board of Health and the Annual Reports of the Hamilton Health Association.

2.1 Board of Health Minutes

The Minutes from the Hamilton Board of Health were read from its inception in 1884 to 1949. Information pertaining specifically to tuberculosis was gathered from the Minutes from 1888 to 1946, after which the Minutes no longer contained references to tuberculosis. While a number of motions and decisions surrounding tuberculosis made by the Board of Health were found in the Minutes, much data were lacking. Frequently information located in the Board of Health's Annual Reports would not have any corresponding reference in the Board of Health's Minutes, and *vice versa*. The Minutes were read to gain insight into some of the tuberculosis treatment and care decisions found in the Board's Annual Reports. While the information in the Minutes is historically interesting, the Minutes themselves did not offer much in terms of shedding light on the tuberculosis activities of the Hamilton Board of Health.

⁶ Please refer to the Introduction for subsequent name changes.

2.2 Board of Health Annual Reports

The Annual Reports of the Hamilton Board of Health were gathered from Special Collections in the Hamilton Public Library's Central Branch and the Public and Social Services Library in Dundas, Ontario. The following is a list of years that the Annual Reports were available: 1905, 1906, 1907, 1910, 1912, 1913, 1917, 1918, 1920-1940, 1943, 1946-1985, and 1988-2000. The missing years could not be located elsewhere. The data contained in the Annual Reports followed a general trend from very detailed reports to mere reporting of statistics. The Reports for the years 1905-1940 proved to be the most data rich. Not only were statistics a part of these Reports but the thoughts and opinions of the Medical Officer of Health were also included. These opinions ranged from the adequacy of tuberculosis treatment the year in which the Reports were written to the future of tuberculosis eradication activities. The Medical Officer of Health would often explicitly state the reasons for using certain approaches to tuberculosis surveillance, treatment and prevention in Hamilton and how effective these efforts were.

From 1943-1970, the content of the Annual Reports changed to statistics, which were plentiful. Discussions in the Reports were purely descriptions of the statistics; no opinions, thoughts or speculations were included. It was difficult, therefore, to comprehend the reasons behind the use of and change in various tuberculosis treatments on the basis of the Reports.

The Annual Reports from 1970-2000 contained little data. Save for three outbreaks of tuberculosis in Hamilton (two in 1984 and one in 1985) in which details concerning coping methods were outlined, the only information contained in these

Annual Reports were the numbers of tuberculosis deaths and cases, except for 1979, 1992 and 1998 in which nothing on tuberculosis was printed. In the 1990s, the information on tuberculosis changed in that a few lines about the educational activities of the Tuberculosis Control Branch were recorded in addition to the statistics. The decrease in data quality and quantity from 1970-2000 can be explained by the decreasing numbers of tuberculosis cases in Hamilton-Wentworth. Tuberculosis during this period was no longer a serious public health threat and therefore little was written about the disease in the Annual Reports. The lack of qualitative data made discussions of tuberculosis surveillance, treatment and prevention during this time frame nearly impossible.

2.3 Hamilton Health Association Annual Reports

The Annual Reports for the Hamilton Health Association (HHA) were read in order to obtain further information regarding the early days of the tuberculosis movement in Hamilton. Reading these Reports was crucial to this investigation of tuberculosis in Hamilton because it was the activities of the Health Association which started the City's tuberculosis movement; the Association opened the Downtown Dispensary and provided the Dispensary's visiting nurse and physician. Each of these was critical to the early work in the tuberculosis campaign. The Reports were read from 1907-1974, with the exception of 1910 and 1928, as no Reports were written. After 1971, when the Hamilton Health Association became the Chedoke Hospitals, the Annual Reports no longer contained information regarding tuberculosis treatment. The Reports from 1907-1927 were filled with details about tuberculosis treatment, surveillance and educational

activities in Hamilton (in addition to discussions about the Sanatorium) and the rationale behind these efforts. These discussions often supplemented those found in the corresponding Annual Reports of the Board of Health. The Association's Annual Reports from 1928 until the late 1930s were identical—with respect to the treatment of tuberculosis in the general population, excluding the Sanatorium—to those found in the Annual Reports of the Department of Health. This is because the Hamilton Department of Health had assumed responsibility for the majority of the HHA's work, including the Chest Clinic by 1928. From 1940 onward, there was little information regarding general tuberculosis treatment in Hamilton, save for the mass surveys conducted by the Association. Instead, the discussion in the Reports focussed on the Sanatorium.

2.4 Data Collection

The data collected for this thesis were gathered according to the Research Objectives found in the Introduction. These objectives were kept in mind while reading the various reports.

The Minutes from the Board of Health consist of four volumes of mostly handwritten notes. It was important to read all the minutes because it was uncertain, at the time of the reading, what would be useful information for this present study; these Minutes were the first reports read. Therefore, any decisions or motions of the Board regarding how tuberculosis was treated or prevented were copied and referenced. Also included were activities or decisions which were not solely about tuberculosis, but affected either how the disease was treated or prevented, e.g., the inspection of meats and

the pasteurization of milk (tuberculous cows were a source of infection), and the construction of the bacteriological laboratory.

The Annual Reports of the Hamilton Health Association were the last of the reports to be read. Any mention of the tuberculosis movement in Hamilton in the Reports prior to 1928, with the exception of discussions of the Sanatorium, was recorded. Between 1928 and 1939, the Association's Reports contained identical information to the Board of Health's Annual Reports and, therefore, the data from the Association's Reports were not recorded. The little amount of relevant information about tuberculosis treatment in Hamilton, with the exception of the Sanatorium, found in the Association's later Annual Reports (1940-1971) were collected and recorded.

There were, however, occasions where greater detail was found in the Association's Reports compared with the Board's Reports. The Board's Annual Reports, for instance, referred only briefly to the Edinburgh System of treatment of tuberculosis, the model which was employed in Hamilton at the turn of the 20th century; very little background information on the System was provided. In a number of the Association's Reports, there was much discussion regarding the arrival of the Edinburgh System to Hamilton because it was the Association—not the Board of Health—which took interest in this particular mode of treatment (see 6.2.3). In cases such as this, where the Association's Annual Reports augmented the Board of Health's Reports, information from the Association's Reports was gathered and referenced.

The Annual Reports of the Board of Health were then read, between the Board's Minutes and the Association's Reports. The majority of the data regarding tuberculosis

in Hamilton were collected from the Board's Annual Reports. It was unknown at the time of collection how many of the statistics would be included in this thesis; therefore, *all* the statistics found in the Reports were extracted and recorded in spreadsheets. Similarly, all information regarding tuberculosis, such as treatments and their effectiveness, efforts at prevention, public education, mass surveys and the opinions of the Medical Officer of Health, found in the Annual Reports was noted and referenced. This included data found in the Introduction of the Reports written by the Medical Officer of Health.

2.5 Analytic Strategy

After data collection was completed, the data were organized in chronological order, according to source. The data were then read in chronological order beginning with the Annual Reports of the Board of Health, followed by the Minutes of the Board. The Hamilton Health Association's Annual Reports were read last. The data were read a second time and major themes were extracted. These main categories (surveillance, prevention and treatment) reflected the Objectives of this research—to explore tuberculosis surveillance, prevention and treatment methods in Hamilton from both historical and present-day perspectives. The data were then classed according to these three major themes. Each of the three groupings—surveillance, prevention and treatment—was refined into smaller categories after a third reading of the data. A chronological theme chart was created where the major and minor themes were categorized according to 10-year intervals. This provided the opportunity to observe

changes in the groupings from 1884 to 2000 and to set the boundaries for the inclusion of minor themes. The smaller categories were subjected to one criterion for inclusion in the thesis—that the topic remained in either one, two or all three of the data sources (Annual Reports of the Board of Health and the Hamilton Health Association and the Minutes of the Board of Health) from the early 20th century to the present. Discussions surrounding the establishment of a bacteriological laboratory in Hamilton to aid in the diagnoses of infectious disease were present in the early Minutes and Annual Reports of the Board of Health. With the establishment of the laboratory sometime before 1920⁷, no further information on this topic was found in the data sources. The minor themes which satisfied the criterion for inclusion in this thesis were nursing, school surveillance, the Downtown Dispensary and Chest Clinic, surveys, education, tuberculosis regulation and responsibility. It was through this inductive approach to the data that the major and minor themes were established for this thesis.

2.6 Problems with the Data

The greatest difficulty in employing historical information stemmed from the fact that the data were inconsistent. For example, many of the older reports of the Board of Health's Annual Reports were not kept. Attempts were made to find some of the data through the Board's Minutes, but this proved unsuccessful. The Hamilton Health Association's Annual Reports, however, were excellent in filling in gaps left by the missing Reports of the Board of Health because of the Association's strong involvement with the Board of

⁷ The exact year the laboratory was established is uncertain.

Health in the treatment, surveillance and prevention of tuberculosis, especially prior to the 1930s. In combining the Annual Reports of the Hamilton Health Association and the Board of Health, a fairly complete picture of the treatment of and the issues surrounding tuberculosis was obtained, particularly before the 1940s.

From 1940-1945, very little information regarding the disease of tuberculosis in Hamilton was found. The Annual Reports from the Board of Health for this period—except for 1943—were not found. These Reports may have not been published during the war. The Minutes from the Board contained only one entry regarding tuberculosis for this period. The Annual Reports of the Hamilton Health Association contained information about the Sanatorium but did not have any information about the general treatment of the disease in the city of Hamilton. Due to this lack of data, it was, therefore, next to impossible to state anything regarding tuberculosis activities during this period of time.

The Board of Health's Annual Reports from 1946-1969, as mentioned above, contained mostly statistics. The statistics were explained, but only briefly. Some of the methods of treatment of tuberculosis were outlined, but this occurred only in conjunction with the statistics. It was possible to piece together some of the tuberculosis treatment methods based on the short discussions of the statistics. What was lacking was the rationale behind these treatments and how useful the treatments were. Occasionally, comments were made regarding patient drug resistance and the difficulties surrounding patient co-operation, but little else was mentioned. Because of this lack of information, it was very difficult to assess the efficacy of tuberculosis treatment during this period.

The Annual Reports of the Hamilton Health Association from 1946-1971 contained information on the Sanatorium and the mass surveys in which the Association participated. The President's Address often contained warnings about possible complacency with respect to finding cases of tuberculosis. Beyond these two elements of discussion—the mass survey and the President's Address—there was no information relating to the general treatment of tuberculosis in Hamilton. In this regard, for this period, the Annual Reports of the Association were not useful in illuminating any information beyond what was contained in the Board of Health's Annual Reports.

Another major problem, which was limited to the early years of the Board of Health's Annual Reports (up to the 1940s), was contradictory data. In a number of instances, the case or death rates for one year would be published differently in another Annual Report. When this situation occurred, the data for the year in question would be taken from that year's Annual Report, not from subsequent Annual Reports. It was assumed that the mis-reporting in the later Reports was due to transposing of numbers or a mis-reading of the data. Mention of the inconsistent reporting of statistics was not found in any of the Reports. In using the data from the year in which the Annual Report was written and not using those found in following Annual Reports, an effort was made to overcome this consistency issue.

A concern with employing the Annual Reports of the Board of Health and the Hamilton Health Association was that the Reports were written for a specific audience and, thus, were potentially biased. For example, the Annual Reports of the Hamilton Health Association were written not only for its members, but also for possible donors to

the Association. The tone of the Association's Reports was usually optimistic; possibly to convey to the reader that the work of the Association was not only fulfilling a need in society but that it was doing so with success. It is unclear for which audience the Board of Health wrote its Annual Reports. Much like the Hamilton Health Association's Annual Reports, the Board's Reports were also optimistic. In neither the Annual Reports of the Hamilton Health Association nor the Board of Health was there mention of reasons, outside the Board and Association's efforts, for the possible decline in tuberculosis rates in Hamilton. Better housing, increased wages and improved nutrition were societal factors which influenced tuberculosis rates, not only in Hamilton, but also in North America and Europe. These factors were never raised in the Annual Reports of the Board of Health or the Hamilton Health Association. In this thesis, specific attempts to overcome the bias in the data sources were not made.

Chapter 3 Tuberculosis

For the greater part of the 20th century, awareness surrounding tuberculosis was common. This was due to two factors: public education on the nature of the disease (see 6.3) and high tuberculosis case rates. Most individuals in North America and Europe in the early to mid-20th century had first hand experience with the disease—either through a tuberculous family member or a friend—thereby increasing their awareness of tuberculosis. With declining tuberculosis rates over the 20th century (see 3.3), common knowledge of the disease has similarly declined. This chapter, therefore, is to provide both the medical and social aspects of tuberculosis, from historical and present-day perspectives.

3.1 The Medical Perspective

Tuberculosis is one of the oldest diseases affecting humans; it is known to have infected the ancient Egyptians as early as 4000 B.C. (Ryan, 1992). The disease has had many names over the course of its existence, including consumption, phthisis, decline, wasting disease, delicacy of the lungs, graveyard cough and lung weakness. The most common, consumption, was brought into general usage around 1660 and referred to the way the disease “consumed” individuals (Smith, 1988). Tuberculosis is a bacterial infection caused by the *Mycobacterium tuberculosis* (*M. tuberculosis*) bacterium (City of

Hamilton, 1999). The tubercle bacillus, the etiological agent of the disease, was discovered in 1882 by Robert Koch (Rosen, 1993). The zoonotic form of the disease caused by the *Mycobacterium bovis* (*M. bovis*) is transmitted from tuberculous cows to humans through ingesting infected cow's milk or meat. In Canada, until the late 1930s, infection from tuberculous cows was common, especially in children. In 1965, tuberculous cows could still be found in Ontario (Brink, 1965). Today, however, they are an extremely rare occurrence.

Tuberculosis (from *M. tuberculosis*) is an airborne disease with the primary mode of infection being through the inhalation of tubercle bacilli-infused droplets, produced by talking, coughing, sneezing or singing (Heppner, 1992). When the droplets are inhaled, they settle in the periphery of the lung and grow very slowly until they form a collection of tiny boils. The infection then enters nearby small airways and more boils form there. It was the appearance of these tiny boil collections (like little tubers) that gave the disease its name (Ryan, 1992). Although most noted for its pulmonary form, tuberculosis can spread from infected lungs to the throat, lymph nodes, abdomen, intestines, long bones of the legs, spine (Pott's disease), kidneys, bladder, skin, eyes, meninges, or it can come out the chest wall, discharging from abscesses (Dubos and Dubos, 1952; Heppner, 1992; Ryan, 1992)(see Table A1).

Once the bacilli-tainted droplets have been inhaled, three scenarios are possible. The first is where the body fights off the infection. This is called inactive tuberculosis. From this state, the individual may or may not develop active disease during the course of their lifetime. The second, active tuberculosis, is when the body cannot fight off the infection and the person develops the disease. This may occur immediately after the

primary infection or may take several weeks, months or years to develop. Factors favouring the progression to active disease include, a weak immune system, old age, alcoholism or drug addiction, poor diet, other infections like HIV, other underlying pulmonary disease, diabetes, and pregnancy (Heppner, 1992; City of Hamilton, 1999). Symptoms of active disease include fatigue, weight loss, a cough persisting longer than four weeks, a general feeling of lethargy and, in advanced cases, the coughing of blood (Health Canada, 1999). Ten percent of people infected with tuberculosis will develop the active disease (Health Canada, 1996). Development of the disease is also possible after a period of latency, which is the third scenario. For example, if an individual had active tuberculosis earlier in their life, they may reactivate the disease after years of inactivity. Reasons for reactivation are similar to those listed above for active disease. Tuberculosis can be healed by the body's own defences (inactivity) but it is never fully cured. Chest x-rays show tiny scars in which the agent lives on, slowly growing (Ryan, 1992).

Tubercle bacilli are destroyed by exposure to direct sunlight, ultraviolet light, heat and certain disinfectants. They are more resistant to chemical agents, such as acids and alkalis, and to antibacterial agents, such as penicillin, than are most pathogenic microorganisms because of the bacilli's thick, waxy coat which makes penetration of it very difficult (Heppner, 1992; Ryan, 1992). The bacilli may remain viable for years in dried sputum. However, usually the airborne bacilli are infectious (Heppner, 1992).

Turn-of-the-20th-century efforts at treating the disease consisted mostly of fresh air, good food and housing, and plenty of sleep (Annual Report, 1917-1933; McCuaig, 1999). Sanatoria played an important role in providing the necessary rest, fresh air, good food and shelter for convalescing tuberculous patients, as well as isolating them from the

general population. In 1924, the B.C.G. (Bacillus-Calmette-Guérin) vaccine was discovered. Although it confers resistance to the disease rather than immunity, it was used extensively worldwide and is still in use today.

Surgery was another method for treating tuberculosis. In the 19th century, surgery was undertaken for glandular tuberculosis, and for genito-urinary, intestinal, laryngeal and bone tuberculosis in the early part of the 20th century. As early as 1900, immobilization of the diseased lung by injecting air into the pleural cavity (pneumothorax) was being used in Guelph, Ontario. By 1920, this procedure was quite popular. A similar treatment, pneumoperitoneum, was frequently practiced in the 1930s. Thoracoplasty, the removal of part of several ribs, began in the early 1930s and was mostly used on patients with only one infected lung. Segmental resection, the removal of part of a lung lobe, and pneumonectomy, the removal of an entire lung, were common surgical procedures of the 1940s (Brink, 1965).

The advent of chemotherapy heralded new treatments for tuberculosis. Streptomycin and para-amino-salicylic acid (PAS), the first of the anti-tuberculosis drugs, were discovered in the mid-1940s (Ryan, 1992). By the 1950s, the use of chemotherapy had led to the gradual decrease in the number of surgical procedures and the length of stay in sanatoria (Brink, 1965). Isoniazid, discovered in the 1950s, is still employed in treating tuberculosis today, along with streptomycin (City of Hamilton, 1999). To be effective, chemotherapy must include at least two drugs to which the strain is susceptible (Heppner, 1992). A course of chemotherapy for both inactive and active disease lasts between six months to one year (Health Canada, 1998). Current first-line drugs are isoniazid (INH), rifampin, pyrazinamide, streptomycin, and ethambutol (Heppner, 1992).

Drug resistance was noted as early as the late 1940s and has been a problem ever since (Ryan, 1992). Drug resistant tuberculosis occurs when an individual is resistant to streptomycin, isoniazid and pyrazinamide. Multi-drug resistant tuberculosis (MDR-TB) is when the disease has built resistance to both isoniazid and rifampin, two major first-line drugs (City of Hamilton, 1999). Evidence of MDR-TB was first found in the early 1980s. MDR-TB is almost impossible to treat (Ryan, 1992).

Finding cases of multi-drug resistant, drug resistant, and ordinary tuberculosis requires much effort. In the early part of the 20th century, cases were found through physicians, contact tracing and referrals to the Chest Clinics from family, friends, industry and government agencies (Annual Report, 1912-1920)(see Figure 6.4). Tuberculin testing in elementary and high schools began in the late 1930s and mass x-ray surveys of the population started in the late 1940s to detect cases of the disease (Annual Report, 1934-1952)(see 6.2.2 and 6.2.4.1). Tuberculin testing, chest x-rays and contact tracing are the primary case-finding tools in use today.

3.2 The Social Perspective

Today, tuberculosis is considered a medical disease. At the turn of the 20th century, it was considered, as Sir William Osler, the Canadian physician, noted, “a social disease with a medical aspect” (in McCuaig, 1999, p.7). The primary focus of the early part of the tuberculosis movement was not on the disease, *per se*, but on the environmental, social and economic factors, such as poverty, housing and sanitation, which affected the prevalence of the disease. In his 1910 Address, J.G. Adami, President of the Canadian Association for the Prevention of Tuberculosis, remarked:

This is not merely a campaign against tuberculosis, but is the inevitable centre of a great movement making for social betterment . . . Everything . . . that makes for impoverished health makes for susceptibility to tuberculosis. Everything that makes for better social conditions develops naturally as an object and outcome of our campaign. (In McCuaig, 1999, p.3)

And in speaking of childhood tuberculosis, Kellynack of London, England writes:

We must recognize that tuberculosis of infancy and childhood is a manifestation of SOCIAL DISORDER, ECONOMIC DISTRESS, and SOCIOLOGICAL BLUNDERING, as well as, DEBILITATED and DEPRAVED INHERITANCE, INADEQUATE NURTURE and HYGENIC LAWLESSNESS. (In HHA, 1913, p.20, original emphasis)

McCuaig sums the entire perspective in one statement: “To cure tuberculosis, one had to cure society” (McCuaig, 1999, p.7).

Numerous volunteer organizations were established with the goal of reducing tuberculosis while creating massive societal and/or behavioural change. Dr. J.H.

Holbrook of the Mountain Sanatorium in the Eighth Annual Report of the Hamilton Health Association writes:

Poverty is the greatest cause of tuberculosis, and ignorance, alcohol and tuberculosis are the greatest causes of poverty, so neither can a tuberculosis association disregard these factors, nor can associations for the suppression of any one of these evils withhold their support from anti-tuberculosis work. (HHA, 1913, p.22)

These tuberculosis volunteer groups were often pioneers in educating the public as to the methods of transmission and symptoms of tuberculosis, how to treat the disease and about matters of personal hygiene; they worked very hard lobbying the government and raising funds for the building of sanatoria and chest clinics, and for food, clothing, shelter, medical supplies and medicine for tuberculous patients (Report, 1932; Brink, 1965; Rosen, 1993; McCuaig, 1999). At the end of World War I, anti-tuberculosis

associations began to shift their focus away from environmental, social and economic conditions as causes of tuberculosis and instead began to attack personal apathy and ignorance as a cause of the disease (McCuaig, 1999). By the mid-1940s, with the advent of the first anti-tuberculosis drugs, the disease was primarily viewed as less of a social disease and more of a medical one. Recognition of the social aspects of tuberculosis persisted into the 1950s: “Tuberculosis is a social disease and presents problems that transcend the conventional medical approach. The impact of social and economic factors must be considered as much as the mechanism by which tubercle bacilli cause damage to the human body” (Dubos and Dubos, 1952, p.vii in HHA, 1952, p.5).

3.3 Tuberculosis Cases and Deaths: The Role of Statistics

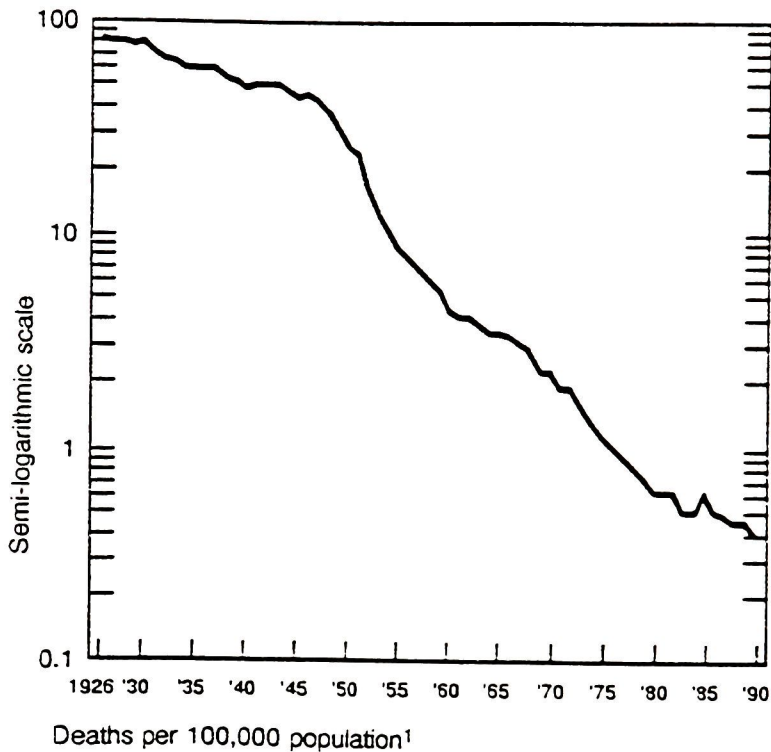
The gathering of tuberculosis statistics is a relatively new phenomenon, beginning in the early 19th century. Statistics on tuberculosis prior to the 1920s are often under counted. The social stigma of the disease often led doctors to purposefully classify cases and deaths of tuberculosis as another respiratory ailment or pneumonia (Gagan, 1981). In Canada, national statistics on tuberculosis were not collected until the 20th century. Tuberculosis data were gathered for Montreal and Toronto from 1880 onward, and represent the earliest statistics on tuberculosis in Canada (Brancker et al., 1992).

In 1867, the year of Confederation, tuberculosis was the greatest cause of death in the Dominion. In 1908, according to a Canadian Tuberculosis Association report, national death rates from tuberculosis had dropped to 165 per 100 000 population. This was equivalent to the death of one Canadian per each daytime hour and the deaths of two Canadians during each nighttime hour. By 1926, the year of the earliest reliable national

morality statistics, the death rate from tuberculosis had fallen to 84 deaths per 100 000 population. The national rate decreased an average of three percent per year between 1926 and 1946. After the introduction of chemotherapy, the annual rate dropped an average of twelve percent from 1947-1951. A sharper decline of twenty percent per annum was evident between 1951 and 1956 when chemotherapy became the norm for treatment. From the mid-1950s to the present, national tuberculosis rates have continued to drop (Brancker et al., 1992)(see Figure 3.1).⁸

⁸ There is no information regarding the reasons for the decrease in death rates between 1971-1978.

Figure 3.1. Trends in Tuberculosis Death Rates, Canada, 1926 to 1990



¹ Age-adjusted to the World Population

Note: Excludes Nfld. prior to 1949 and the Yukon and N.W.T. prior to 1956.

Source: Brancker et al., 1992, p.111, modified

The Ontario experience mimicked that of the national with respect to declining tuberculosis death rates. In 1901, the death rate per 100 000 population was 148.6. Twenty-five years later, the rate was less than half—58.0 per 100 000. At mid-century (1951), the tuberculosis death rate had plummeted to 12.6 per 100 000 population. Nine years later (1960), the rate was at an all-time low of 2.6 per 100 000 population (Brink, 1965)(see Table 3.1).

Table 3.1. Tuberculosis Deaths in Ontario, 1901-1960*

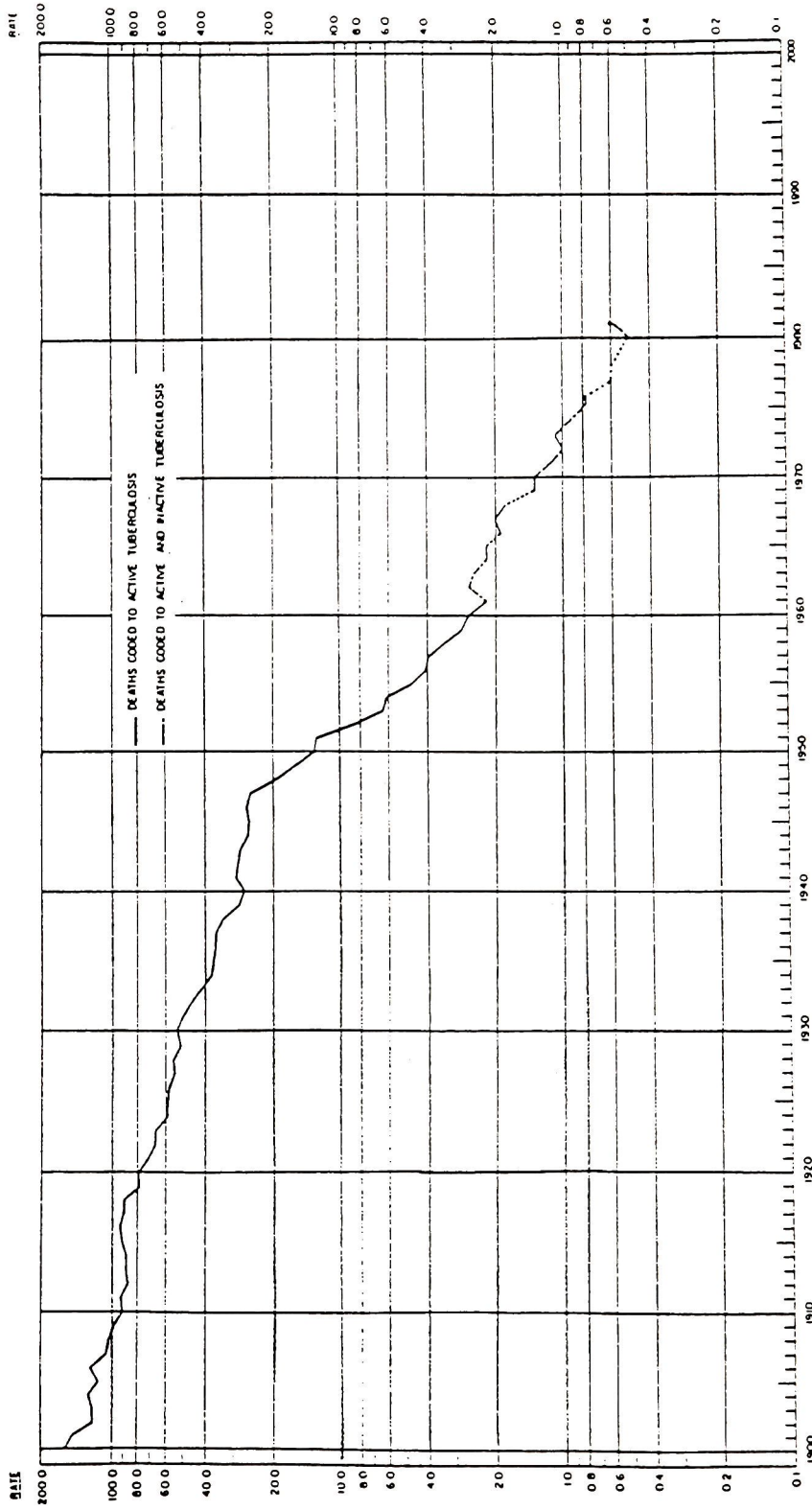
YEAR	Deaths	Rate*	YEAR	Deaths	Rate*
1901	3,243	148.6	1931	1,728	50.4
1902	2,694	121.5	1932	1,604	46.2
1903	2,723	120.9	1933	1,465	41.7
1904	2,877	125.8	1934	1,337	37.7
1905	2,667	114.9	1935	1,303	36.4
1906	2,911	123.6	1936	1,327	36.8
1907	2,530	105.9	1937	1,315	36.2
1908	2,511	103.6	1938	1,327	36.1
1909	2,380	96.8	1939	1,085	29.3
1910	2,291	91.9	1940	1,011	27.0
1911	2,353	93.1	1941	1,100	29.0
1912	2,250	87.6	1942	1,093	28.1
1913	2,294	87.9	1943	1,101	28.1
1914	2,340	88.3	1944	1,068	26.9
1915	2,466	91.7	1945	1,015	25.3
1916	2,559	93.7	1946	1,054	25.7
1917	2,460	88.8	1947	1,042	24.8
1918	2,519	89.6	1948	825	19.2
1919	2,215	77.7	1949	686	15.6
1920	2,280	78.8	1950	585	13.1
1921	2,083	71.0	1951	579	12.6
1922	1,979	66.4	1952	398	8.3
1923	1,989	66.0	1953	311	6.3
1924	1,823	59.6	1954	307	6.0
1925	1,842	59.2	1955	242	4.6
1926	1,835	58.0	1956	221	4.1
1927	1,803	56.0	1957	221	3.9
1928	1,832	55.9	1958	186	3.2
1929	1,703	51.1	1959	166	2.8
1930	1,791	52.9	1960	157	2.6

*Rate per 100 000 Population

Source: Brink, 1965, p.73, modified

Figure 3.2 illustrates the information found in Table 1 with the addition of deaths coded to active and inactive tuberculosis. The death rate for 1962, the year in which deaths

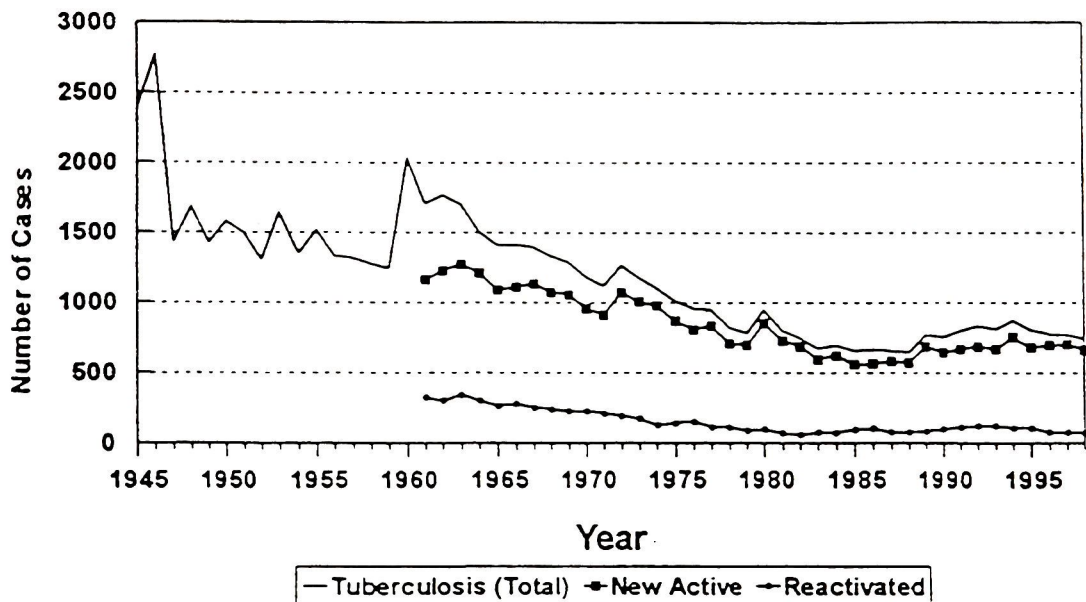
Figure 3.2. Trend in Tuberculosis Mortality, Ontario, 1900-2000*



*Rate per 100 000 Population
Source: Ministry, p.53, modified

attributed to both inactive and active disease began, the rate increased slightly. This upward turn in the trend was due to the new coding of tuberculosis deaths (Ministry). Cases of the disease in Ontario followed the same general downward trend as mortality. Occasionally, mass surveys or a large influx of immigrants would cause a sharp increase in the number of cases but overall the rates continued to decline (Ministry, 2000)(see Figure 3.3).

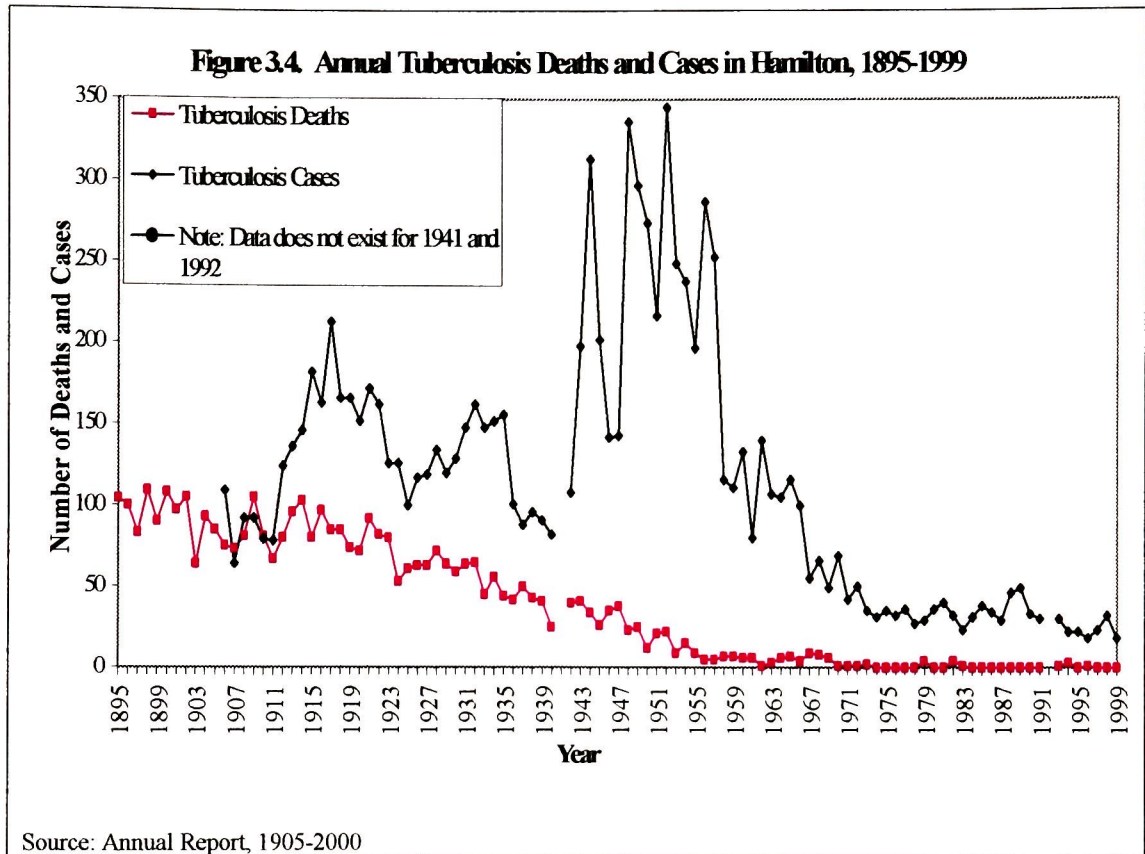
Figure 3.3. Tuberculosis Ontario, 1945-1998



Source: Ministry, 2000, p.5, modified

Hamilton's tuberculosis cases followed the same trends as those for Canada and Ontario. Bearing in mind the tendency to deflate tuberculosis rates prior to the 1920s, the decline in the number of cases of the disease in the city is nonetheless impressive (see

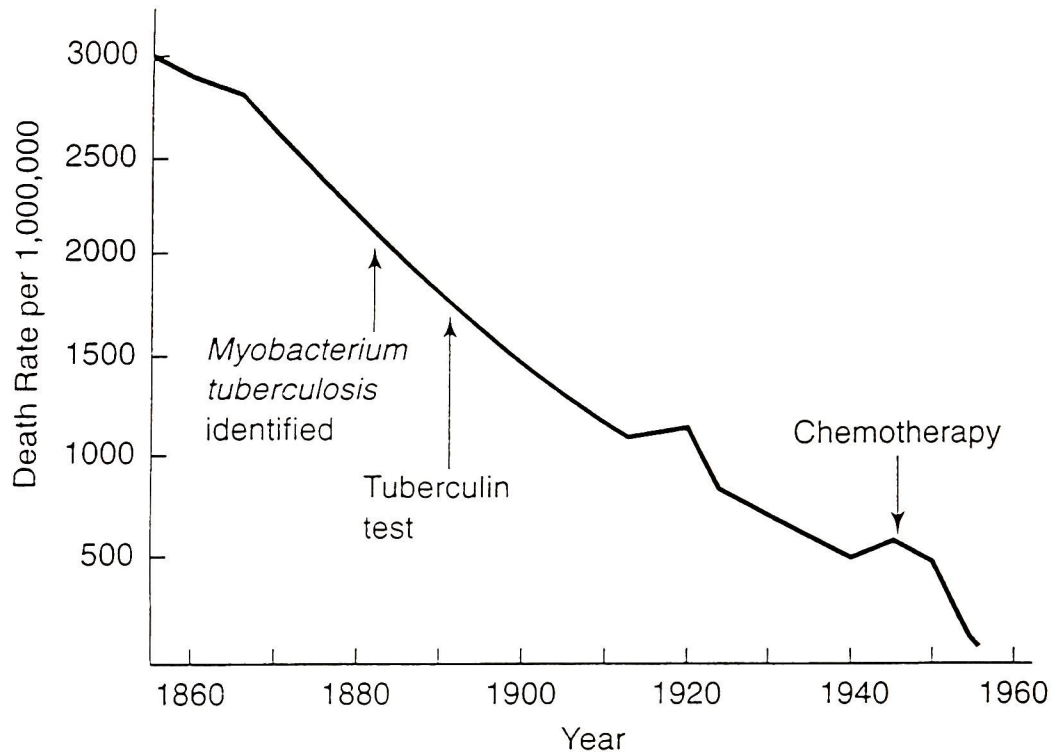
Figure 3.4). The sharp increase in cases from 1915 to 1917 and 1942 to 1944 was attributable to the return of soldiers from training camp and overseas service during both World Wars (Houghton, 1974). The higher “peaks” in 1944, 1948, 1952, 1956, and 1960 reflect the years in which the Provincial Department of Health undertook community screenings for tuberculosis in Hamilton (Annual Report, 1943 and 1944, 1948 and 1949, 1952, 1956, 1960). These community surveys were executed every four years (Somerville). The lower “spikes” at 1962 and 1965 reflect the aggressive case-finding activities of the Hamilton Health Department through mass surveys of industry, at-risk groups and students (Annual Report, 1962-1969). This downward trend from the early 1980s was interrupted in 1988 and 1989 when the number of cases rose for the first time in 16 years. This sudden increase was not an anomaly, but a reflection of a North American and Western European trend, which had been occurring at the national and provincial levels since the early 1980s (see Figure 3.3). The cause of this increase was due to a number of factors. First, government cutbacks to public health departments made finding new cases and tracking known tuberculous individuals a greater challenge. Second, increased immigration was observed from tuberculosis endemic countries and regions, such as Africa and Asia. Third, HIV—the immune cells which fight off tuberculosis are the same cells destroyed by HIV. Fourth non-compliance with chemotherapy regimens increased the number of cases of MDR-TB and drug resistant tuberculosis (Ryan, 1992; Dye et al., 1999).



The number of deaths attributable to tuberculosis in Hamilton is available from 1895 to the present. Figure 3.4 illustrates the same declining trend in tuberculosis deaths in Hamilton as those found at the provincial, national and world levels. The reason for this decline in the number of tuberculosis deaths is uncertain. However, McKeown, Record and Turner theorize the cause of the decline as the result of the efforts of the sanitary movement. They cite, for example, that in Britain, two-thirds of the reduction in tuberculosis mortality occurred before 1947, when anti-tuberculosis chemotherapy began (see Figure 3.5). This same decrease in tuberculosis deaths prior to 1947 was also found in Hamilton (see Figure 3.4). McKeown, Record and Turner also contend that without the intervention of chemotherapy or the sanatorium treatment regimen that death rates

from tuberculosis would have continued to decline (McKeown et al., 1975). Due to this long-term decrease in tuberculosis deaths, the contribution of the disease to the over-all cause of deaths similarly diminished (Figures 3.6 and 3.7). This trend not only applied to

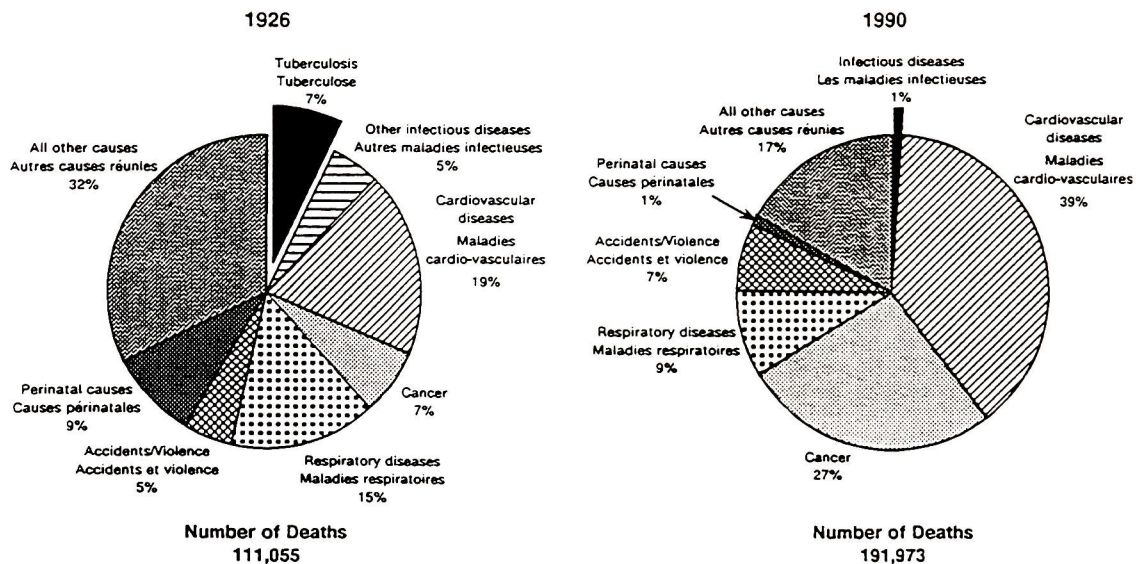
Figure 3.5. Mean Annual Death Rates From Tuberculosis in England and Wales from 1860 to 1960



Source: Last, 1998, p.130, modified

tuberculosis but to all infectious diseases which were the main causes of death in the 19th century. In Hamilton, for much of the 20th century, tuberculosis was one of the most infectious diseases and was one of the greatest causes of death due to a communicable disease (see Figure 3.8).

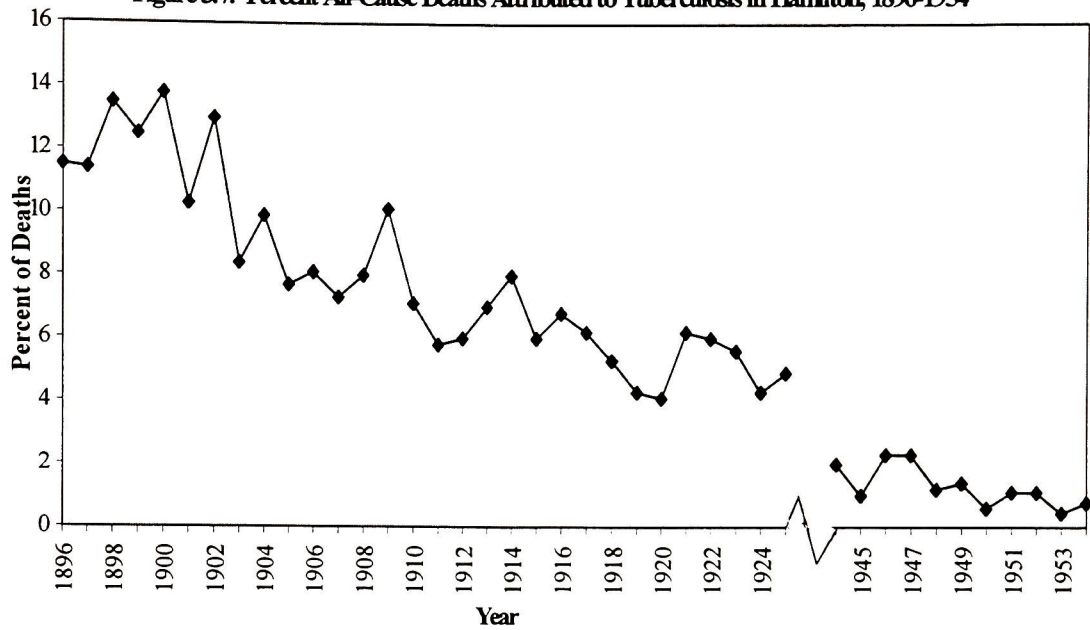
Figure 3.6. Major Causes of Death, Canada, 1926 and 1990



Note: Excludes Newfoundland, the Yukon and the Northwest Territories in 1926

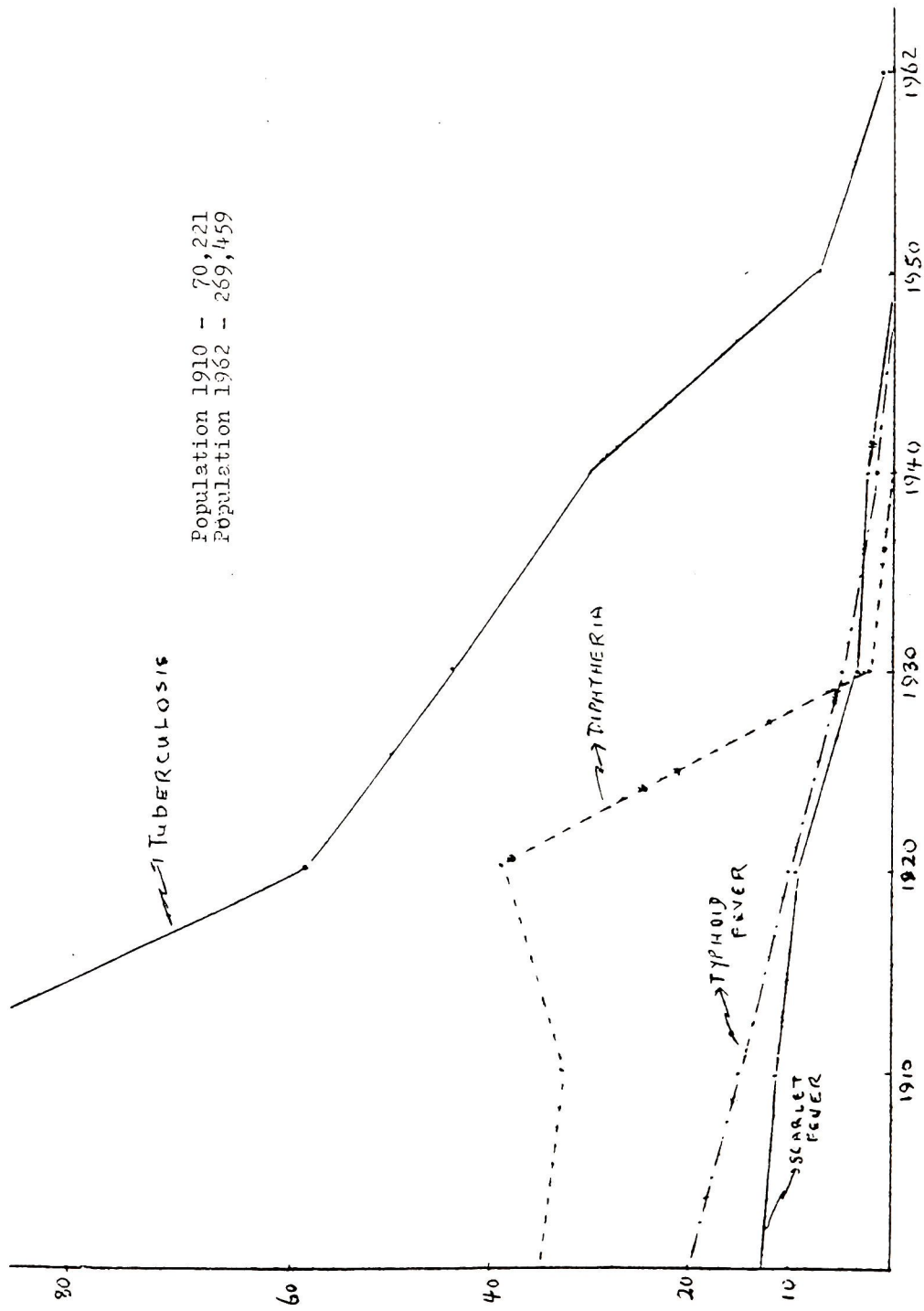
Source: Brancher et al., 1992, p.113, modified

Figure 3.7. Percent All-Cause Deaths Attributed to Tuberculosis in Hamilton, 1896-1954



Source: Annual Report, 1905-1954

Figure 3.8. City of Hamilton, Communicable Diseases, 1910-1962*



*Rate per 100 000 Population
Source: Annual Report, 1962, p.18, modified

Chapter 4 Public Health

Over the last 150 years public health has undergone many changes. Some of these are transformations in thinking which have affected the theories and functions of public health as well as treatment approaches. There is consensus among medical geographers and those who study public health that the field has undergone at least two such shifts since the mid-19th century. The first occurred at the start of the sanitary era in the 1840s and the second at the beginning of the germ movement in the 1880s. Since the 1980s there has been much discussion about a third transformation, the “new” public health, a movement different in many respects from its predecessors. There is some debate as to whether or not public health has already entered or is about to enter this new phase of development. While these three movements, sanitary, germ and “new”, appear to be discrete, the theories, functions and activities of the preceding movements initially linger into the subsequent periods. An examination of the definition and theories of public health is crucial to an understanding of the three public health eras and to the approaches to treatment, surveillance and prevention found in each epoch. The public health theories in particular are critical to later discussions of the tuberculosis movement.

4.1 What is Public Health?

During the sanitary era, there was no formal definition of public health. Instead, public

health was associated with environmental sanitation measures and epidemic coping techniques. The theory dominating this period was that the environment affected human health, which placed the responsibility of health on the community. As the germ movement began and the shape of public health expanded from environmental activities and contending with infectious disease outbreaks to public education, specialized nurses and medical services, disease prevention, the prolonging of life and promotion of physical health, a formal definition of public health emerged:

Public health is the science and art of preventing disease, prolonging life, and promoting physical health and efficiency through organized community efforts for the sanitation of the environment, the control of communicable infections, and the education of the individual in principles of personal hygiene, the organization of medical and nursing services for the early diagnosis and preventative treatment of disease, and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health. (Winslow in Terris, 1987, p.317)

This definition—written in 1923 by C.E.A. Winslow, a leading theoretician of the American public health movement—illustrates not only the influence of both the environmental dirt and miasma and the germ theories (see 4.4) but also that the responsibility of health rests with society, not the individual. As the germ era progressed, the “lifestyle theory” gained ground, placing the individual as responsible for health (see 4.3). An assumption can be made that the nature of the definition of public health would change to reflect the influence of this new theory. In 1974, the Canadian government released *A New Perspective on the Health of Canadians* (also known as the Lalonde Report). The definition given in this report emphasized community-based public health efforts through the “health field concept” which included four elements: human biology,

environment, lifestyle and health care organization (Beaglehole and Bonita, 1997; Green, 1999). The Lalonde Report's definition of public health re-iterated the idea in Winslow's definition—that the community is responsible for health, not the individual. The 1987 Acheson Report proposed the following definition which was adopted in the United Kingdom and other countries: “the art and science of preventing disease, promoting health, and prolonging life through organized efforts of society” (Beaglehole and Bonita, 1997, p.146). The concept of community responsibility for health is again noted in this later definition.

4.2 The Function of Public Health

In the sanitary era the objective of public health was simply to sanitize the environment and cope with disease epidemics (Fee, 1993). Winslow's definition, above, illustrates a striking example of the expansive functions of public health in the germ period compared with that of the sanitary movement. Not only was public health to continue in its purpose to sanitize the environment and cope with communicable diseases, it was also about education, the (further) organization of medical and nursing services, preventing disease, prolonging life, promoting physical health and efficiency and the development of the social structure to raise individuals to a healthy standard of living. By the end of the 20th century, however, the purpose of public health had narrowed once again. Turnock, for instance, characterizes public health as a “broad social enterprise . . . that seeks to extend the benefits of current knowledge in ways that will have the maximum impact on the health status of a population. It does so through identifying problems that call for

collective action to protect, promote, and improve health, primarily through preventive strategies” (Turnock, 1997, p.10). The function of public health, according to Turnock, is simply to extend the benefits of current knowledge in a very specific manner. How this is to be accomplished is loosely specified. Similarly, for Wenzel:

The most important function of public health in its broadest sense is to seek an optimal harmony between groups of people in society and their environment. This goal can be approached in three ways: 1) by methods to improve host resistance of populations to environmental hazards, 2) by effective plans to improve the safety of the environment, and 3) by improving health care systems designed to increase the likelihood, efficiency, and effectiveness of the first two goals. (Wenzel, 1992, p.57)

Wenzel’s definition differs from Turnock’s in that it is implied that there are other functions of public health, which are not outlined in his article. Wenzel’s above description is a reflection of ideas found in the sanitary movement, except that the definition of environment is social as well as physical (Wenzel, 1992). Beaglehole and Bonita offer a similarly narrow function of public health but this definition describes further purposes, which ultimately make the objectives of public health more expansive than in Wenzel’s or Turnock’s descriptions: “[public health is] dynamic and flexible, incorporating the most appropriate elements of earlier public health movements: disease prevention, health promotion, health education, health policy, environmental concern and community empowerment” (Beaglehole and Bonita, 1997, p.215). It appears, from Beaglehole and Bonita’s description of the functions of public health, that “[a]t the end of the century, we find new forms of old ideas, new wine in old bottles” (Green, 1999, p.83).

4.3 Public Health Theories

Underlying the public health movements has been a number of theories which attribute the responsibility of health to either the individual or the community (see below). These theories have, as will be discussed in subsequent chapters, played a greater or lesser role in public health—and the tuberculosis movement—over the past 150 years. The sanitary and the germ eras—in particular the latter—were heavily influenced by the different theories. The sanitary epoch, for instance, was based on the notion that the physical environment affected health. This theory placed the responsibility of health not on the individual but on the community because the physical environment was viewed as common to all. Since the responsibility of health was placed on the community, efforts to improve the cities—and indirectly health—were undertaken by the federal and local governments through the Boards of Health. Prior to the release of the Royal Commission's Report in the mid-1840s (see 5.2), the commonly held theory was that the individual was responsible for health (Rosen, 1993); poor health was the result of poor behaviour, such as drinking, lack of exercise and improper nutrition (Tesh, 1994). The Royal Commission's Report provided the impetus for the shift in theory which ultimately moved responsibility for health from the individual to the community.

The germ movement was similarly influenced by a theory that held that the individual was not responsible for health but it differed in its placement of responsibility from that of the sanitary era. The theory that germs or bacteria were the cause of disease existed from the early 1800s. One reason for its rejection in favour of the environmental dirt and miasma theory was that it could not explain why some individuals, such as

doctors and nurses, who were in contact with sick persons never became ill while others who were isolated in their homes or in the country became unwell (Tesh, 1994). It was not until the 1880s when laboratory testing proved that certain organisms were the causes of particular diseases—coupled with the availability of treatments such as vaccines—that the germ theory was accepted. Infectious diseases, it was recognized in the 19th century, were a community problem, not the individual's, because entire communities would be affected by infectious disease epidemics. Responsibility for health, through the prevention of infectious disease, therefore, was shouldered by the community.

A third theory, which is currently found in public health, dates back to the pre-sanitary era—the individual is responsible for health, and that an unhealthy lifestyle encourages illness. The “lifestyle” theory claims that disease prevention, particularly for heart disease and cancers, is possible through personal behaviour changes, such as cessation of smoking, dietary alterations and participating in regular exercise. This theory places responsibility for health on the individual and removes liability from the community and the medical profession (Tesh, 1994).

4.4 Public Health Eras

4.4.1 The Sanitary Movement

The sanitary movement was born in the industrialization period, when cities were dirty and overcrowded and there was much poverty and preventable mortality. The main ideas that dominated this era were directly related to the state of the cities in the mid-19th century: Dirt and miasmas, poisonous gases which emanated from the soil, water and the

air, were believed to be the cause of disease and it was thought that in ridding the cities of these undesirable features death rates would drop (Rosen, 1993; Susser and Susser, 1996). Organized environmental sanitation efforts were the method by which this goal was accomplished.

In 1848, England enacted the Public Health Act, out of which the General Board of Health was created (Rosen, 1993). This was the first organized public health effort in the 19th century and it was the origin of present day public health. The main concerns of the General Board of Health, and all other Boards of Health in Great Britain and North America, were to clean up the cities and cope with any epidemics of disease (Fee, 1993). Efforts to this effect included closed drainage and sewage systems, indoor toilets, regular garbage collection, clean water and unadulterated food, dwelling inspection, legislation surrounding the proper keeping of animals and the construction of isolation hospitals for those with infectious disease (Minutes, 1884-1905; Rosen, 1993; Susser and Susser, 1996). While these sanitation efforts did much to improve the standard of cleanliness in the cities, they also accomplished the goal of reduced mortality associated with sanitary conditions (Susser and Susser, 1996).

The end of the sanitary movement did not come abruptly with the birth of the germ epoch. While the dominating ideas of the sanitary period—that dirt and miasmas caused disease—were no longer in congruence with those of the germ movement, many of the sanitary solutions implemented during the sanitary age continued to be practiced through the subsequent public health movements. Today, for instance, proper sanitation,

clean water and unadulterated food are the mainstays of public health efforts throughout the world.

4.4.2 The Germ Movement

The germ era started in the late 1800s. Its onset began in 1880 with the discovery of the pathogen which caused typhoid. The next two decades would be witness to no less than nineteen discoveries of pathogenic organisms, including the 1882 finding of the tubercle bacillus, the etiologic agent of tuberculosis (Rosen, 1993). These discoveries would be proof positive that something other than dirt or miasmas was the cause of many of the common diseases affecting people in the 19th century.

The main idea of the germ epoch was that a single entity was responsible for a particular disease—the tubercle bacillus caused tuberculosis. This thinking departed greatly from the sanitary period's notion of miasmas where diseases were caused by a number of, sometimes indefinable, factors. Knowing that a specific agent caused a specific disease, methods of surveillance for that particular illness were created in the early germ movement. For instance, tuberculin testing made the diagnosis of tuberculosis simpler because a reaction to the tuberculin indicated the presence of the tubercle bacillus. New technologies, such as the development of the x-ray and fluoroscope, permitted the surveillance of infectious diseases, particularly tuberculosis, in ways previously unavailable. Mass screening—the hallmark of tuberculosis surveillance—was possible only through the creation of the miniature x-ray machine.

Education of the public played a large role during the germ movement.

Pamphlets distributed in the late 19th century were used to educate people about certain diseases and were the first efforts at public health education (Rosen, 1993). The early 20th century witnessed the expansion of public health education to include posters, radio and magazine advertisements and, in the case of tuberculosis, travelling exhibits. Young children and teenagers were taught about proper hygiene and health in school, and were also subjected to school medical inspections. Voluntary health associations were among the first organizations to promote public health education. Public health education, coupled with the focus on a single disease-causing organism, also served to shift the responsibility of health from the community to the individual (McCuaig, 1999).

Nurses were crucial in educating the public about diseases, health and proper hygiene and treatment regimens for those recovering from illness. In the beginning of the germ period, nurses were specialized according to certain diseases, e.g., the Tuberculosis Nurse. As time passed, nurses became less associated with one disease and instead became known as “Public Health” nurses (Rosen, 1993). Nurses also played a critical role in disease surveillance. The school nurse looked for cases of infectious disease among school children while the public health and district nurses were involved in contact tracing and observing of family members for signs of disease in households where an infectious individual resided.

By the 1950s, mortality and morbidity rates for infectious diseases had dropped and the rates for non-infectious diseases, such as heart disease and cancer, were on the rise. The early, underlying idea of the germ movement—that diseases were caused by a

single organism—no longer held as much merit as it once did because the non-infectious diseases affecting the population in the 1950s often did not have one sole agent. Despite this shift in focus to diseases with multiple contributing factors, the movement continued to exist and its practice also relied on those elements found in the earlier part of the period: public health education and disease surveillance.

4.4.3 The “New” Public Health Movement

As mentioned above, it is debatable as to whether or not society has entered the third phase in public health, the “new” public health. What is clear is that this movement is different from the germ era in many respects but, at the same time, overlaps with some of the ideas and methods of the previous movement. This overlap also occurred when the germ theory overtook the sanitary theory as the dominant public health model. Little is known about how much or little the “new” public health movement will differ or resemble the ideas or practices of the prior germ age until the new movement is well established.

One element common to both movements is the use of community-based support. Early in the germ era community action—primarily through voluntary agencies—played a big role in furthering public health. The “new” public health movement also relies on community-based support, especially through volunteer groups (Curtis and Taket, 1996; Shah, 1998).

A basic idea found in both the sanitary and the “new” public health movements

is that the environment and health are linked. In both the “new” public health and the sanitary era it is, and was, held that improving living conditions will prevent or slow down the progress of a disease. Today, worldwide, efforts are underway to create a healthier living environment and thus improve the health of the population (Curtis and Taket, 1996).

The following chapters explore, through the tuberculosis campaign, the ideas and efforts of the sanitary and germ movements and the “new” public health.

Chapter 5 The Sanitary Movement

The sanitary movement lasted approximately fifty years from 1848 until the turn of the 20th century. It was an era represented by large-scale government efforts to improve the conditions of the cities and to cope with epidemics of disease. While many of the ideas and activities undertaken during this time were not new, it was the breadth of these efforts which set this period apart from similar, past efforts. The creation of the General Board of Health in Britain in 1848 can be seen as the official start of the era of sanitary reform, and the beginning of modern-day public health (Rosen, 1993). For the last twenty years of its reign, the sanitary era overlapped with the germ epoch, the birth of which may be attributed to the 1880 discovery of the etiologic agent for typhoid. As the ideas of the germ movement slowly gained ground from 1880 onward, the popularity of the notions of the sanitary era waned. Even as the strength of the sanitary movement decreased, many of the sanitation efforts undertaken by the Boards of Health in North America and Western Europe, which had commenced in the early part of this period, continued to be practiced until the turn of the 20th century, with some still in practice today. The contribution of the tuberculosis movement during the sanitary era was virtually non-existent as the voluntary tuberculosis associations did not form until after 1900. Though not specifically targeted, many of the activities of the Boards of Health

affected case and death rates for tuberculosis. Also, it was during the latter half of the 19th century that voluntary organizations formed to mold public opinion and lobby the government to institute health reform. These groups were the predecessors of the voluntary tuberculosis associations, the latter inevitably influencing public health in the 20th century. It is important, therefore, for later discussions of the contributions of the tuberculosis movement to public health, to examine the sanitation activities and epidemic coping efforts of the sanitary epoch.

5.1 Early Public Health Efforts—Quarantine and Disinfection

The creation of public health boards did not originate with the General Board of Health in Britain. One of the earliest government health groups was created in Venice in 1486 when three noblemen were elected to a Commission of Public Health (Hays, 1998). The activities of this and other early public health organizations were concentrated on controlling the spread of plague. Quarantine, first introduced in Italy in 1350, was a major method for stopping the plague epidemic. Isolation of infectious individuals in their homes or in quarantine stations on the edge of town was a common practice. Disinfection of the homes of victims and the burning of their personal effects were similarly employed to stop the dreaded disease (Watts, 1997; Hays, 1998). These activities, quarantine and dwelling disinfection, would play an important role in the sanitary movement as Boards of Health used these measures to control infectious disease epidemics (see 5.3).

5.2 Chadwick and the Birth of the Sanitary Movement

For most Western European and North American citizens, life in the cities of the mid-19th century was less than sanitary. Improper or non-existent sewage and garbage disposal, overcrowded living conditions, poverty, disease and the keeping of animals in the city all contributed to unhealthy urban living. In the 18th and early 19th centuries, little government action was taken to improve the state of the cities. This changed in the 1830s with the passing of the Poor Law Act in England. This legislation was the first Act in English history which provided concentrated attention on the health problems in the cities. The man considered to be one of the most influential persons in the sanitary movement, Edwin Chadwick, was first appointed Assistant and then Commissioner to the Royal Commission, which was established to inquire into the operation and administration of the Poor Law Act. Between the creation of the Poor Law Act in 1834 and the Public Health Act in 1848, it was commonly held that expenditures for sanitary facilities like public bathhouses and sewage and garbage disposal were not considered remunerative. Chadwick was convinced that it made good economic sense to undertake measures to prevent disease based on his observations that, in many cases, poverty was the consequence of disease for which individuals could not be held responsible, and that disease was an important factor in the increasing numbers of paupers. He persuaded businessmen that disease prevention was economically feasible because healthy workers were more productive than ill employees. In turn, these same employers formed associations which lobbied the government in support of improved public health (see 5.4). Coupled with his conviction of the sound economics of disease prevention was his

equally deep-rooted “sanitary idea”, the notion that the physical and social environment affected health (Rosen, 1993).

Chadwick’s certainty in the role of the environment in health would influence not only the report written by the Royal Commission but the entire public health movement.

According to Rosen,

The *Report* presented with dogmatic clarity a plausible epidemiological theory that fitted many of the known facts, and from this basis derived the principles on which sanitary reform and community health action in Great Britain and the United States . . . was based for the next 50-60 years. To the early public health workers, these principles constituted the law and the gospel of community health action, and for the most part they are as valid today as when they were first enunciated. Indeed, any health program in an underdeveloped country today is to a considerable degree based on the principles set forth by Chadwick more than 100 years ago. (Rosen, 1993, p.190)

The “plausible epidemiological theory” to which Rosen is referring is that disease, especially communicable disease, was related to the physical environment, and in the mid-19th century that environment was seen as the filthy, disease-ridden, overcrowded cities. And it was a commonly held belief that dirt (filth) and miasmas, foul emanations from the earth, water and air, were considered to be the environmental causes of disease, thus linking the environment to health. This principle—that the physical environment affected health—would: 1) shift the responsibility of health from the individual to the public; and 2) make the issue of health an engineering (environmental) problem rather than a medical matter (Rosen, 1993). These two ideas were combined in the Royal Commission’s Report, such that Chadwick would write:

The great preventives, drainage, street and house cleansing by means of supplies of water and improved sewerage, and especially the introduction of cheaper and more efficient modes of removing all noxious refuse from

the towns, are operations for which aid must be sought from the science of the Civil Engineer, not from the physician, who has done his work when he has pointed out the disease that results from the neglect of proper administrative measures, and has alleviated the sufferings of the victims. (Chadwick in Rosen, 1993, p.191)

It was the recommendations and observations made in this report that would help to delineate the responsibilities of the General Board of Health.

5.3 The Boards of Health

The Public Health Act in Britain gave authority to the local Boards of Health to undertake the recommended environmental changes found in the Royal Commission's report (Rosen, 1993). Since the General Board of Health was the example on which Boards of Health in Western Europe and North America modeled themselves, the activities of these boards were similar in nature. Garbage and sewage disposal, clean water supplies and the control of nuisances were undertaken by the various Health Boards. In Hamilton, for example, much of the early recordings of the Board's Minutes included requests for private residences to be connected to the new underground sewer lines and there was much discussion about procuring water from Lake Ontario to be used as the city's source of potable water (Minutes, 1884-1905). In 1895, the Ontario Provincial Board of Health was given authority to require that all plans for sewage disposal and water systems in the province be submitted for its approval (Gagan, 1981). Other environmental activities of the Hamilton Board of Health included regular garbage collection and by-laws regarding proper garbage disposal and the keeping of animals within city limits (Minutes, 1884-1905). In Hamilton, by the late 1890s, regular garbage collection had been instituted, and

a by-law regarding the proper keeping of cows, pigs and horses within city limits was passed (Minutes, 1884-1890).

To carry out the various sanitary measures, the Public Health Act in Britain empowered each Board of Health to appoint inspectors. Inspectors were similarly appointed to Boards in Western Europe and North America. In Hamilton, cow byres and privy vaults were two of the targets of inspectors before the turn of the 20th century (Minutes, 1884-1900). The 1882 Public Health Act of Ontario required local boards to inspect all food, such as milk and meat, to be sold for human consumption in an effort to prevent the spread of certain diseases, like tuberculosis, and to improve standards (Gagan, 1981). The Hamilton Board of Health carried a motion on February 17, 1888 to adopt the regulations recommended by the Provincial Board of Health for the inspection of dairy milk and approximately one year later a milk inspection by-law was approved by the Hamilton Board (Minutes, 1888, 1889). An inspector for dairy products was hired in Hamilton before the 1900s but a meat inspector was not appointed until 1901 (Minutes, 1888-1901). Under Section 99 of the Public Health Act, the Food Inspector had authority to seize anything for sale for food which he considered unfit for human consumption, including meat from tuberculous cows (Minutes, 1893; Annual Report, 1910).⁹ Today, the inspection of milk and meat continues to be a public health practice, as does the seizing of foodstuffs unsuitable for sale to humans.

The Boards of Health also undertook the inspection of dwellings. Houses were inspected for structural soundness, overcrowding and health hazards. Many of the

⁹ Milk inspection and pasteurization will be discussed in Section 6.4.2.

epidemics affecting the population during the 19th century were exacerbated by damp, crowded living conditions. By 1889, dwelling inspections were well underway in Hamilton. The inspection of living quarters was primarily undertaken after an infectious individual was quarantined at the isolation hospital (Minutes, 1889). Under Sections 72 and 73 of the Public Health Act of Ontario, the inspector was authorized to notify persons occupying premises where infectious diseases existed to disinfect their residence. Failure to do so to the satisfaction of the inspector was akin to permission for the inspector to disinfect the premises himself (Minutes, 1899; Gagan, 1981). Disinfection, as previously discussed, was employed to stop the spread of infectious disease. The definition of satisfactory dwelling disinfection is not outlined in the literature. As with food inspection, the inspection of buildings for soundness and potential health hazards continues today.

To help cope with epidemics and to supervise medical activities, the Public Health Act in Britain also empowered each local Board of Health to appoint an Officer of Health who was required to be a legally qualified medical practitioner (Rosen, 1993). Hamilton appointed a Medical Officer of Health in 1884 during its first year of operation (Minutes, 1884). The Medical Officer of Health was necessary to help locate pockets of disease, diagnose disease and supervise and aid efforts associated with epidemic control (Rosen, 1993). In Ontario, up until the early 1880s, the thrust of public health legislation in the province and the municipalities was directed at the control of infectious disease outbreaks (Gagan, 1981).¹⁰ For example, the 1882 Public Health Act of Ontario gave

¹⁰ Efforts to reduce the incidence of disease by the Boards were associated with the germ movement.

municipalities the right to establish isolation hospitals for the care of persons suffering from contagious disease (Brink, 1965). The Medical Officers of Health in Ontario were given the authority under the same Act to remove anyone with an infectious disease from their dwelling and place them in an isolation hospital (Gagan, 1981). By the late 1880s, Hamilton had an isolation hospital for the quarantining of individuals infected with diseases like smallpox (Minutes, 1884-1894). Tuberculous persons were not removed from their homes and placed in these isolation hospitals (Brink, 1965). Many physicians in the late 19th century remained skeptical about the contagious nature of tuberculosis. It did not spread like other contagious disease, such as smallpox, typhoid or cholera, and sometimes did not infect relatives who lived in close quarters with tuberculous individuals. In the words of one physician, tuberculosis simply did not conform to the “time-honored definition of a contagious disease” (Morse, 1919 in Tomes, 1997).

5.4 Voluntary Organizations

The origins of the voluntary health movement began in the early part of the sanitary movement. Businessmen convinced of Chadwick’s notion that disease prevention made good economic sense formed the Health of Towns Association and other, similar groups. These organizations, according to Rosen, employed and further developed the approach and methods initiated by reformers in the 18th century, including molding public opinion in an effort to agitate for change and to lobby the government to effect legislation for improved public health. Similar groups were also formed in the United States (Rosen, 1993). No information is available regarding the existence of such organizations in

Hamilton prior to the formation of the voluntary tuberculosis associations of the 20th century.

5.5 Summary

The sanitary era heralded the birth of modern-day public health. Quarantine, dwelling disinfection and the notion that filth and miasmas were the cause of disease were ancient in their roots, but it was the idea that the environment affected human health which provided a new context for these old concepts. The legislating of the Poor Law and Public Health Acts in England, and the subsequent creation of the Royal Commission and the General Board of Health reflected the British government's willingness to address matters of public health. The local Boards of Health in North America, Western Europe and Britain undertook measures to cope with epidemics of disease and to mitigate the effects of the environment (dirt and miasmas) on human health. These efforts overlapped with the beginning of the germ movement and some of these efforts, such as inspection and quarantining are still employed today.

Chapter 6 The Germ Movement

The longest lasting of the public health movements, the germ epoch, has been the main public health model of the last one hundred years. Beginning in 1880 with the identification of the etiologic agent for typhoid, the germ era has heralded some of the greatest disease cures and treatments in human history. The last two decades of the 19th century witnessed the discovery of nineteen disease-causing organisms (Rosen, 1993). With these findings, vaccines and new treatment methods were developed and, around the start of the 20th century, the shift from the simple epidemic-coping methods of the sanitary era to disease prevention occurred. Infectious diseases were the primary focus of the early germ movement, particularly tuberculosis. To combat tuberculosis, volunteers formed associations which educated the public as to the transmission and treatment of the disease, lobbied the government to enact legislation to help lower its incidence, raised funds to pay for medical treatment of the disease and participated in its surveillance. These volunteer groups did much in reducing tuberculosis rates, and, through their various activities, shaped public health. Over time the majority of the responsibilities of the volunteer tuberculosis associations, such as education, surveillance, prevention and treatment of tuberculosis, were assumed by the local Boards of Health.

Many present-day surveillance techniques were created and implemented by Boards of Health and the tuberculosis associations. These include contact tracing, mass surveys, disease testing for at-risk populations and school medical inspection. Employed to aid in these efforts were specialized tuberculosis nurses who eventually formed the foundation for public health nursing. New technologies, such as x-rays, fluoroscopes and tuberculin testing were used in tuberculosis surveillance. Education also played a large role in motivating the public to become willing to participate in surveillance activities. The methods through which the public was educated with respect to the nature of tuberculosis served to lay the base for modern day public health education. The public, including students, were also taught the value of good health—proper diet, rest and exercise.

6.1 Voluntary Associations

The earliest voluntary groups of the modern public health era were those formed in the mid-1800s during the time of Britain's Royal Commission (see 5.4). These groups were primarily interested in molding public opinion as a means to agitate for change and in lobbying the government to enact legislation to improve public health (Rosen, 1993). While the 20th century volunteer health organizations did partake in these activities, they were a small part of the myriad undertakings of these associations. According to Shah, “their primary or major objectives are the promotion of health, the prevention of illness or disability, and the identification, treatment or rehabilitation of people with a disease or disability” (Shah, 1998, p.407); they also furnished “health services of a kind that had not

previously been available” (Rosen, 1993, p.358), including disease education, prevention, treatment and surveillance. Voluntary health organizations illustrated—both to the public and, most importantly, to the government—through their activities the need and feasibility of attention to certain diseases (MacDermot, 1967). The work of these health associations was eventually assumed by the various levels of government, sometimes with reluctance (McCuaig, 1999).

The first voluntary health groups focussed on tuberculosis. In 1900, the Organization of the Ontario Association for the Prevention of Consumption and Other Forms of Tuberculosis was created. It eventually became the Canadian Tuberculosis Association (Brink, 1965). In Hamilton, the Hamilton Health Association (HHA) was formed in 1905 (HHA, 1964). The purpose of this group was simply, at the time of its founding, “to care to care for the consumptive citizens of Hamilton and the County of Wentworth” (HHA, 1907, p.5). This included the raising of funds to build and maintain the Hamilton Health Association Sanatorium for Consumptives, also known as the Mountain Sanatorium, which opened May 28, 1906 (HHA, 1907). By 1923 the activities of the HHA became quite numerous and more diversified. An excerpt taken from the Annual Report of the HHA for 1923 illustrates not only the new objectives of the association, but its new endeavours:

The Hamilton Health Association is non-political, non-sectarian, and is closely associated with all other organizations working for the betterment of living conditions in Hamilton and its environments.

The operation of the Sanatorium is only one phase of the work of the Association, the real aim of its work being the organization of the community in a united and scientific effort to stamp out the dread disease—tuberculosis.

Other activities directed to this end are:

- 1) Conducting clinics to assist in the discovery of patients in the early stages of disease.
- 2) A Social Service Department, in which a visiting nurse follows up suspect cases, and keeps ex-patients under observation to safeguard against the recurrence of active disease.
- 3) Educational work with the general public to inform them as to the dangers of the disease, and the opportunities for its control and eradication.
- 4) Active co-operation with the Canadian Tuberculosis Association, which is a nation-wide organization, and is purely educational in its activities. The Canadian Red Cross is also associated in this work. (HHA, 1923, pp.3-4)

The HHA, as will be illustrated throughout this chapter, was extensively involved in many aspects of the early tuberculosis movement in Hamilton. As time passed and the Hamilton Board of Health assumed greater responsibility for the care and prevention of tuberculosis in the city of Hamilton, the HHA's activities became more focussed on the Sanatorium. Eventually, the HHA would cease its involvement in the Hamilton tuberculosis movement.

6.2 Surveillance

Tulchinsky and Varavikova (2000) define the surveillance of disease as “the continuous scrutiny of all aspects of occurrence and spread of disease pertinent to effective control of that disease” (Tulchinsky and Varavikova, 2000, p.179). The first surveillance activities employed in the modern public health period were the sanitary surveys, undertaken by Britain's Royal Commission. The purpose of these surveys, according to Rosen, was as a tool to obtain information on which remedial action was taken (Rosen, 1993). The surveys not only pointed out the types of diseases and illnesses found in the community

but also their prevalence. Surveys, as will be later examined, were a key instrument in the tuberculosis movement.

The first surveillance tool employed in Hamilton was the recording of tuberculosis death rates in 1851.¹¹ In 1852, the first year that the rate is available, the death rate for tuberculosis in Hamilton was 233 per 100 000 population (Wells). The benefit of accurate statistical information in disease prevention was first noted and employed by Chadwick of the Royal Commission (Rosen, 1993). Keeping accurate records of the causes of death was important as an indicator of diseases and illnesses affecting a community. As early as 1895, the Board of Health in Hamilton kept records of tuberculosis deaths in the city and published these statistics in its Annual Reports (see Figure 3.4). In observing Figure 3.4, it is evident how such information was useful in surmising the prevalence of the disease in the community prior to the birth of modern epidemiological statistics-gathering techniques.

Another useful surveillance tool was house-to-house inspection which, as recorded in the 1889 Minutes of the Hamilton Board of Health, had been underway for some time prior to 1889. These inspections were also useful in disease surveillance. Inspectors, upon entering a house, not only judged the dwelling for soundness, dampness and overcrowding but also searched for the presence of disease in the home's occupants. In cases where infectious disease was found, the Medical Officer of Health had the power, under Ontario's Public Health Act of 1882, to remove any infectious individual—

¹¹ It is unknown which organization collected this data and whether it is still in existence. Unsuccessful attempts were made to locate this information.

with the exception of tuberculous persons—from their home and place them in an isolation hospital (Gagan, 1981)(see 5.3). Once in the hospital, the Board of Health would then enter the premises and disinfect the home free of charge (Annual Report, 1906). The homes of tuberculous persons were similarly disinfected upon admittance to the Sanatorium, a move to another location or in the event of the death of the tuberculous individual (HHA, 1911). Between 1905 and 1920, the average number of houses occupied by tuberculous individuals which were disinfected by the Board of Health was 46 per year (Annual Report, 1905-1920). This practice of dwelling disinfection continued until the late 1920s (Annual Report, 1906-1929).

Between the recording of house-to-house inspections in the Minutes of the Board of Health in 1889 and the appointment of the visiting nurse in 1906, no information regarding the surveillance of tuberculosis exists in either the Minutes of the Board or the Board's 1905 Annual Report. The reason for this may be the focus of the Board of Health on sanitary endeavours. During this period, the Minutes of the Board are filled with requests for connections to the new underground sewer lines and discussions about sources of potable water; very little was written regarding infectious disease, and nothing regarding the surveillance of tuberculosis (Minutes, 1884-1905).

6.2.1 Nursing

In the United States and England in the late 19th and early 20th centuries, nurses were appointed by volunteer health associations to attend to specific diseases. The tuberculosis nurse was one of the first such nurses (Rosen, 1993). The HHA in 1906 appointed a

visiting (tuberculosis) nurse to look after consumptives who were taking treatment in their homes (HHA, 1906). Her work reflected the objectives of her employer—“to care for the consumptive citizens of Hamilton and the County of Wentworth” (HHA, 1907, p.5). The HHA also provided a tuberculosis nurse who worked at the Downtown Dispensary of the Sanatorium (Minutes, 1919). In 1917, the responsibility for employing the visiting nurse was assumed by the Hamilton Board of Health; and in 1919, the tuberculosis nurse became employed by the Board (Annual Report, 1917; Minutes, 1919). Slowly, in both Europe and North America, it was realized that the tuberculosis (visiting) nurse could be more efficient and effective if the focus of their work was expanded from one disease to more general nursing. Thus the public health nurse evolved (McCuaig, 1999). By 1936, the public health and district nurses had taken over the responsibilities of the visiting nurse, in addition to their other duties (Annual Report, 1935 and 1936). The work of the tuberculosis nurse in the Chest Clinic remained for several decades until the closing of the Chest Clinic in the early 1980s. From the earliest beginnings of the germ movement until the present, nurses have played a large role in the surveillance of tuberculosis.

6.2.1.1 The Visiting Nurse

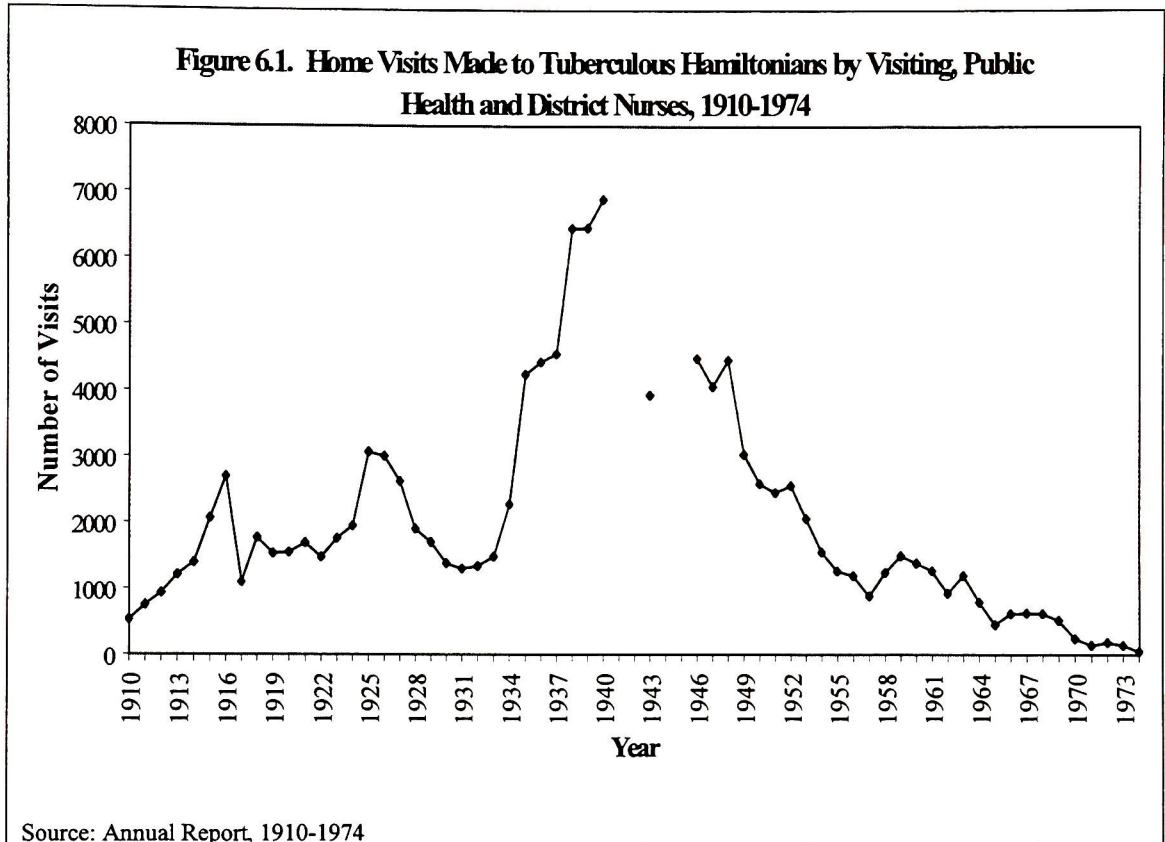
The first action taken specifically to locate cases of tuberculosis was the appointment of the visiting nurse by the HHA. The nurse’s primary function was to care for homebound tuberculous individuals and instruct them in the treatment of the disease. Her secondary role, but also of great importance, was to scrutinize the home’s inhabitants for other cases

of tuberculosis and observe those individuals who were suspicious or doubtful of having the disease; incipient cases could thus be located (Minutes, 1906; HHA, 1907, 1912; Annual Report, 1917, 1923). The nurse also visited the homes of individuals discharged from the Sanatorium to observe for signs of re-activation of disease (Annual Report, 1924). (It is unclear for what length of time these ex-Sanatorium patients were kept under surveillance.) The nurse averaged 100 home visits per month in 1907 and by 1909 was making approximately 34 home visits per day (HHA, 1907, 1909)(see Figure 6.1). Starting in 1935, the number of visits made to patients' homes increased dramatically. This was the result of the addition of visiting the dwellings of tuberculosis individuals to the duties of the public health and district nurses (Annual Report, 1935 and 1936)(see 6.2.1.3).¹² Statistics show that between 1910 and 1974, a total of 122 115 visits were made to homes of individuals with active disease taking treatment at home, those discharged from the Sanatorium, and those who were under observation for suspected or doubtful tuberculosis (Annual Report, 1910-1974)(see 6.2.1.3).

In 1917, the Annual Report of the Board of Health records that "the visiting nurse is one of the chief factors, if not the chief factor, in the prevention of tuberculosis" (Annual Report, 1917, p.4). Because tuberculosis is an air-borne disease, if one member of a household is infected the risk infection of other inhabitants of the home is greatly increased. Tuberculosis has a number of symptoms which are relatively easy to observe, including weight loss and racking cough (see 3.1). The visiting nurse in entering the

¹² There is no information describing the reasons for the decrease in the number of home visits after 1940. In fact, by 1963, with public health and district nurses visiting new and inactive cases, discharged Sanatorium patients, the contacts of tuberculous persons plus those who had missed appointments at the

homes of known cases of active tuberculosis had the advantage of observing the health of members of the house over a period of time. She, more than any other surveillance tool



available in the early 20th century, could detect very quickly, from the above mentioned symptoms, if anyone in the household of a known active tuberculous case had developed the disease. And the sooner a case was discovered the better the chances for recovery. Suspicious and doubtful cases of tuberculosis were also similarly observed through home visits by the visiting nurse and noted for the commencement of any tuberculous-like

clinic and individuals on chemoprophylaxis, it is surprising that the number of home visits declined over time rather than increased.

symptoms. Unfortunately, statistics as to the numbers of incipient cases discovered by the visiting nurse in this manner are unavailable.

Around 1913 the rhetoric surrounding tuberculosis changed in that efforts to stamp out the disease focussed on the child rather than the adult (HHA, 1913). It was discovered that tuberculous children often became tuberculous adults or adults with decreased lung function. This was of particular importance as young males who were tuberculous children were not able to serve in the Canadian Forces due to their decreased lung capacity (HHA, 1913-1918). The requirements of war had shifted the tuberculosis campaign away from treatment of tuberculous adults to the prevention of childhood tuberculosis. By 1922, the Annual Report of the Board of Health records that the visiting nurse was offering special attention to children in the homes of tuberculous cases (Annual Report, 1922, 1923). The impetus for this attention was no longer due to the requirements of the war but more a matter of economy. Since most cases of childhood tuberculosis became tuberculous adults, then prevention of the disease during childhood was more economical than treating an adult with active disease. The visiting nurse's work of finding incipient cases, especially in children, was assisted by reports of doctors, public health nurses and friends of the family who noted that a child might be infected with tuberculosis (Annual Report, 1922, 1923). The children were kept under observation by the visiting nurse for signs of disease activation and when disease was discovered they were removed from their homes and placed in the Sanatorium (Annual Report, 1933).

One of the difficulties of the visiting nurse was attending the homes of foreigners.

Rarely could the homemaker understand English, thereby making the call “most unsatisfactory” (Annual Report, 1917, p.10). Attempting to rectify this situation, a need for literature printed in the language of the foreigner was suggested in the 1917 Annual Report of the Board of Health. It is unknown whether this recommendation was undertaken.

6.2.1.2 The Tuberculosis Nurse

The tuberculosis nurse was first hired by the HHA to work in the Downtown Dispensary (HHA, 1909). While the work of the tuberculosis nurse could not be classified as surveillance, *per se*, her efforts were necessary in order for the surveillance aspect of the Chest Clinic to occur. A description in the 1924 Annual Report of the Board of Health outlines the procedure for examination at the Chest Clinic; it illustrates how the tuberculosis nurse’s activities supported the surveillance of tuberculosis through the clinic:

The patients come to the general waiting room and as quickly as possible the nurse takes them in order into the outer examining room, where she takes a brief history of important points; takes the temperature and weighs the patient. With children this is compared with the normal weight for height and age. . . . In addition, it is the routine now to give a tuberculin test to every patient under 18 years of age and to take the blood pressure of every patient above 30. (Annual Report, 1924, pp.53-54)

The 1949 Annual Report of the Department of Health records that, for sometime before that year, the district nurses on a rotating basis had been undertaking these above mentioned clinic responsibilities of the tuberculosis nurse. Unfortunately, there is no

information on the activities the tuberculosis nurse or the existence of the position after 1924.

In 1990, nurses were formally re-assigned to the control of tuberculosis and became known as “tuberculosis nurses” (Annual Report, 1990). Unlike the activities of their predecessors, the primary function of the present-day tuberculosis nurse is surveillance. Working in the Tuberculosis Control Program, formed in 1990, the nurse is responsible for the tracing of contacts and the investigation of active and reactivated cases of the disease in Hamilton-Wentworth (Annual Report, 1990-2000). Newly arrived immigrants with inactive tuberculosis living in Hamilton-Wentworth are also kept under surveillance by these nurses (Annual Report, 1995-1997). In 1995 and 1996, 93 and 73 referrals, respectively, for immigrant observation were received by the Hamilton-Wentworth Regional Public Health Department (Annual Report, 1995, 1996). For 1997, the Department received 91 referrals for surveillance. Of these referred persons, 41 would remain under observation for signs of disease reactivation for a 2 through 5-year period. The remaining 49 referred individuals either had no evidence of the disease, could not be located or had moved out of the region. Only one person was found to have active disease (Annual Report, 1997). Occasionally, the surveillance activities of the nurse are expanded to include the observation of certain groups, such as inmates from prisons. In 1996, the nurses observed inmates released from Kingston prisons upon their arrival to the Hamilton-Wentworth area for signs of disease (Annual Report, 1996).

Identical to the work of the visiting nurse, the present-day tuberculosis nurse observes contacts and individuals with active and reactivated tuberculosis, immigrants

with inactive disease, and the occasional group of inmates for signs of disease activation; the sooner active tuberculosis is recognized, the better the chances of recovery. Prompt attention to infection by tuberculosis also translates into a reduced chance of infecting others. The tuberculosis nurse, through surveillance activities, therefore not only discovers incipient and reactivated cases of disease but aids in the prevention of additional cases of tuberculosis through early detection.

6.2.1.3 The Public Health and District Nurse¹³

The role of the public health and district nurses with respect to tuberculosis surveillance in Hamilton was varied. For instance, in the 1935 and 1936 Annual Report of the Department of Health, a nurse was hired to be in charge of the Tuberculosis Division of the Department. Her responsibilities were primarily administration and attending the chest clinics (Annual Report, 1935 and 1936). For other public health and district nurses, “The Tuberculosis control programme has been intensified and the service woven into the entire fabric of [the public health and district nurses’] generalized activities” (Annual Report, 1935 and 1936, p.36). The district nurse¹⁴, under the direction of the nurse in charge of the Tuberculosis Division, was responsible for the home visiting of patients and contacts and would be required, on a rotating basis, to assist at the chest clinics. This approach gave the district nurse “a much better understanding of the tuberculosis problem

¹³ The work of the district and public health nurses with respect to tuberculosis surveillance overlap in numerous ways. As a matter of simplicity, the work of the two types of nurses will be discussed in the same section.

¹⁴ The Annual Reports are contradictory in the sense that one Report lists the public health nurse as undertaking surveillance activities while another Report records that it was the duty of the district nurse. These terms will be employed as found in the Annual Reports.

in its relation to the general public health problem” through home visiting and provided “special training in all phases of anti-tuberculosis work” though assisting at the chest clinics (Annual Report, 1935 and 1936, p.44). The objective of this nursing structure was to ensure that “that every known case of tuberculosis and the contacts shall be under the supervision of the district nurse and that this supervision shall be both adequate and continuous” (Annual Report, 1935 and 1936, p.36).

To ensure adequate supervision of all contacts, a contact form was designed for use by district nurses during contact tracing to ensure complete coverage (Annual Report, 1958). Securing the examination of all contacts at the chest clinic and keeping them under surveillance was the responsibility of the public health nurse (Annual Report, 1933, 1935 and 1936, 1949, 1950, 1955; HHA, 1939).¹⁵ This observation of contacts was necessary to ensure swift action should disease occur (Annual Report, 1951). This promptness not only increased the chances of recovery, but also lessened the possibility of infecting other individuals. For these same reasons, the public health nurse visited the homes of discharged Sanatorium patients and inactive cases to observe for signs of disease reactivation (Annual Report, 1933, 1951).

By 1961, the public health nurse not only visited the homes of discharged Sanatorium patients, inactive cases, new patients of the Chest Clinic and contacts of individuals with known tuberculosis, the nurse was also visiting the homes of individuals who had missed appointments at the Chest Clinic (Somerville). Knowing the reasons

¹⁵ The surveillance of contacts of school age were under the supervision of the school nurse (Annual Report, 1935 and 1936).

behind missed appointments was important in attempting to alleviate the problem of clinic non-attendance. It was discovered, for example, that many individuals who worked throughout the day could not afford or were unable to take time off from work to visit the clinic during business hours. It was for this reason that in 1955 the Chest Clinic began to offer nighttime appointments (Annual Report, 1955). Home visiting of individuals who had missed clinic appointments also permitted the public health nurse to further stress the need for regular examinations and answer any questions relating to treatment of the disease.

The surveillance efforts of the public health nurse had further expanded so that by 1963 they included those persons taking anti-tuberculosis chemotherapy in their homes (Annual Report, 1963). The primary purpose of observing these individuals was to ensure adherence to the drug regimen, thereby reducing the chance of drug resistance. With chemotherapy for tuberculosis lasting generally about one year—but it could vary from six months to an indefinite period of time—it was necessary to periodically make home visits to safeguard against the possibility of drug resistance (Annual Report, 1960). The secondary purpose of home calling was, when drug resistance was found to have occurred, to prevent the infecting of others with that resistant strain. These visits of the public health nurse to individuals on anti-tuberculosis chemotherapy not only served to help prevent drug resistance and the infecting of others with a resistant strain, they also aided in saving the public health system money. Drug resistant tuberculosis is both more difficult and expensive to treat.

One of the greatest surveillance tasks of the public health and district nurses was maintaining supervision of tuberculous transients and tracing their contacts. There is no further information recorded in the Annual Reports with respect to this topic, with the exception that the nurses completed this task with the aid of the Inspection Division of the Health Department (Annual Report, 1958). The observation of transient individuals and their contacts continues to remain a challenge for public health workers. Unfortunately, no information contained in current or past Annual Reports lists the methods employed to combat this difficulty.

With the closing of the Chest Clinic in 1982, the tuberculosis surveillance responsibilities of the public health nurse were limited, according to the Annual Reports of the Hamilton-Wentworth Regional Board of Health, to outbreaks of disease. In 1984 and 1985, public health nurses were employed to aid in coping with three separate outbreaks of tuberculosis. In June 1984, two cases of active pulmonary tuberculosis were diagnosed in a factory in Hamilton. The factory employed 220 persons and involved the use of silica. The workers were at risk of contracting silicosis, with pulmonary tuberculosis a resulting complication. The Hamilton-Wentworth Regional Board of Health, working in conjunction with the plant management, physician and nurse, the Ministry of Labour, and union representatives, created a three-month plan to prevent the spread of the disease. A team of public health nurses, together with the factory nurse, carried out tuberculin skin tests on the employees. Three months later, the employees whom had negative tuberculin skin tests were re-tested, and the eleven “convertors” had chest x-rays taken. A case of active pulmonary tuberculosis was diagnosed in a

secondary school in Hamilton in October 1984. Public health nurses carried out tuberculin skin testing on 41 staff and students in the school (Annual Report, 1984). In June 1985, a student was diagnosed with active pulmonary tuberculosis. Tuberculin skin testing was undertaken on 393 students and 61 teachers and staff by public health nurses at clinics held at the school and at the Mountain Health Office (Annual Report, 1985).

The finding of cases during tuberculosis outbreaks by the public health nurses appears to be the only tuberculosis surveillance activity during the 1980s. From 1970 to 1989, in fact, no information on tuberculosis surveillance, save for the above discussions of outbreaks, was found in the Annual Reports. It is uncertain who was responsible for surveillance of immigrants, inactive cases, and active cases on drug therapy during this period. It is also unclear which methods were employed to observe these individuals. As the threat of tuberculosis lessened in the early 1970s and remained so until the late 1980s, the information in the Annual Reports regarding its surveillance similarly diminished.

6.2.2 School Surveillance

During the latter part of the 19th century and the early part of the 20th century, an interest in the welfare of children developed. Children, throughout the industrial era, were subject to abuses such as long hours, hard, and often dangerous, work and poor working conditions. The child welfare movement grew out of recognition of these abuses (Rosen, 1993). Part of this movement included concern over the physical health of children. School medical surveillance was one method by which to diagnose, prevent and educate¹⁶

¹⁶ Education with respect to tuberculosis will be discussed in section 6.3.

children with respect to health matters. As most children attended school by the age of five, it was most sensible to educate children about and inspect them for various health deficiencies and illnesses at school.

The first organized school medical inspection system in North America was in Massachusetts, instituted in 1906. Following the example in Europe and Great Britain, school medical inspection in this state was made the responsibility of the Department of Education, not the Health Department. The reason for this was to ensure better care because most local health departments were poorly staffed or politically controlled and therefore unable to provide consistent service (Rosen, 1993). The Annual Report of the Hamilton Board of Health cites that to be more “effectual” school medical inspection in Hamilton would eventually be made the responsibility of the Health Department, following Montreal’s example (Annual Report, 1907, p.26). Even though the School Medical Services did not amalgamate with the Department of Health until 1934, the findings of the Service were printed in the Annual Reports from 1907 until amalgamation (Annual Report, 1907-1934).

Medical Inspection in Hamilton was underway for some time prior to 1907. The Inspection team was aided by the work of principals and teachers who had “at all times properly referred all suspicious cases [of contagious and infectious disease] to [the Health] department” (Annual Report, 1907, p.26). Medical Inspection in Hamilton was “mooted” when it was decided in 1907 that a school nurse would be placed in the schools (Annual Report, 1907, p.26). By the end of the year, school medical inspection consisted

of a team of three nurses who inspected the children not only for signs of infectious disease, but also for evidence of poor hygiene (Annual Report, 1910; Gagan, 1981).

It became evident, a few short years after the introduction of school medical inspection, that the system would be useful for surveillance of tuberculosis. In 1910, the school nurse was instructed to focus her attention on finding cases of tuberculosis (Annual Report, 1910). By 1913, it was being recognized by the medical community that “eradication of tuberculosis is dependent almost wholly upon the care of the child” and that it was more feasible to prevent tuberculosis in children than it was to cure it in adults (HHA, 1913, p.20, 1914-1917). This recognition led to the suggestion by the Hamilton Health Association that the new direction for surveillance should be with school children (HHA, 1914). By 1918, the HHA urged that health inspections be extended to other schools outside of public elementary system in order to find early cases of the disease. This was recommended as a preventive measure against the development of advanced cases, which were more expensive and difficult to treat (HHA, 1918b, 1920). By 1925, school medical inspection was enlarged with the commencement of pre-school and technical school visits (Annual Report, 1925, 1946).

The surveillance of tuberculosis in elementary school children consisted of a public health nurse examining every child in a class where a communicable disease was reported and referring any children suspect of having tuberculosis to the chest clinic (Annual Report, 1920, 1924, 1925). By 1928, this same method of surveillance was extended to include all secondary schools (Annual Report, 1946). A survey of health activities in Hamilton in 1933 made a recommendation that the method of surveillance

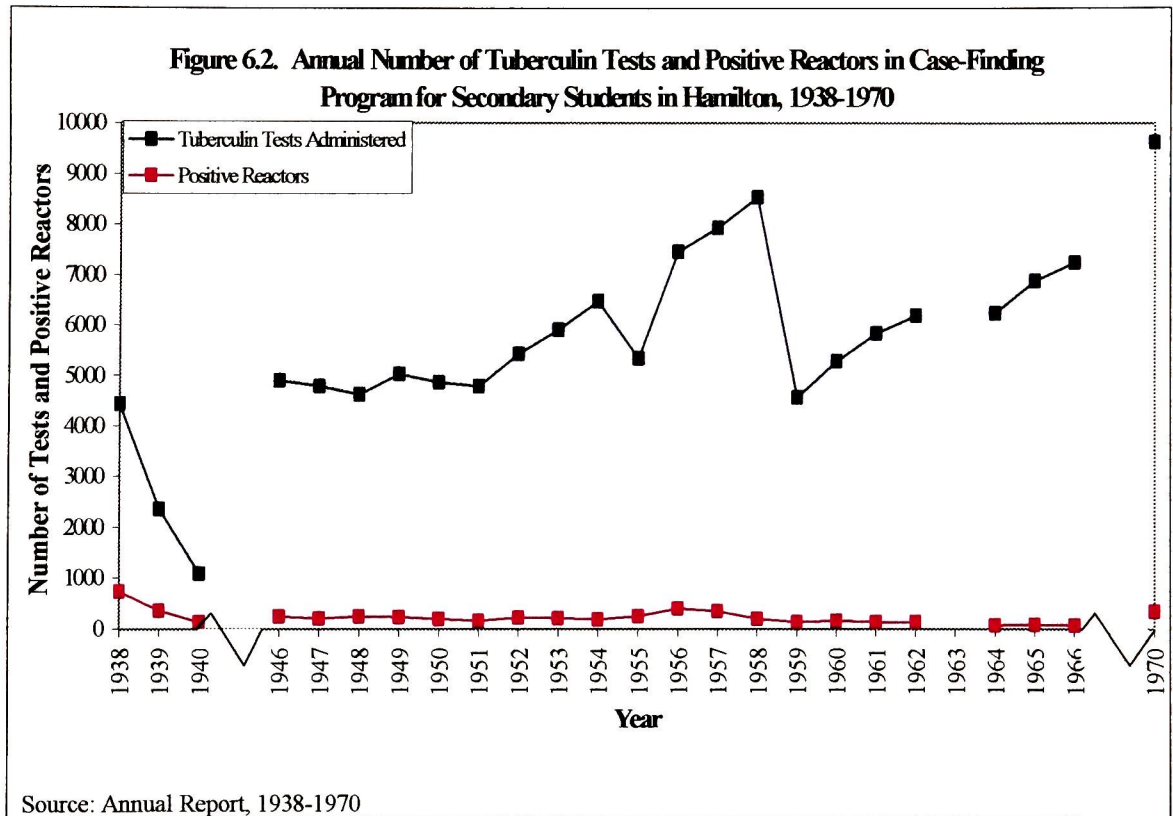
for tuberculosis in both elementary and secondary school be changed from visits by the public health nurse to a class where a communicable disease had been reported to a more “intensive effort to discover unsuspected cases, such as a routine tuberculin-testing or x-ray examination of children at a certain school age” (Fleming). In 1938, this recommendation was placed in action and was the start of a yearly testing program.

The yearly survey was instituted in 1938 by School Medical Services and included the tuberculin testing of all secondary school students, with x-rays for those with a positive reaction. Arrangements for the tests were made by the school nurse (Wells; Annual Report, 1946). The purpose of the program was firstly to find cases of tuberculosis and secondly to trace contacts (Annual Report, 1937 and 1938). This method of surveillance would become the primary approach for case finding for children of teen age for the next approximately thirty years (Annual Report, 1939-1970)(see Figure 6.2). In 1939, through this screening process, between 5000-6000 students were tested and those with a positive reaction were x-rayed at the Chest Clinic (HHA, 1939).¹⁷ Testing was undertaken in the fall months with clinics moving from school to school. By 1948, it was the responsibility of the public health nurse, and not the school nurse, to arrange for the tests (Annual Report, 1948-1954). The tuberculin testing of high school students was amended in 1951 so that tests were only given to students whose tuberculin status was unknown or to those whose previous tests were negative (Annual Report, 1951). In 1955, the yearly survey was altered again to reflect the decreasing proportion of new reactors in the upper grades. Students in Grades 9, 10 and 12 and new students in

¹⁷ No information could be located regarding the number of positive reactors.

other grades were tuberculin tested. Positive reactors, both new and previously known, underwent chest x-rays either at the Chest Clinic or the mobile chest x-ray unit. Students who had missed the survey at school were examined at the Chest Clinic (Annual Report, 1955). One addition to the annual secondary school screening was the interrogation of all positive reactors as to the possible source of their infection (Annual Report, 1956). Possible sources included the drinking of raw milk, recent contact with a known active case, contact with ex-Sanatorium relatives or friends, history of childhood infection or inoculation with the B.C.G. vaccine (Annual Report, 1956-1962). This information was particularly useful at reducing the work of the public health nurse in attempting to track the source of disease in these particular students. In 1959, the tuberculin-testing program for teens was further amended so that only students in Grades 9 and 12 were being tested; new and previously known positive reactors continued to be x-rayed (Annual Report, 1959). This was to become the annual standard for testing until 1970. (Unfortunately, no information is available regarding the annual survey of secondary students for 1967, 1968 and 1969. It can, however, be assumed that the program was still in existence as mention of tuberculin testing of Grade 9 and 12 students was found in the 1970 Annual Report of the Hamilton-Wentworth Health Unit.) The screening program was expanded in 1965 and 1966 to include, in addition to the secondary students, all grades in the Junior Vocational Schools. Children known to be positive reactors, in both the secondary and Junior Vocational Schools, were not administered the tuberculin test but they were x-rayed. As with the secondary school program, students in the Junior Vocational Schools

were interrogated as to the possible source of their infection (Annual Report, 1965, 1966).



The annual screening of secondary students was terminated in 1971 when immunization with the B.C.G. vaccine was instituted.¹⁸ While it is not explicitly stated in the Annual Reports, it can be surmised that the reason for the cessation of the secondary school testing program was due to the decline in the number of cases of tuberculosis. Mass screenings, by 1971, were no longer economically feasible—the proportion of cases

of tuberculosis to those without the disease was too small to justify such a grand undertaking. In 1971, 820 children were immunized with B.C.G. (Annual Report, 1971). This number increased dramatically in 1972, where 12 715 children were innoculated (Annual Report, 1972). There is no further information regarding the surveillance of tuberculosis in children in the Annual Reports beyond 1972.

On occasion, special surveys of children were undertaken in order to locate cases of tuberculosis. The first of these was in 1923. A survey of 1392 elementary and high school children was conducted under the auspices of the Canadian Tuberculosis Association in the Town of Dundas and Township of West Flamboro, County of Wentworth. Examinations were provided by the staff of the Mountain Sanatorium and physicians who were members of the Hamilton Medical Association. The survey included a general examination for a number of ailments, in addition to the search for cases of tuberculosis. With respect to tuberculosis, tuberculin tests, chest x-rays and a physical examination were given. No cases of open pulmonary or extra-pulmonary tuberculosis were found, even though more than 50% of the high school students reacted to the tuberculin test (Brink, 1965). In the winter and spring months of 1963-1964, the Division of Tuberculosis Prevention, Provincial Department of Health conducted a mass tuberculin-testing program of all elementary and secondary school children. Tests were administered to 62 377 children. Of these, 3099 or 5.1% reacted positively to the tuberculin; x-rays were taken of 2431 of the positive reactors. This particular survey was sponsored by the Hamilton Health Association (Annual Report, 1964).

¹⁸ No information could be located regarding this change in policy. Attempts were made to find reference

A special program was created in 1956 encouraging families of secondary students who had converted from a negative to a positive reaction to undergo an x-ray (Annual Report, 1956). While it is not explicitly stated in the Annual Report, it can be assumed that the program was designed to locate a source of active tuberculosis in the home. There would be no reason, save for exposure to an active case of the disease, for a student to convert from a negative to a positive reaction. And since cases of active tuberculosis in the general public were decreasing rapidly and students who had active disease were placed in the Sanatorium, therefore, the most logical source of infection would be in the home. For reasons not cited, by 1958, families and contacts of “converted” students had not been x-rayed (Annual Report, 1958). (The assumption can be made that the reason for this was because there were numerous mass surveys conducted during this period of time.) In 1966, an opportunity was made available for adults in the households of student convertors to undergo a chest x-ray at the Chest Clinic (Annual Report, 1966). Whether individuals partook in this opportunity was not found in any of the Annual Reports. Similarly, no further information regarding this program was found in subsequent Annual Reports.

6.2.3 The Downtown Dispensary and Chest Clinic

Physician Robert W. Philip opened the world’s first tuberculosis dispensary, the Victoria Dispensary for Consumption, in 1887 in Edinburgh, Scotland. Dr. Philip saw that “If the community as such was to benefit practically by the discovery [of the tubercle bacillus],

to this policy change at both the local and provincial levels.

there appeared to be need of centralized effort in order to ascertain the extent of tuberculosis in a district, and to devise means for its limitation and prevention” (in Rosen, 1993, pp.361-362). The main organizational unit of Philip’s tuberculosis system was the dispensary, which not only provided medical supplies and examinations of patients, it also coordinated home visiting and offered health education (Rosen, 1993).

The Downtown Dispensary¹⁹ of the Mountain Sanatorium was opened on Hess Street by the Hamilton Health Association in 1909 following a visit to Canada by Dr. Philip (HHA, 1909, 1919). The HHA opened Hamilton’s dispensary downtown for three reasons. First, clinics held at the Sanatorium were poorly attended; second, these clinics did not afford the opportunity to organize a general campaign against tuberculosis in Hamilton; and third, the HHA believed in the efficacy of Dr. Philip’s system for tuberculosis (HHA, 1919). Clinics at Hamilton’s Downtown Dispensary operated free of charge twice weekly from 1909. Examinations were conducted by Dr. Holbrook of the Sanatorium from 1909 until 1949, when three physicians provided by the HHA replaced Dr. Holbrook (HHA, 1909; Annual Report, 1949). The Hamilton Board of Health assumed responsibility for the dispensary work of the HHA in 1920 (Annual Report, 1920). By 1921, adult clinics were running Monday, Wednesday and Friday afternoons (Annual Report, 1921). The clinic moved to the basement of the Health Centre—which was the Old Public Library—in 1922 and by August of that year had expanded to include a children’s clinic held on Saturdays (HHA, 1920; Annual Report, 1922); the children’s clinic was discontinued in 1929 because of the existence of a general health clinic held

¹⁹ The Downtown Dispensary later became known as the Chest Clinic.

for pre-schoolers and students on Saturday mornings. Any children suspected of having tuberculosis were referred from the general health to the chest clinic (Annual Report, 1929). In the early days of the clinic, patients received instruction for sputum care so as not to infect others and were given the basic advice: “lots of fresh air, good food, and keeping a dry, clean and ventilated home” (Annual Report, 1922, p.10). Patients who were unable to afford a physician or who were under home treatment were given supplies of sputum bottles and handkerchiefs; literature and medication were also distributed from the clinic (Annual Report, 1921, 1922). Responsibility for the operation of the clinic and for tuberculosis control by 1949 was vested in the director of the Division of Tuberculosis Control, Hamilton Department of Health who was assisted by a full-time public health nurse, two full-time and one part-time clerk-stenographers and a part-time x-ray technician. Due to the volume of work, a full-time x-ray technician was hired in 1950 (Somerville; Annual Report, 1949). The Downtown Dispensary, and its clinics, was the central focus for the prevention, treatment and surveillance of tuberculosis in Hamilton.

6.2.3.1 Surveillance Through Accurate Diagnosis

Prior to 1920, tuberculosis associations, including the Hamilton Health Association, were interested in combating the disease and simultaneously attempted to rid society of anything perceived to be a cause of tuberculosis, such as poverty (see 3.2). Reflecting this objective, the Downtown Dispensary not only provided medical supplies and educational material to patients but also offered food, clothing and other necessities to

poor tuberculous individuals and families (see 6.5.1). Just prior to the 1920s, however, a shift occurred in the tuberculosis movement such that activists began to realize that ridding society of all the perceived causes of tuberculosis was an impossibility. By 1919, as a result of this realization, dispensaries in Canada, including the Downtown Dispensary of the HHA, became “more and more a consultation, diagnostic and referral centre, not a welfare distributor—in the post-war era that role would be left to other charities and auxiliary associations” (McCuaig, 1999, p.45).

The dispensary was an integral part of the surveillance of tuberculosis; it provided for the accurate diagnosis of the disease. Proper identification of tuberculosis was not only crucial to successful treatment (HHA, 1921), it also served as the basis for future case-finding programs (see 6.2.4). Prior to 1924 diagnosis of the disease was primarily through a chest examination and identification of the tubercle bacillus in sputum analyzed at the city laboratory (Annual Report, 1921).²⁰ By 1924, however, much had changed in the routine procedure at the clinic. For instance the Annual Report of the Hamilton Department of Health for 1924 recommended that a chest x-ray be carried out to assist in final diagnoses, as it was nearly impossible to make final judgements based on a single examination. Since diagnosis had become the emphasis of the clinic by 1924, a routine examination was not considered complete unless the heart, nose, throat, tonsils and teeth were similarly inspected for identification of other illnesses. This same year, two new procedures were instituted as part of clinic routine: the taking of blood pressure in adults and the intracutaneous tuberculin testing of children (Annual Report, 1924).

²⁰ Prior to 1924 there is no mention of the use of x-rays in diagnosis.

Diagnosis, having become the focus of the clinic, required proper equipment and facilities. The chest clinic was considered less than “ideal” by Dr. Holbrook, then clinic physician, because of its lack of x-ray and fluoroscopic equipment (Annual Report, 1924, p.67). A fluoroscope was particularly useful in a busy clinic since the image did not have to be developed, as was the case with x-rays (Webster’s, 1991). This translated into faster diagnoses and also a cheaper cost. The fluoroscope also allowed for the viewing of deep body structures and was equally as accurate as an x-ray in illuminating all moderately or far advanced cases of tuberculosis and had approximately 87 percent accuracy in showing minimal cases (Annual Report, 1937 and 1938; Brink, 1965; Webster’s, 1991). In 1939, a fluoroscope was added to the Health Centre clinic (Wells; Annual Report, 1946). The procurement of an x-ray machine for the Health Centre clinic was recommended in the 1933 survey of health activities in Hamilton (Fleming). It was not until 1947, however, when a promise was received from the Wentworth County Christmas Seals Committee to purchase the necessary x-ray equipment for use at the Health Centre clinic, that this recommendation approached implementation. The agreement between the Department of Health and the Christmas Seals Committee was that the purchase cost would be borne by the Committee while the cost of operation was the responsibility of the Department (Annual Report, 1947). The Hamilton Health Association, working in conjunction with the Christmas Seals Committee, presented the Health Department with the x-ray machine in 1948 (Annual Report, 1948). The 1950 Annual Report of the Health Department indicates that the x-ray machine by that year was being employed for diagnostic purposes on patients of the Health Centre Chest Clinic

(Annual Report, 1950). A second x-ray machine was purchased and installed in the clinic in 1955. This particular equipment had tomograph attachments for all types of x-ray films required for diagnostic purposes. Prior to acquiring this new machine, patients were referred from the chest clinic to the Sanatorium x-ray department for special x-rays (Annual Report, 1955).

To further expand the surveillance of tuberculosis through accurate diagnosis, a house-to-house survey in the northeast part of Hamilton was undertaken during the early part of 1923 to ascertain the necessity of another chest clinic in that area. Health and other information was gathered from 350 families which served as the basis for the decision making process. "As to establishing a chest clinic in this section, we were unable to complete sufficient data at the time and a more complete survey will be undertaken" (Annual Report, 1923, p.47). No mention of a second survey or the opening of a chest clinic in that section of the city was found in either the Minutes or the Annual Reports of the Department of Health. In 1927, however, an Eye, Ear, Nose and Throat clinic was opened in conjunction with the chest clinic so that persons with doubtful tuberculous conditions could be referred and properly diagnosed (Annual Report, 1927). The Annual Report of the Hamilton Department of Health for 1930 records that the Eye, Ear, Nose and Throat clinic "has proved valuable in the diagnosis of doubtful cases of tuberculosis" (Annual Report, 1930, p.37). A second chest clinic was opened at the City Hospital in 1927. This clinic differed in numerous respects from the one located at the Health Centre. The City Hospital clinic was established to undertake all cases of doubtful diagnosis. Not only were x-ray and laboratory facilities located on site but specialists and

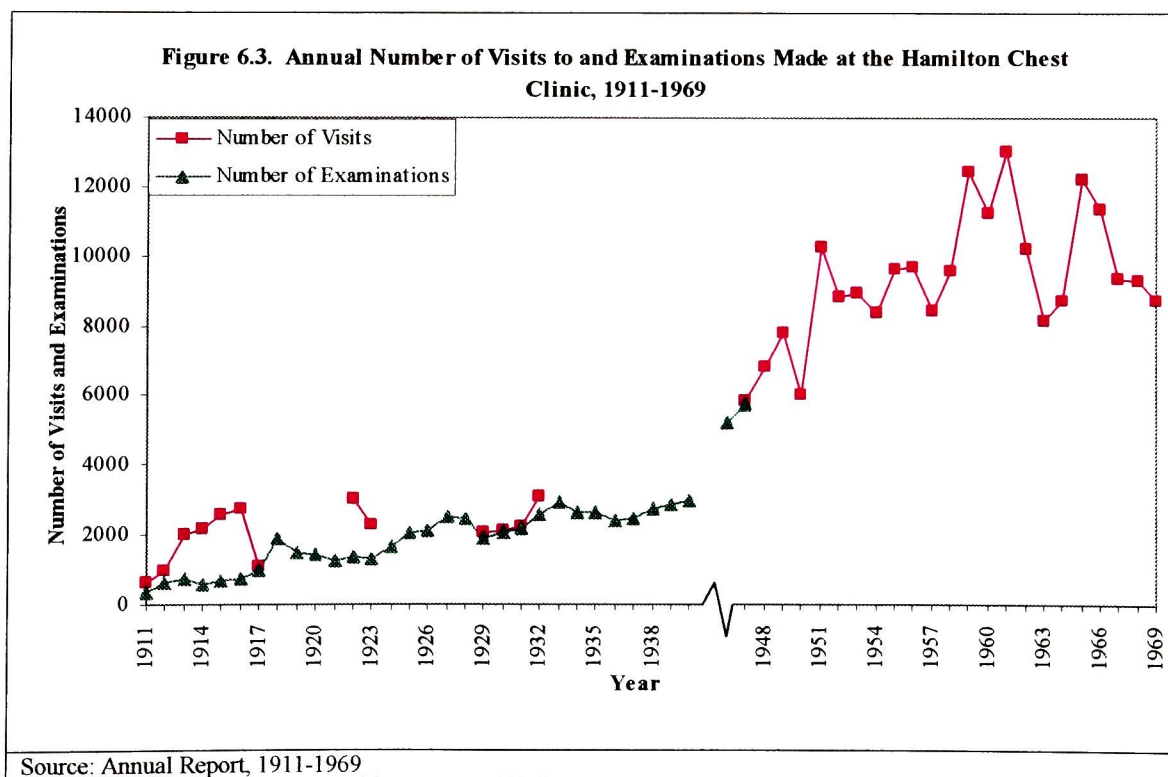
consultants from different branches of medicine were also present to serve for a “more accurate means for differential diagnosis” (Annual Report, 1927, p.93). A third diagnostic chest clinic was held every Thursday afternoon, by 1930, at the Outdoor Department of the General Hospital. Patients from the Health Centre clinic were referred to this clinic for x-rays and further observation (Annual Report, 1930).

Occasionally, the Steel Company of Canada, various family physicians throughout the city and the Hamilton Office of the National Employment Service would submit x-rays to the chest clinic for the opinions of the clinicians. Often, non-tuberculous conditions were diagnosed through this process and these were referred to the appropriate specialists (Annual Report, 1959, 1968). On December 1, 1969, the Chest Clinic of the Hamilton-Wentworth Health Unit became the Regional Chest Clinic of the Provincial Department of Health. Diagnostic practices such as medical examinations and chest x-rays continued at the clinic under the supervision of the Province (Annual Report, 1969). The clinic was officially closed in December 1982 by the Provincial Department of Health. Diagnosis of tuberculosis became the responsibility of respirologists and other chest specialists (Whitehead, 2000, pers. comm.).

6.2.3.2 The Many Roles of the Clinic

The surveillance of tuberculous cases was made simpler through the establishment of the dispensary (HHA, 1919). Following Dr. Philip’s Edinburgh system, the dispensary was the central organization in the Hamilton tuberculosis effort. Coordinating cases for home visits by the visiting nurse, therefore, was one of the responsibilities of the dispensary.

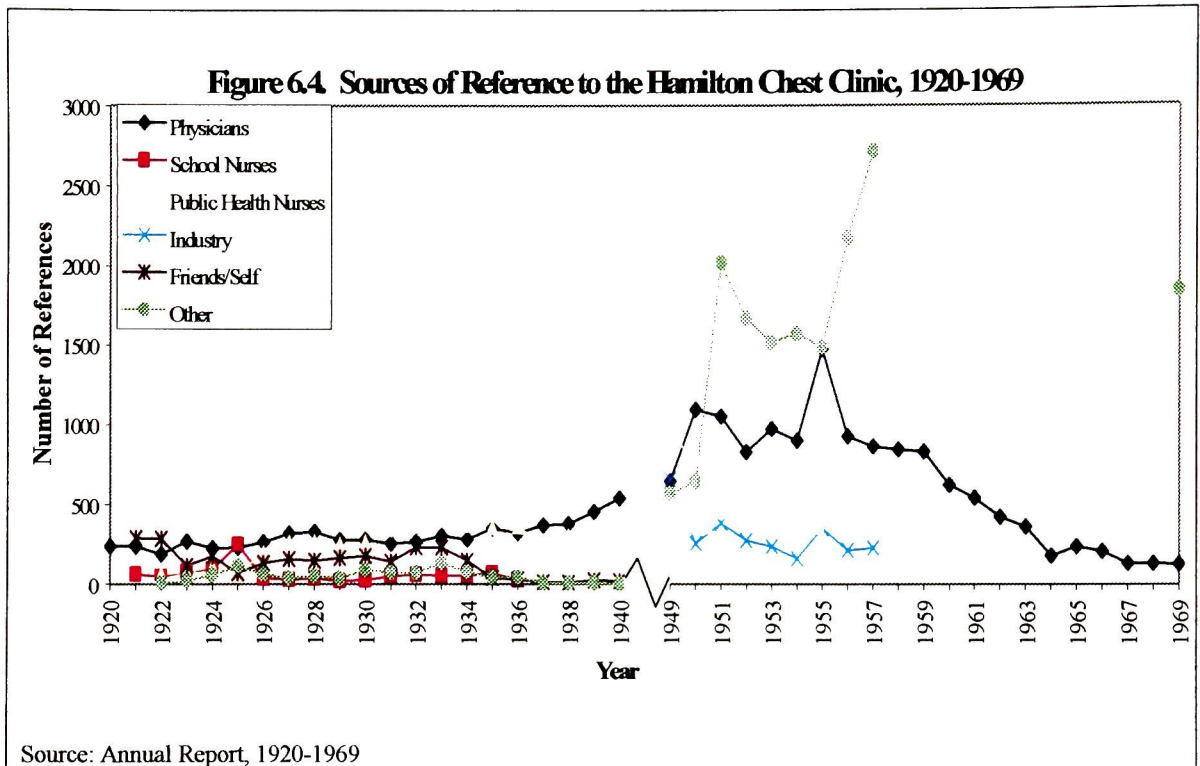
This made the supervision of advanced cases manageable since all known advanced cases were handled through the dispensary.²¹ In fact, supervision of all patients was less complicated as Dr. Holbrook, then clinic physician, required the examination of cases at regular intervals (HHA, 1909). Observation of an individual's progress, therefore, was made easier through these required examinations. It was also found, after opening the downtown dispensary, that the number of individuals attending the clinic for examinations increased rapidly (HHA, 1919)(see Figure 6.3). This was at least partially due to the accessibility of the clinic in downtown Hamilton.



²¹ It is unknown how advanced cases of tuberculosis were handled prior to the establishment of the dispensary.

The Hamilton Health Association noted in its 1919 Annual Report “that more early and curable cases were being diagnosed at these clinics” (HHA, 1919, p.48). While the dispensary contended with tuberculosis at all stages (Annual Report, 1923), it was of particular value in diagnosing individuals with early tuberculosis.²² The 1924 Annual Report of the Hamilton Department of Health records, “The special purpose of the clinic is to afford facilities for finding cases of tuberculosis in as early a stage as possible, and it is felt that the activities of the clinic in this direction have been an important factor in establishing the very favourable conditions that exist in Hamilton with respect to the incidence of tuberculosis” (Annual Report, 1924, p.65). Family physicians helped immensely by referring individuals to the chest clinic when they suspected tuberculosis (Annual Report, 1924). In fact, they constituted the largest referring group (see Figure 6.4). In the early days of the dispensary the physician would often wait until the disease had progressed prior to referral because methods of diagnosis were often inaccurate. By 1924, however, the clinic provided a more definite means of diagnosis, through the use of x-rays, a chest examination and sputum analysis, which gave the physician confidence to provide a referral simply on the suspicion of tuberculosis (Annual Report, 1924).

²² This was due, primarily, to the tuberculosis education campaign. See Section 6.3.



Other sources of referral to the clinics included public health and school nurses, friends of patients, self-referrals, industry and various organizations. By 1924, most cases attending the clinic were referred by a physician, nurse, employer or a social service organization (see Figure 6.4). The proper procedure, according to the 1924 Annual Report of the Department of Health, was for the family physician, if the individual could afford one, to make the request for examination. In this manner, the physician would receive a report from the clinic indicating the presence or absence of tuberculosis. This would permit the physician to observe other members of the family for signs of the disease, thus further adding to tuberculosis surveillance in the city (Annual Report, 1924).

The clinic played another important part in the surveillance of tuberculosis beyond diagnosis and the coordinating of the tuberculosis movement in Hamilton. Records were kept of all the different types of tuberculosis diagnosed at the clinic. With this information, referring groups, particularly the physician, could then be on alert for these manifestations of the disease (see Table A1). It is apparent from Table A1 that the types of tuberculosis diagnosed in the early part of the century tended to be quite different than those identified later. This was primarily due to three things: First, better detection methods in the latter part of the century; second, reduction in the over-all number of tuberculosis cases; and third, the finding of earlier cases, which translated into fewer diagnoses of many types of tuberculosis. These types, such as tuberculosis of the intestines, vertebral column, kidney and others, were associated with moderate to advanced stages of disease.

Information regarding the occupation of clinic attendees was noted during the examination (Annual Report, 1925-1940). The results of this data collection were printed in the Annual Reports of the Department of Health from 1925 to 1940. The listing of occupations in the 1925 Report was the most detailed, while the 1940 Report was the least (see Table A2). There is no specific mention of the surveillance of these occupations in these Reports; this did not preclude the clinic from actively seeking cases in occupations with high tuberculosis rates.²³ In 1946, the Annual Report of that year suggested the examination of food handlers in order to discover any positive reactors to tuberculin. It was not until a program to x-ray food handlers was instituted in 1968 that

²³ Industrial surveys will be discussed in section 6.2.4.2.

this suggestion came to fruition (Annual Report, 1968). The program lasted two years, with 75 and 135 x-rays taken for 1968 and 1969, respectively (Annual Report, 1968, 1969). Also in 1968, the Hamilton-Wentworth Health Unit targeted barbers as an at-risk group for tuberculosis. That year 50 appointments for x-rays were confirmed, however, only 14 barbers attended for an x-ray (Annual Report, 1968). There is no further mention of this survey of barbers in any subsequent Annual Report.

Along with the gathering of occupation, the nationality of each patient was similarly recorded at the examination for surveillance purposes. Beginning in 1917 and lasting until 1940, most of the Annual Reports in that period listed the nationality of the new patients to the clinic (see Table A3). With the exception of the 1937 and 1939 Annual Reports, the nationalities listed in each of the other Annual Reports included Canadians, Irish, English, Scots and Americans (Annual Report, 1917-1940). Canadians were the most represented nationality in each of these counts. Had the clinic not gathered this data, it would not have been possible to ascertain whether the case-finding efforts of the Board of Health were reaching the foreign population. The 1920 Annual Report of the Board of Health states, "Considering our foreign population, there is very little doubt that incipient or even moderately advanced cases are not being located" (Annual Report, 1920, p.31). Unfortunately, there is no mention of the possible reasons for this occurrence or the undertaking of specific activities for locating foreign-born tuberculous individuals. The surveillance of newly arrived foreign-born immigrants with tuberculosis became the responsibility of the clinic starting in 1952. In that year, 123 individuals were referred for observation (Annual Report, 1952). The Federal Department of National

Health and Welfare referred newcomer immigrants with inactive tuberculosis to the clinic for observation as well as the relatives and families of immigrants admitted to the Sanatorium under the Refugee Plan; between 1952 and 1969 an average of 99 referrals per year were made (Annual Report, 1959-1969). After the 1959 Annual Report, there was no further mention of immigrants in the Annual Reports of the Hamilton Health Department, save for counts of referrals. Starting in 1995, the Annual Reports of the Hamilton-Wentworth Regional Public Health Department recorded that newly arrived immigrants with inactive tuberculosis were under the observation of the tuberculosis nurse (see 6.2.1.2).

Individuals chosen for outpatient drug treatment were selected on an individual basis by the clinic and the referring physician. Persons chosen for chemotherapy were ex-Sanatorium patients and not considered to be potential public health threats (Annual Report, 1967, 1968, 1969). The procedure for patients on drug therapy was as follows:

. . . medication with anti-tuberculous drugs is continued on an out-patient basis for one year following discharge [from the Sanatorium], while a few [patients] are treated for 2 years and a small number for an indefinite period of time. All patients are interviewed at monthly intervals during the first 6 months after Sanatorium discharge, and then at two monthly intervals by a physician. This is to pick up as early as possible, signs of drug intolerance. (Annual Report, 1961, p.20)

Individuals were required to renew their drug supply at the chest clinic. While most patients were conscientious regarding their medication taking and renewing their drug supply, it was necessary to send reminder letters to approximately 25% of patients on chemotherapy indicating that, if they had been taking their medication faithfully, they were overdue for their renewal (Annual Report, 1961, 1963). Drug re-fill visits not only

permitted an opportunity for an interview by the physician for signs of drug resistance, but it also allowed for random urine tests to check for the presence of para-amino-salicylic acid (PAS) metabolites in the urine, thus indicating drug intolerance (Annual Report, 1961, 1962). By 1963, random urine tests were no longer being employed for drug resistance surveillance. Patients were required to bring urine specimens to the clinic on each drug renewal visit. Specimens were then tested for the presence of PAS metabolites (Annual Report, 1963). The best response to the urine-testing program occurred in 1966.²⁴ In previous years, it was considered a success if 50% of patients brought samples to their appointments at the clinic. There were, unfortunately, individuals who consistently failed to supply a urine specimen (Annual Report, 1966).

Surveillance of patients on anti-tuberculosis drug therapy also included individuals placed on chemoprophylaxis for the prevention of tuberculosis. Mainly young children and contacts of patients, these persons, who were non-infectious, received the medication as a preventive measure. In 1968, 31 people were started on chemoprophylaxis on an outpatient basis; in 1969 this number increased to include 18 contacts of tuberculous patients (Annual Report, 1968, 1969). The clinic was legally required to report to the Provincial Department of Health the number of individuals on chemotherapy and chemoprophylaxis and the types of medications they were receiving (Annual Report, 1963).

The clinic also offered B.C.G. vaccinations for people at risk of contracting tuberculosis. While this activity was not surveillance, *per se*, keeping note of these

²⁴ There is no statistic given as to the response rate.

individuals did make other surveillance efforts, such as contact tracing, simpler. For example, beginning in 1949, a program was instituted to inoculate with the B.C.G. vaccine children at risk of contracting tuberculosis from a parent. Requirements for program participation included no contact with the tuberculous parent for at least three months (the parent was segregated at the Sanatorium) and to be tuberculin and x-ray negative. If the child became a positive reactor to tuberculin, contact tracing of the source of infection would be easier because the child was known by the clinic to be at risk and the clinic was aware from whom the disease might have been contracted. In 1949, the vaccine was given to 40 children who met the requirements of the program. It was the opinion of the clinicians that the vaccination might confer up to 75% protection for the child, if precautions were taken (Annual Report, 1949). This program of preventive vaccination was expanded so that by 1953 both children and nurses whose future contact with tuberculous individuals was probable and who were non-allergic to the vaccine were inoculated (Annual Report, 1953). Between 1949 and 1954, an average of 43 children and nurses per year were vaccinated (Annual Report, 1949-1954). With an expansion of this program three years later to include adult relatives of patients in the Sanatorium and nursing assistants, inoculations between 1956 and 1969 ranged from 105 to 219 per year, with a yearly average of 162 (Annual Report, 1956-1969).

6.2.4 Surveillance Through Surveys

The mass tuberculosis screening programs of the mid-20th century remain in the minds of most individuals as the most distinguishable feature of the tuberculosis movement. Mass

surveys, however, did not become the prevailing method for tuberculosis surveillance until the late 1930s. Prior to this, the only methods to examine internal body structures were x-rays, which were expensive and time-consuming to develop, and the fluoroscope, which provided non-permanent images; large screening programs were, therefore, impossible due to inadequate technology, time and cost. It was not until the development of a machine which took miniature photographic exposures of fluoroscopic examinations that surveys of large populations became possible (Brink, 1965). This new technology, which produced small chest films at a greatly decreased cost, could record pictures at a rate of 300 to 400 per hour and the cost of one film was approximately 15 cents in 1938 dollars. The films were developed in batches of 300 and could be read at a rate of 200-300 per hour. These pictures were nearly as accurate as x-ray, making them ideal for mass screening efforts (Annual Report, 1937 and 1938). The efficacy of such technology in the surveillance of tuberculosis was recognized by the Hamilton Department of Health:

With such a machine the effectiveness of the Health Centre clinics and the School Health Service could be greatly extended, and when one considers that every person in Hamilton could be checked for \$25 000, which is a quarter of what it costs to maintain tuberculous cases in the Sanatorium for a year, the possibilities latent in such an apparatus become obvious. Cheap and efficient examinations, using mass-production methods, are in line with the whole trend of anti-tuberculosis work and with such a machine the final complete control of tuberculosis can be envisioned for the near future. (Annual Report, 1937 and 1938, p.18)

Further reasons for employing such technology included the locating of minimal cases of the disease. Most patients would often wait until they were moderately or far advanced before seeking treatment. The mass screening of various populations permitted the finding of early cases of the disease; early treatment offered better chances of

recovery and lessened the opportunity to infect others: “It is also important to remember that each far advanced case admitted to Sanatorium means eventually three or four more cases will develop tuberculosis, whereas a minimal case rarely, if ever, infects anyone” (Annual Report, 1937 and 1938, p.20).

The advantages of using mass surveys outweighed the disadvantages, the latter of which were formidable. Cost was one of the major factors involved in this type of surveillance. While the new technology permitted a cheaper method to x-ray the population, an expense was incurred to develop the films. Funds were also required to pay the salaries of the necessary medical staff, such as nurses, doctors, and technicians. The greatest disadvantages to mass screenings were the education efforts required to overcome public mistrust while simultaneously extolling the value of such an undertaking. In order for mass surveys to be successful, it was necessary to mold the public into willing participants (see 6.3).

6.2.4.1 Community Surveys

By 1941, the responsibility for tuberculosis screening had been divided between the province and the local departments of health such that the latter were responsible for surveying individuals in the education system—students, new teachers, staff—while the Province was responsible for screening the remaining population (Annual Report, 1941-1949). In 1941, the Ontario Provincial Division of Tuberculosis Prevention secured its first miniature x-ray unit for the purpose of mass screening for tuberculosis (Brink, 1965). Two years later, spanning from 1943 to 1944, the Province began Hamilton’s first

community survey. This effort was an attempt to screen all citizens of Hamilton for evidence of active tuberculosis (Annual Report, 1952). Four years later, in 1948, a second community screening of the city of Hamilton was undertaken (HHA, 1948). Approximately 106 000 individuals were x-rayed for signs of tuberculosis by Provincial authorities during that year (Wells; Annual Report, 1952). In 1952, eight years after the initial community survey, 107 000 people were x-rayed for tuberculosis in Hamilton during a community screening effort (HHA, 1952). Individuals suspected of having active tuberculosis and those with active disease were asked to attend special chest clinics for further investigation into their condition. A tuberculin skin test, sputum examination and a large chest film were taken during this supplementary examination. Doctors from the Provincial Department attended these clinics, interviewed these individuals, read the person's large chest x-ray and made a final recommendation regarding the individual's diagnosis and treatment. Written reports were sent to the Hamilton Department of Health from the Provincial Department in all cases of abnormal x-ray findings from the community survey. Subsequent investigation into these cases resulted, in some instances, in a change of diagnosis (Annual Report, 1952). All told, 55 active cases of tuberculosis were found during this particular community survey (Wells). The next mass screening in Hamilton occurred in 1956. According to the 1956 Annual Report of the Hamilton Health Association, "[t]his survey was not as successful as was hoped for" (HHA, 1956, p.6). The reason cited was that "the people of the community do not seem to be particularly interested in this aspect of case finding" (HHA, 1956, p.6); no further elaboration was offered. There is no mention of the poor response to this screening effort

in the 1956 Annual Report of the Hamilton Health Department. Mass surveys of Hamilton citizens were also undertaken by the Province in 1960 and 1964. The 1964 Annual Report of the HHA records that, at the time of writing, preparations were in place for that year's survey. It was hoped that an estimated 100 000 to 150 000 persons would be screened by the Provincial authorities (HHA, 1964). Unfortunately, no further information regarding this survey is found in the Annual Reports of the Health Department or the Hamilton Health Association.

6.2.4.2 Industrial Surveys

Similar to the mass screening of communities, surveys of industry were the responsibility of the Province. In 1942, the Division of Industrial Hygiene began to x-ray employees in Ontario who worked in industrial plants with silica dust and other hazards which might be injurious to the lungs (Brink, 1965); working in such conditions increased the likelihood of contracting tuberculosis. The first industrial survey in Hamilton occurred in 1943 (Wells; Annual Report, 1946).²⁵ In November 1949, the Province x-rayed industrial workers in Hamilton and referred thirty cases to the chest clinic for further investigation (Annual Report, 1949). The following year, 2582 x-rays were taken of persons working in industry in the city. Active cases found totalled 2, while 7 individuals were located with inactive tuberculosis (Annual Report, 1950). The 1951 Provincial industrial survey visited 26 plants in Hamilton and x-rayed 4081 employees, 3339 of which worked in

²⁵ It is unknown whether other industrial surveys were undertaken between 1943 and 1949. Annual Reports for 1944 and 1945 are unavailable, while the 1946-1948 Annual Reports of the Department of Health do not mention the screening of these employees.

plants which handled silica. Inactive tuberculosis was discovered in 16 individuals and one case of active disease was found during this screening effort (Annual Report, 1951). In 1952, 47 171 employees in industry in the city were x-rayed during the community survey (Annual Report, 1952). Unfortunately there is no data regarding active and inactive cases located. In May 1952, the Silicosis Act came into effect requiring all employees working in plants which handled silica dust to be examined every 18 months and all new workers required an examination within four months of their employment. All cases of tuberculosis were reported to the Department of Health and referred to the chest clinic (Annual Report, 1952). The Annual Reports of the Hamilton Department of Health for the years 1953, 1954, 1955, 1956 and 1962 state that the Provincial Division of Industrial Hygiene continued its policy of x-raying employees in industrial plants where workers were exposed to silica dust (Annual Report, 1953-1962).²⁶ In 1961, 27 active cases were found through the industrial survey. By 1962, this number decreased to 10 active cases (Annual Report, 1963). The 1961 and 1968 Annual Reports of the Hamilton Health Association state, respectively, that an industrial survey was completed in 1961 and that preparations were in place for a similar screening in 1969 (HHA, 1961, 1968).

²⁶ There is no mention as to the number of employees referred to the clinic for suspected tuberculosis or having active disease between 1953 and 1961.

6.2.4.3 Special Screening Programs

In addition to the surveying of industrial workers and the general population, groups of individuals who were at risk of contracting tuberculosis were targeted for special surveillance programs. These persons included the elderly in nursing homes, those on social welfare, the unemployed, employees of the Board of Education and prisoners.

One of the first special surveillance programs focussed on employees of the Board of Education. Working with children of all socio-economic classes, and in such close quarters, placed teachers at an elevated risk of contracting or infecting others with tuberculosis. Beginning in 1943 and ending in 1944, the Province x-rayed all teachers and staff of school boards across Ontario (Brink, 1965). By 1948, the screening of teachers and staff of the Boards of Education in the Province became the responsibility of the municipality. Each teacher new to the Hamilton Board of Education was examined for evidence of tuberculosis by the Director of School Medical Services and given a chest x-ray at the chest clinic (Annual Report, 1948, 1949). This program was expanded in 1950 so that both teachers and caretakers new to Hamilton's Board of Education were examined for signs of tuberculosis. Also new to the program that year was the inclusion of tuberculin testing in addition to the mandatory chest x-ray (Annual Report, 1950). One year later, all staff new to the Board were required to undergo an examination to search for indications of tuberculosis, including a chest x-ray and tuberculin testing. That year, 1461 school employees were x-rayed and 1070 tuberculin tests were administered. More than half of the staff who were tuberculin tested reacted positively to the test (51.86%); only 13 individuals were found to have inactive tuberculosis. No cases of

active disease were located (Annual Report, 1951). The policy of staff screening at the Board of Education had changed by 1957 such that teachers and staff of the Board were required to submit to screening during the community surveys instead of undergoing an examination by the Director of School Medical Services. Any individuals not x-rayed during the community screening were obliged to attend the chest clinic and undergo an x-ray (Annual Report, 1957). In 1960, 415 employees of the Board were x-rayed at the chest clinic as a result of missing the community survey (Annual Report, 1960). The 1968 Annual Report of the Hamilton-Wentworth Health Unit records that a “Board of Education Tuberculin Test Programme was successfully carried out [that] year” (Annual Report, 1968, p.26). A total of 3067 employees of the Board were tested. Individuals referred to the chest clinic for x-ray numbered 278 and 19 of these received treatment supervision (Annual Report, 1968). Between 1960 and 1968 there is no mention of this change in screening policy or the reasons for the shift in procedure. There is also no mention in the Annual Reports regarding the termination of screening for Board of Education employees.

Four special tuberculosis screening programs were instituted in 1955 in Ontario (Brink, 1965) to survey people at risk of contracting the disease due to, typically, lower socio-economic status. These groups included the unemployed, those on social assistance, the elderly living in nursing homes and inmates. Since tuberculosis is associated with poverty, targeting these groups was particularly useful in surveillance of the disease in cities and the province.

Individuals receiving unemployment benefits and their families were x-rayed in 1955 in a special screening effort called the “Hamilton Relief Survey”. One moderately advanced case of active disease was discovered; 15 cases of inactive tuberculosis and four individuals suspected of having the disease were found out of the 707 persons x-rayed (Annual Report, 1955). In May 1957, a miniature x-ray machine was installed in the National Employment Office in Hamilton (HHA, 1957; Annual Report, 1958); 2806 x-rays were taken in the first year (Wells). The screening of unemployed individuals lasted until July 1968 when the program was discontinued by Provincial authorities (Annual Report, 1968)(see Figure A1).

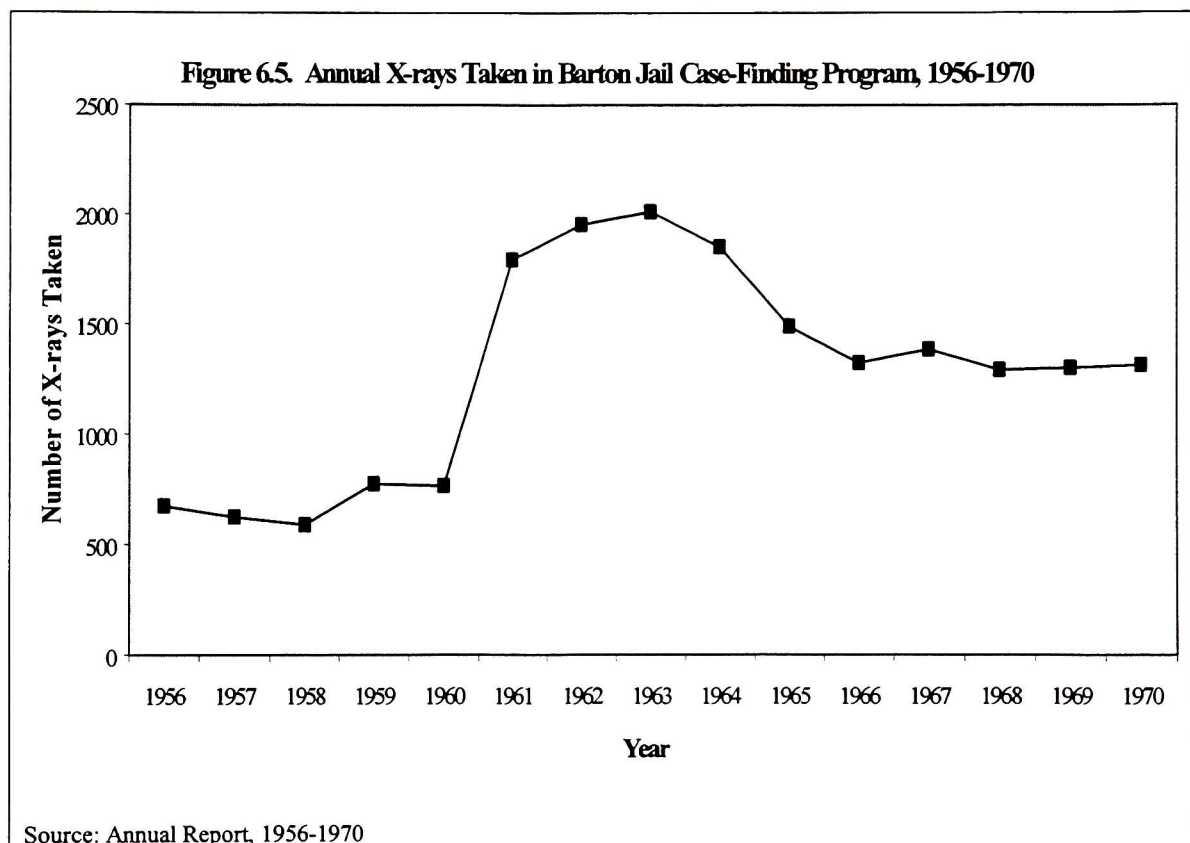
The elderly are particularly susceptible to reactivation of latent tuberculosis due to age-induced weakened immune systems. Surveillance of nursing homes was not only to locate reactivated cases but also to prevent the spread of the disease in an environment where individuals with weakened immune systems lived in close quarters. The Province began the surveillance of tuberculosis in elderly residents in nursing homes in 1955. In Hamilton, the first mention of a focussed observation of this group for tuberculosis was found in the 1967 Annual Report of the Hamilton Health Department. Recognizing the problem of the disease in this population, the Health Department distributed questionnaires to 23 nursing homes in the city in an attempt to discover the number of patients who had undergone a pre-admission chest x-ray. The results indicated that more than half (57.8%) of nursing home patients had a chest x-ray prior to admission, 18% did not and no information was available for 24.2% of residents. For the duration of the questionnaire survey, the Health Department requested that all new admissions to these

23 nursing homes have a sputum specimen taken. Seventy samples were taken and examined. There was no evidence of active tuberculosis in the sputa (Annual Report, 1967).

Aiding the Health Department with surveillance of the elderly in nursing homes in Hamilton, the Hamilton Health Association's X-ray Unit visited some of the nursing homes in the city. No active cases of tuberculosis were found through this effort (Annual Report, 1967). The 1968 Annual Report of the Hamilton-Wentworth Health Unit reports that while "tuberculosis continues to be a problem among the elderly . . . [t]here is no need to be over concerned with tuberculosis in Nursing Homes" (Annual Report, 1968, p.25). The same report cautions that "careful watch should be kept" on this particular population (Annual Report, 1968, p.25). As a result of continued surveillance of residents of nursing homes, 4 elderly patients were admitted to the Sanatorium from the homes in 1969 (Annual Report, 1969). There is no further mention in the Annual Reports of the Hamilton-Wentworth Health Unit regarding the termination of this program of surveillance.

For reasons similar to the elderly in nursing homes, inmates of the Barton Street Jail were subject to special surveillance for tuberculosis. Living in close quarters, inmates were at greater risk of contracting or infecting others with tuberculosis. In May 1956, through the Ontario Department of Health and assistance from Federal Health Grants, an x-ray machine was installed in the Barton Street Jail to take chest films of all incoming prisoners (Annual Report, 1956; HHA, 1956). The developing and reading of the chest films were completed at the chest clinic (Annual Report, 1956). Between 1956

and the termination of the program in 1970, 19 162 x-rays were taken of inmates arriving at the Barton Jail (Annual Report, 1956-1970)(see Figure 6.5).



One of the most comprehensive special surveillance programs for tuberculosis undertaken in the city of Hamilton focussed on those receiving social assistance. The 1956 Annual Report of the Hamilton Health Association indicates that, by that year, the x-raying of adult recipients of welfare benefits was underway in Hamilton (HHA, 1956). Two years later, the results of this screening program were “disappointing” and measures were taken to improve the efficacy of this effort in 1959 (Annual Report, 1958, p.21). (Unfortunately, there is no mention in any Annual Report of the types of changes.) In

1961, the program had expanded so that adults were x-rayed and their children were subjected to tuberculin testing for evidence of tuberculosis; the tests and x-rays were taken at the chest clinic (Annual Report, 1960, 1961). After adopting this new procedure, the results of the program “appear[ed] to be working satisfactorily” (Annual Report, 1961, p.17). Difficulties were experienced as a result of the expansion of the program because a number of parents failed to return to the chest clinic with their pre-school children to have the tuberculin test read by the clinicians. Children of school age had their tests read by the school nurse (Annual Report, 1961). The value of undertaking a special surveillance program for welfare recipients was, through a comparison of figures from previous years, in providing a “guide to the infectivity rate among the lower socio-economic groups” (Annual Report, 1962, p.24). Individuals on social assistance and their children were considered a high-risk group, second only to contacts of persons with active disease. The primary purpose of this particular surveillance program was case finding, but the effort was also, as previously mentioned, valuable as an epidemiological index of infection in the Hamilton community (Annual Report, 1965). Between 1959 and 1967, 12 608 adults on social assistance were x-rayed at the chest clinic and between 1961 and 1967, excluding 1964, 9356 children were tuberculin tested under this program. In 1968, one individual on welfare benefits was x-rayed and the program terminated (Annual Report, 1959-1967, 1968).

The surveillance of certain sections of the population also included individuals from groups who were at a lower risk of contracting tuberculosis than those in the above described programs. Starting in 1947, students at McMaster University and other

universities in the Ontario were x-rayed to locate cases of tuberculosis (Brink, 1965). The Province continued to survey this population into the early 1950s (1951-1953), after which time there is no further mention of this effort in the Annual Reports of the Hamilton Health Department (Annual Report, 1951, 1953). Another section of the population which was at greater risk of contracting tuberculosis than the university students were those working with children in the social welfare system. Individuals wishing to adopt children, foster parents and members of the Children's Aid were x-rayed in 1956 for evidence of tuberculosis. Working with children from all socio-economic classes placed these individuals at a greater risk for contracting the disease. Children who were Wards of the Crown were tuberculin tested in 1956 and positive reactors were x-rayed (Annual Report, 1957). As part of the surveillance of tuberculosis, individuals admitted to hospitals in Hamilton were x-rayed upon admission (HHA, 1958). This was not only to locate cases but also to protect convalescing individuals in the hospital. Unfortunately, there is no further information on these activities.

Mass surveys became the hallmark of the tuberculosis movement. While created primarily as a case-finding activity, the surveys became much more. Through the surveys, the public became educated as to the nature of the disease and its treatment and individuals came to understand the roles of the chest clinic, the Department of Health and the Sanatorium as well as the significance of chest x-rays and tuberculin testing. This was crucial because " . . . the anti-tuberculosis campaign depends to a great extent on the co-operation of the general public, their enlightenment is of prime importance" (Annual Report, 1937 and 1938, p.21).

6.3 Education

The co-operation of the public in the tuberculosis movement was sought through education. Individuals who were unwilling to change their behaviours placed themselves and others at risk of contracting the disease. Early Boards of Health and Tuberculosis Associations sought to motivate the public to participate in the tuberculosis movement through education of the nature of the disease:

These facts simply lead to the conclusion that the prevalence of tuberculosis is due to ignorance, and that if the death rate is to be materially reduced, the further development of the work of the [Hamilton Health] Association must be along the lines of a very active educational campaign until every citizen knows the nature of tuberculosis . . . (HHA, 1911, p.14) When the people understand the nature of tuberculosis work, there is no difficulty in securing their aid, but the ignorance of the vast majority in this vital question is still most lamentable. (HHA, 1913, p.21)

Over the years, public enlightenment with respect to the nature of tuberculosis took many forms including, films, slide shows, exhibits shown at fairs and vacant stores in large cities, newspaper articles, leaflets, pamphlets and health talks (HHA, 1913; Rosen, 1993). The first effort at tuberculosis education in Hamilton occurred in 1903 when the Board of Health carried a motion to print 1000 copies of a pamphlet on the disease (Minutes, 1903). Literature was also distributed in 1905 and was considered to play a part in the reduction of tuberculosis deaths in the city (Annual Report, 1905). In 1912, the Red Mill Theatre showed films containing information dealing with tuberculosis. The reels were considered educating and interesting and helped in promoting knowledge of the disease (HHA, 1913). Owing to the influx of immigrants in the early part of the century, recommendations were made by the Medical Officer of Health to the Board of Health to

print tuberculosis literature in the languages of the immigrants residing in Hamilton. It was found that the visiting nurse had difficulty communicating treatment regimens and health information to people who did not speak English (Annual Report, 1917). By 1921, the visiting nurse was not only giving oral instruction as the care of sputum, and general health information including proper rest, diet, exercise and ventilation, but she also left printed instructions (Annual Report, 1921). This method of information exchange was particularly useful because any literate member of the household could read the pamphlet and thus educate themselves in the nature and prevention of tuberculosis.

Tuberculosis education was primarily employed as a tool for disease prevention. The source of infection in most childhood cases of the disease was an adult living in that child's home. "Thus, to stamp out tuberculosis the adult must be taught how to live, and with it develop self control . . ." (HHA, 1918a, p.18). This included not spitting in public, keeping children away from tuberculous relatives, approximately 10 hours of sleep per night and the destruction of sputum from tuberculous individuals (HHA, 1911, 1919). Other instructions included "An ever-present watchfulness, caution, cleanliness, sunshine, fresh air and cheerfulness to those who are sick and well; proper feeding of kids, proper rest and work, with advised recreation for kids . . ." (Annual Report, 1921, p.38). The visiting nurse and the clinic were avenues by which this lifestyle information was disseminated. Ex-Sanatorium patients were another. Having lived in the Sanatorium for a period of time, the Board of Health assumed that the treatment regimen of the institution would be passed from the patient to the other members of the household (Annual Report, 1920, 1924).

School nurses also played a role in tuberculosis education. As early as 1915, the Hamilton Health Association urged the teaching of good health in the classroom as a preventive measure against tuberculosis. The value of which is evident in this statement of Dr. Holbrook of the HHA: “It seems to me that education of this sort is far too little touched upon in our schools, for the majority of the young men and women who come to [the clinic] are so totally ignorant of the fundamental principles of healthful living that the wonder is how so many escape serious disease” (HHA, 1915, p.22).

The concerted educational effort of the Hamilton Health Association and the Board of Health in teaching the public about tuberculosis resulted in unexpected benefits. The 1912 Annual Report of the HHA illustrates this point:

A number of these downtown patients became so alive to the danger of careless expectoration that they did some missionary work for the cause, and it is through their instrumentality that some of these homes were sought out and the patient prevailed upon to visit the Dispensary for examination. (HHA, 1912, p.25)

Part of this educational campaign was to motivate people to seek medical attention at the first signs of illness rather than waiting until the disease was far advanced—minimal cases infected fewer people than moderate or far advanced cases. By the early 1920s, the Hamilton chest clinic was diagnosing a greater number of non-tuberculous chest conditions. This was the direct result of the educational campaign aimed at motivating individuals to seek medical attention at the first signs of illness (Annual Report, 1924). Educating individuals in a manner such as to prevent childhood tuberculosis resulted in a second benefit. Gradually over the span of the educational campaign, public opinion grew in the favour of greater protection for children against the disease. The 1935 and

1936 Annual Report of the Department of Health indicates that this opinion was shown through the willingness of adults to go to the Sanatorium when diagnosed with tuberculosis, particularly when the possibility of infecting their children existed (Annual Report, 1935 and 1936).

The tuberculosis educational campaign shifted focus after the introduction of anti-tuberculosis drugs into the treatment regimen. The target of the education was the patient on chemotherapy rather than the general public. Irregular drug taking leading to drug resistant tuberculosis was a concern of the Health Department. As such, the public health nurse's duties included educating patients as to the necessity of taking all their medications and doing this on a regular schedule to prevent drug resistance. This effort was undertaken at both the chest clinic and at the individual's home. Family members were similarly educated in an attempt to help the patient remember to take their medication (Annual Report, 1962). This focussed education resulted in a decrease in the incidence of irregular drug taking (Annual Report, 1960).

Tuberculosis educational efforts were not solely directed at the public. District nurses, for example, were obligated to attend the chest clinic on a rotating basis in order to familiarize themselves with all aspects of tuberculosis work (Annual Report, 1935 and 1936). In 1962, student nurses from the Hamilton General Hospital attended the chest clinic twice per month to learn about the public health aspects of tuberculosis and the routine of the chest clinic (Annual Report, 1962). One year later, General Hospital nurses-in-training attended the clinic three times per month (Annual Report, 1963). By 1964, student nurses from both the Hamilton General Hospital and affiliates of the

Hamilton Health Association attended 6 or 7 clinics per month to learn about clinic procedure and the role of the Tuberculosis Control Department of the Health Department. Students from the McMaster School of Nursing were also given instruction on tuberculosis control when attending the Health Department (Annual Report, 1964). The following year, student nurses from the Hamilton and District School of Nursing, Hamilton Civic Hospitals' School of Nursing and Hamilton Health Association's Affiliate Training Programme attended 72 of 164 clinics to observe the clinic's routine while receiving instruction on the public health aspects of tuberculosis (Annual Report, 1965). Student nurses continued to attend the chest clinic until 1969 (Annual Report, 1966-1969).

From the beginning, the education of the public with respect to tuberculosis was to inspire a willingness to participate in the tuberculosis movement as a method of disease prevention. Healthy lifestyles were urged as well as changes in behaviour to prevent the spread of the disease. A concerted public education effort involving the visiting nurse, clinic, school, public health and district nurses was necessary in order for the spread of tuberculosis to be halted or slowed (HHA, 1939). The educational activities associated with the tuberculosis movement were the first forms of public health education.

6.4 Tuberculosis Regulation

6.4.1 Bovine Tuberculosis

One of the first legislative acts of local Board of Health, with respect to tuberculosis, focussed on dairy cows. Bovine tuberculosis can be passed from infected cattle to humans via consumption of tainted meat or milk (see 3.1). On February 17, 1888, the Hamilton Board of Health carried a motion to adopt the regulations regarding the inspection of dairy milk as recommended by the Provincial Board of Health (Minutes, 1888). A little over one year later, a milk inspection by-law was approved as written by the Hamilton Board of Health (Minutes, 1889). Dr Roberts, then Medical Officer of Health for the Hamilton Board of Health, reported, in 1910, that many of the dairy farms under the jurisdiction of the Board were improperly ventilated and lacked sufficient light and that these conditions were ideal for the spread of bovine tuberculosis (Annual Report, 1910). In his report to the Milk Commission of the Ontario Government, Dr. Roberts offered the following as necessary to obtain a clean, raw milk supply at moderate cost:

- a) The protection of milk from infection by scarlet fever, diphtheria, typhoid and tuberculosis.
- b) Cooling the milk and keeping it cool, or at least below 50 degrees F in order to prevent the growth of the bacteria which contaminate milk in spite of the most careful precautions.
- c) Keeping the utensils clean, because it is impossible to produce uninfected milk unless the vessels are comparatively sterile.
- d) Keeping the milk tightly covered.
- e) Keeping the cows as clean as possible.
- f) Keeping the milker's hand and clothes clean.
- g) Keeping the barns and surroundings in a wholesome and thoroughly sanitary condition. (Annual Report, 1910, p.42)

Other measures taken to reduce the spread of bovine tuberculosis by the Hamilton Board of Health included the use of a scorecard system for dairy inspection. The Board kept a record of the score of each farm and a copy of their farm's score was supplied to each dairy farmer (Annual Report, 1910). The Board could then use the record as a baseline to measure improvements. In 1910, the Hamilton Board of Health drew up a written agreement requesting that milk vendors comply with the revised city by-law of June of that year (Annual Report, 1910). The 1910 Annual Report of the Board of Health records that, "This by-law embodies probably the most advanced municipal legislation in Canada, with respect to milk" (Annual Report, 1910, p.42).²⁷ At the time of writing the Annual Report for 1910, no milk vendor had refused to sign the agreement (Annual Report, 1910).

The Board of Health also instituted the testing of milk. Regular testing of milk for bacteria and banned additives was well underway by 1923. The Annual Report for that year describes the rationale behind and the procedure by which Hamilton Department of Health Milk Inspectors test milk:

The status of any milk supply is judged by the samples taken. It is therefore imperative to procure proper and representative samples; nearly all of the city's supply is delivered in bottles to the consumer. In this case, the collection of samples is comparatively simple. The samples, consisting of two one pint bottles, are selected at random from a delivery wagon of each dealer, or from several wagons in the case of the larger dealers. This method procures a fair representation of the dealer's whole supply. If the tests made of these samples do not show a fairly uniform result the dealer is instructed as to the findings. Samples are taken frequently from the delivery wagons. In addition,

²⁷ Unfortunately, there is no information as to the contents of the by-law.

samples are taken from stores and restaurants, a check being made upon the character of the milk, and the care given it at such stores and restaurants. Methods used for keeping it cold, and the protection against contamination, the time of delivery and sale are matters of importance to the inspector. (Annual Report, 1923, p.35)

The most common and simplest method to prevent the transmission of bovine tuberculosis to humans is the pasteurization of milk. In 1910, the flash method, which involved heating the milk to 160 degrees Fahrenheit and then immediately cooling it to 55 degrees Fahrenheit, was employed in Hamilton for this purpose (Annual Report, 1922; Smith, 1988). This method was both cheap and fast (Smith, 1988). By 1913, 7 pasteurizing plants supplied approximately two-thirds of the city's milk. This being the case, it was strongly urged, nonetheless, that Hamilton pass a by-law requiring that all milk in the city be pasteurized, with certain limitations. Unlike many other cities in Ontario, Hamilton did not have a by-law requiring the pasteurization of all milk sold in the city (Annual Report, 1913). In 1916, the Hamilton Board of Health recommended to City Council that all milk sold in the city be pasteurized. This recommendation was not adopted by City Council (Wells; Annual Report, 1967). On December 27, 1922, a motion was carried by the Department of Health stating "that on or after January 1, 1923, it shall be unlawful for any person, firm or Corporation to sell or hold for sale, distribute or supply for human consumption in the City of Hamilton milk or cream that has not been pasteurized in accordance with provisions of the Milk Act, RSO (1914), Chapter 221" (Minutes, 1922, vol.4, p.13). It appears that this by-law was not adopted by City Council because at the meeting of the Department of Health on January 15th, 1923, a communication was received from the Board of Control which contained copies of a

recommendation from the Hamilton Health Association. The HHA suggested that the Department of Health prevent the sale of milk in the city unless its source was from an accredited tuberculosis free herd or the milk had been properly pasteurized. The Department resolved at that meeting that consideration should be given to the introduction of a by-law compelling the pasteurization of all milk sold in the city (Annual Report, 1923). It was not until 1928 that City Council passed a by-law requiring all milk in the City of Hamilton to be pasteurized (Wells; Annual Report, 1967). Three years later, the Food and Dairy Division of the Department of Health recommended and successfully succeeded in having by-laws passed requiring the pasteurization of all dairy products in Hamilton (Annual Report, 1931). On October 1, 1938, legislation came into effect making the pasteurization of all milk sold in Ontario compulsory (Brink, 1965).

6.4.2 Other Tuberculosis Legislation

At the November 3, 1902 meeting of the Hamilton Board of Health, a motion was passed recommending that a by-law be legislated by City Council requiring the mandatory reporting of cases of pulmonary tuberculosis by local physicians to the Medical Officer of Health (Minutes, 1902). On November 24, 1902, City Council passed by-law 226 which required physicians in the municipality to report by way of a standard form to the Medical Officer of Health every case of pulmonary tuberculosis which the doctor attended. The reports were to be submitted within one week after diagnosis of the disease (Gagan, 1981). Hamilton was ahead of most cities in Ontario by adopting such a by-law (Annual Report, 1906) and the by-law made easier the job of tuberculosis surveillance

within the city. In 1912, the Ontario Government amended the Province's Public Health Act. Tuberculosis, mumps, measles, anthrax and poliomyelitis were added to the list of communicable diseases which required mandatory reporting to the Medical Officer of Health or to the local Boards of Health under the Infectious Diseases Act (Gagan, 1981).

Hamilton was also one of the first cities to introduce anti-spitting legislation. While the date this by-law was passed is uncertain, the 1906 Annual Report of the Board of Health indicates that it was already in effect by that year (Annual Report, 1906). Since the tubercle bacilli live in sputum, public expectoration can spread the disease and place other individuals at risk of infection. Spitting, therefore, was viewed by many at the turn of the century as a public health risk (Tomes, 1997). Being a habit not easily broken, Hamilton passed the by-law as a matter of persuading the public to cease this practice. The 1912 Annual Report of the Hamilton Health Association suggested that, by that year, the drop in tuberculosis rates in the city was due to this anti-spitting law. They also urged that Hamilton City Hall prosecute a few "spitters" to get the message across to the public that such behaviour was no longer tolerated in the city. The erecting of anti-spitting signs and enforcement of the by-law were also recommended by the HHA (HHA, 1912).

There were a number of suggestions from the early to mid-20th century regarding the creation of legislation with respect to patients at the Sanatorium. In the November 13, 1917 meeting of the Board of Health, Dr. Roberts, then Medical Officer of Health, requested and obtained the Board's consent to order objectionable cases, such as those he considered a threat to the public health, to the Sanatorium without having to contact the Medical Superintendent of the City Hospital or Dr. Holbrook of the Hamilton Health

Association, the organization which founded and operated the Mountain Sanatorium (Minutes, 1917). Unfortunately there is no information confirming that consent to this request was given by City Council. The 1935 Annual Report of the Hamilton Department of Health cites difficulties in keeping active cases in the Sanatorium. The Report suggested that better legislation was needed to help enforce the regulations of the Public Health Act requiring active cases to remain in the Sanatorium (Annual Report, 1935). By 1953, the problem of patients leaving the Sanatorium without permission still existed. Similar to the 1935 Annual Report, the Report of 1953 also suggested legislation to tackle this difficulty. The challenge with this issue was that the Department of Health lacked the means to forcibly restrain these individuals. The report stated that these persons refused to co-operate even though it was in their and the community's best interest and that "[t]he only way some people can be taught is to 'get tough' with them" (Annual Report, 1953, p.2). During 1959, several patients were charged under the Sanatoria for Consumptives Act and committed to the Sanatorium by a judge. These individuals had either refused to remain in the Sanatorium while they were infectious or they had been discharged from the facility for disciplinary reasons. The 1959 Annual Report of the Health Department states that "in all instances the patients were either chronic alcoholics or frequent imbibers" (Annual Report, 1959, p.23).

6.5 Responsibility

Responsibility for tuberculosis surveillance, treatment and prevention in Hamilton during the 20th century was shared among the individual, the Provincial Government, the Hamilton Board of Health and the Hamilton Health Association.

6.5.1 The Hamilton Health Association

In the early part of the 20th century, tuberculosis surveillance and treatment²⁸ in Hamilton was primarily the responsibility of the Hamilton Health Association. For instance, in 1906, the HHA appointed a visiting (tuberculosis) nurse to look after tuberculous individuals taking treatment in their homes. The visiting nurse also participated in tuberculosis surveillance by observing for evidence of the disease in persons suspected or doubtful of having tuberculosis as well as members of households where active cases resided (Minutes, 1906; HHA, 1906, 1907, 1912; Annual Report, 1917, 1923). In 1906, the Board of Health offered to assist the visiting nurse in any way possible but it was assumed that the responsibility of the visiting nurse was shouldered by the HHA (Minutes, 1906). In 1917, the Board of Health removed this responsibility from the HHA by employing the visiting nurse (Annual Report, 1917).

One of Hamilton's greatest tools against tuberculosis was opened by the HHA in 1909—the Downtown Dispensary of the Mountain Sanatorium. The clinic played a large role in surveillance of the disease through diagnosis and treatment of active tuberculosis.

²⁸ The greatest contribution of the Hamilton Health Association to tuberculosis treatment in Hamilton was the Mountain Sanatorium.

Treatment for the disease was aided by free medical supplies offered by the clinic for those in need (HHA, 1909-1920). The HHA also hired a Tuberculosis Nurse to work in the Dispensary assisting the clinic physician with examinations (Annual Report, 1924). The clinic, the Tuberculosis Nurse and the free medical supplies were funded solely, between 1909 and 1920, through contributions to and monies raised from fund-raising efforts of the Association (HHA, 1909-1920). In 1919 and 1920, the Board of Health assumed responsibility for the Tuberculosis Nurse and the clinic, respectively (Minutes, 1919; Annual Report, 1920). Even though the Hamilton Board of Health began operating and funding the chest clinic in 1920, the Board never assumed the responsibility of employing the clinic physicians. It was suggested, in 1927, that the Department of Health assume full responsibility for tuberculosis surveillance, treatment and prevention in Hamilton (Annual Report, 1927). The 1933 Hamilton Health Activities Survey Report indicated that, by that year, the Hamilton Health Association was still providing the doctors for the chest clinics (Fleming). By 1949, even though the Department of Health organized the chest clinics, the Association continued to provide doctors for those clinics (HHA, 1949). This arrangement was similarly noted in the 1951 and 1961 Annual Reports of the Department of Health. The reasons for this arrangement were never offered in the Annual Reports of either the HHA or the Department of Health.

Motivated by the belief that good food, proper rest and exercise would hasten the recovery process of the tuberculous individual, the Billikin Club, later known as the Junior Health League and the Samaritan Club, of the Hamilton Health Association provided necessities such as coal, clothing, rent, blankets and books to poor tuberculous

individuals and their families. Through the Miss Juliet Doolittle fund, milk, eggs, oysters, fruit and “dainties” were purchased for families in need. It was the responsibility of the Billikin Club (Junior Health League, Samaritan Club) to deliver these necessities to patients of the clinic and their families (Annual Report, 1917-1930). Similar to the providing of physicians to the chest clinic, the Samaritan Club, the Women’s Auxiliary of the HHA, furnished the public health nurse of the Department of Health with a car for the purpose of visiting the homes of tuberculous patients (Fleming). It is unknown why the Department did not provide this transportation.

The execution of the mass community surveys of Hamilton citizens was the responsibility of the Provincial Department of Health. The preparatory work for these surveys, however, was not carried out by the Province. Local volunteer associations, beginning in the late 1940s and ending in the mid-1950s, were responsible for organizing the mass tuberculosis screenings, including fostering public awareness in and encouraging public support for these surveys (McCuaig, 1999). Beginning in 1948 and ending in 1956, the Junior Chamber of Commerce of Hamilton organized the mass surveys of Hamilton citizens (HHA, 1948, 1956; Annual Report, 1952).

6.5.2 The Hamilton Board of Health

It was the responsibility of the Hamilton Board of Health under the Provincial Public Health Act to record the diffusion of tuberculosis in the city (Annual Report, 1906). This was accomplished primarily through the 1902 Hamilton city by-law requiring doctors to report cases of pulmonary tuberculosis to the Medical Officer of Health (see 6.4.2). The 1933 report on Health Activities in Hamilton recommended that the Department of

Health maintain an active register of known cases of tuberculosis (Fleming). This listing was necessary for case finding and contact tracing efforts (McCuaig, 1999). It is unknown, prior to this recommendation, whether such a record was kept by the Department of Health.

Case finding became the full responsibility of the Board of Health in 1920 once the visiting and tuberculosis nurses and the clinic were taken over by the Board. The Department of Health was responsible for case finding in the schools as well as in at-risk populations, such as the elderly in nursing homes, staff of the Board of Education, prisoners, welfare recipients and their children and the unemployed (see 6.2.4). The Hamilton Health Association assisted in case finding by x-raying the residents in some of the nursing homes in the city. The responsibility, however, for locating elderly tuberculous individuals was held by the Department of Health (HHA, 1962). Case finding remained the responsibility of the Hamilton-Wentworth Health Unit even after the Province took over the Chest Clinic in 1969. The case-finding responsibilities of the Health Unit, however, were limited to tuberculin surveys of high school students and follow-up visits of new and known cases (Annual Report, 1969).

The responsibilities of the Hamilton-Wentworth Regional Board of Health changed in 1982 with the closing of the Provincial Chest Clinics. Provincial guidelines delineated the responsibilities of the Ontario Ministry of Health, the Medical Officer of Health and family physicians with respect to tuberculosis surveillance, treatment and prevention. The Province placed drug ordering, storing and distribution with the Medical Officers of Health and doctors obtained the medication from the local Health Units.

Responsibility for tuberculosis surveillance, treatment and prevention was returned to the Health Units, according to the Province's guidelines (Annual Report, 1982). In the 1990s, responsibility for medication distribution, public and professional education sessions, surveillance and treatment continued to rest with the Hamilton-Wentworth Regional Public Health Department (Annual Report, 1990-1997).

6.5.3 The Provincial Government

The Provincial Government's responsibility in tuberculosis surveillance and treatment in Hamilton increased and then decreased over the last half of the 20th century. Prior to 1941, responsibility for tuberculosis surveillance was primarily held by the Hamilton Department of Health (see 6.5.2). By 1941, however, responsibility for tuberculosis screening had been divided between the province and the local departments of health such that the latter were responsible for surveying individuals in the education system—students, new teachers, staff—while the Province was responsible for screening employees in industry and the community as a whole (Annual Report, 1941). This division of responsibility remained until the 1950s when the Department of Health instituted, under Provincial direction, special screening programs for individuals at risk of contracting tuberculosis, thus increasing the Department's share of responsibility for tuberculosis surveillance (see 6.2.4.3). In 1969, when the Provincial Government took control of the chest clinics in Ontario, the Province shouldered full responsibility for tuberculosis treatment and most of the responsibility for surveillance of the disease (see 6.5.2). It was with the closing of the Province's Chest Clinic in Hamilton in 1982 that

responsibility was transferred back to the Hamilton-Wentworth Regional Board of Health (see 6.5.2).

6.5.4 *The Individual*

It was a commonly held belief in the early 20th century that each individual in society was responsible for the prevention of tuberculosis. Tuberculous persons, for example, were responsible for ensuring that other members of society, particularly children, would not become infected with the disease. This responsibility required a change in behaviour and lifestyle for the individual with active disease (see 6.3). Patients were also required to observe their appointments at the clinics. Once tuberculosis medications became part of the treatment regimen, the individual on chemotherapy had the responsibility of taking the medication for the entire duration of therapy and providing urine specimens for examination. These efforts were to guard against the possibility of drug resistance in the individual and thus reduce the chance of infecting others with that resistant strain (see 6.2.3.2). Today, the individual's responsibility remains much the same—to take the tuberculosis medication as prescribed for the duration of their treatment in order to prevent the further spread of the disease.

The 1911 Annual Report of the Hamilton Health Association stated that “the prevalence of tuberculosis was due to ignorance” (HHA, 1911, p.14). It was the opinion of the Hamilton Health Association that each citizen could help to eradicate tuberculosis by educating themselves in the nature of the disease. This education would eventually inspire citizens to participate in screening programs and to encourage family and friends

to seek early treatment to reduce the chance of spreading the disease. The HHA also held the opinion that “the most important way in which every citizen can assist in stamping out tuberculosis in Hamilton is by becoming a member of the Hamilton Health Association” (HHA, 1923, p.33). Since the objective of the HHA was to eradicate tuberculosis, membership in the Association carried responsibility toward this goal.

6.6 Summary

Dominant for approximately 100 years, the germ movement has been the longest of the public health movements. Many modern day surveillance techniques and public health education were developed in the early part of the 20th century by Boards of Health and the voluntary tuberculosis associations. By the early 1970s, new ideas regarding health and illness were developing. At the beginning of the new millennium, these notions have, according to some, become part of the third public health movement—the “new” public health.

Chapter 7 The “New” Public Health

The question as to whether a new movement in public health is emerging or is already in existence is currently debated in public health. Thomas Kuhn argues in his book, *The Structure of Scientific Revolutions*, that the period preceding a paradigm shift is marked by “frequent and deep debates” which serve to define schools of thought rather than to produce agreement (Kuhn, 1996, pp.47-48). Debates over the emergence of a “new” public health era have been in existence since the publication of *A New Perspective on the Health of Canadians*, the landmark report released by the Canadian government in 1974. Those in support of a new era view this report as the start of the “new” epoch (Green, 1999).

7.1 What is the “New” Public Health?

The “new” public health era, being at an early stage of development, is not fully defined and delineated as is the case with the germ and sanitary movements. “Scientists”, according to Kuhn, “can agree in their identification of a paradigm without agreeing on, or even attempting to produce, a full interpretation or rationalization of it” (Kuhn, 1996, p.44). It is for this reason that a definition of this new epoch does not exist in the literature consulted for this project. Instead, authors offer general characteristics which

they attribute to the movement. For instance, Turnock, 1997, describes the “new” public health as “a broad social enterprise . . . that seeks to extend the benefits of current knowledge in ways that will have the maximum impact on the health status of a population” (Turnock, 1997, p.10). The ways in which Turnock suggests this objective can be accomplished are equally as expansive: “through identifying problems that call for collective action to protect, promote, and improve health, primarily through preventive strategies” (Turnock, 1997, p.10). Similar to Turnock, Beaglehole and Bonita describe the “new” public health paradigm as “broad and inclusive” (Beaglehole and Bonita, 1997, p.xiii). For these authors, public health should be “dynamic and flexible, incorporating the most appropriate elements of earlier public health movements: disease prevention, health promotion, health education, health policy, environmental concern and community empowerment” (Beaglehole and Bonita, 1997, p.217).

7.1.1 Community Involvement

Another common characteristic of the “new” era is the emphasis on community. *A New Perspective on the Health of Canadians*, the landmark report released by the Canadian government in 1974, advocated a community-based perspective on health. This document was the first in the latter half of the 20th century to resurrect the early germ movement’s notion of the importance of community in public health (Curtis and Taket, 1996). In the “new” movement, information obtained from the community is employed to influence health policy and create community-based programs (Duplessis et al., 1989). Some of these programs are global or national in scale but implemented locally. For

instance, the Healthy Cities program, launched in Europe by the World Health Organization in 1986, empowers communities to become involved in local health issues (Curtis and Taket, 1996; Beaglehole and Bonita, 1997). These issues result in activities to improve the physical environment, housing and other conditions which impact the health and lifestyles of those in the community (Green, 1999). According to Green, to ensure the relevance and appropriateness of these community-based programs, decisions on priorities and the strategies for creating social changes that affect community health should be made in the community. This permits citizens to become active in the planning process and have a voice in programs which will ultimately affect their health (Green, 1999).

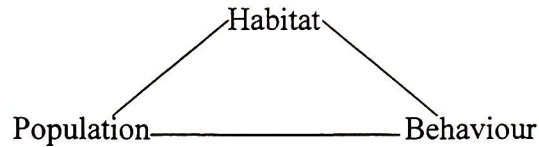
The implementation of community health projects is executed by both the government and the informal sector—namely volunteer organizations—in the “new” era (Curtis and Taket, 1996; Shah, 1998; Green, 1999). The informal sector consists of people who care for sick individuals and/or help in maintaining the health of those without illness. These non-professional volunteer caregivers often provide this aid within the context of family, friendship or community spirit (Curtis and Taket, 1996). The trend in the health field in recent years has been a greater reliance on this volunteer sector. As a result of this increased presence in the health field, it is sometimes difficult to differentiate between the efforts of government and those of the volunteer groups. This duplication in health-related activities may at times create tension between the government and the volunteer sector (Shah, 1998).

The “new” public health's emphasis on community is evidenced by the Hamilton-Wentworth Department of Public Health Services's community presentations on tuberculosis. Beginning in 1993 and lasting until 1997, educational sessions by staff of the Department were offered to professionals and the public regarding tuberculosis control (Annual Report, 1993-1997). In 1993 and 1994, 16 and 14 such presentations were given, respectively (Annual Report, 1993, 1994). From 1995 to 1997, the Hamilton-Wentworth Regional Public Health Department offered consultation and education to area physicians and the community about the prevention and treatment of tuberculosis (Annual Report, 1997). There is no mention of these activities in the Annual Reports after 1997.

7.1.2 The Environment and Health

The “new” public health has not only resurrected the early germ movement's emphasis on community in health, but it also revived the sanitary era's link between the environment and health. Ashton and Seymour, 1988 and Green, 1999, note this shift in public health away from a focus on psychological and behavioural factors in health to a view to the social, cultural, political and environmental factors in health. Duplessis et al. and Curtis and Tacket, illustrate, in the “new” epoch, the links between these factors and health. Health, according to Duplessis et al., 1989, is affected by the interaction among the environment, living conditions and the community. The changing nature of the relationships among these factors can produce health and illness (Duplessis et al., 1989). Curtis and Tacket draw parallels between the “new” public health and human disease

ecology. The latter builds the link between the environment and health as a triad—habitat, behaviour, population—in which all factors are related (Curtis and Taket, 1996, p.186, modified):



Habitat refers to the environment in which people live, including human built, natural and social. Population factors, which help to determine health status, include demographic and physical characteristics of the community (age, structure, gender, genetic predisposition to ill health). Behavioural factors, constrained by social and economic factors at the community and national levels, include health-related beliefs and lifestyles. Population health is a result of the interactions and relationships among these three factors (Curtis and Taket, 1996). It is suggested by Curtis and Taket that the “new” public health movement, through studies of disease ecology, can encourage “a broad perspective on health and development, and may encourage efforts to involve whole communities in action which will tackle the problems that give rise to illness” (Curtis and Taket, 1996, p.186). An emphasis on the link between environment and health in the “new” era can illustrate “how relatively simple measures to improve living conditions for poor populations can influence the pattern of disease” (Curtis and Taket, 1996, p.186).

7.1.3 Breadth

In order to encompass a broader view of health to achieve health objectives, the resources employed in the “new” paradigm necessitate greater breadth in their scope. According to

Kuhn, “the reception of a new paradigm often necessitates a redefinition of the corresponding science” (Kuhn, 1996, p.103). Susser and Susser write in their article on the future of epidemiology, the science of public health:

The present era of epidemiology is coming to a close. The focus on risk factors at the individual level—the hallmark of this era—will no longer serve. We need to be concerned equally with causal pathways at the societal level and with pathogenesis and causality at the molecular level. (Susser and Susser, 1996, p.668)

Young, echoing Susser and Susser’s view, suggests that the “new” era will “achieve the aim of improving the health of populations . . . by integrating research and practice and taking advantage of the full range of tools from molecular biology to the social sciences” (Young, 1998, p.11). Turnock also reflects the extensive nature of the resources found in the “new” paradigm:

This public health is unique in its interdisciplinary approach and methods, its emphasis on preventive strategies, its linkage with government and political decision-making, and its dynamic adaptation to new problems placed on its agenda. (Turnock, 1997, pp.10-11)

7.2 Summary

The emphasis on community in health and social and environmental factors affecting health differentiate the “new” public health era from the germ and sanitary movements. In the “new” era, “[p]ublic participation is the key” (Beaglehole and Bonita, 1997, p.222) and breadth in factors affecting health and resources employed to cope with health issues are the keynotes of this new epoch in public health.

Chapter 8 Discussion and Conclusion

8.1 Summary

8.1.1 The Sanitary Movement

The main ideas that dominated the sanitary era were directly related to the state of the cities in the mid-19th century: Dirt and miasmas, poisonous gases which emanated from the soil, water and the air, were believed to be the cause of disease and it was thought that in ridding the cities of these undesirable features death rates would drop (Rosen, 1993; Susser and Susser, 1996). Organized environmental sanitation efforts were the method by which this goal was accomplished.

In 1848, England enacted the Public Health Act, out of which the General Board of Health was created (Rosen, 1993). This was the first organized public health effort in the 19th century and it was the origin of present day public health. The main focuses of the General Board of Health, and all other Boards of Health in Great Britain and North America, were to clean up the cities and cope with any epidemics of disease (Fee, 1993). Since the physical environment was common to all and epidemics affected entire communities, responsibility for health rested with the Boards of Health, rather than the individual.

The end of the sanitary movement did not come abruptly with the birth of the germ epoch. While the dominating ideas of the sanitary period—that dirt and miasmas caused disease—were no longer in congruence with those of the germ movement, many of the sanitary solutions implemented during the sanitary age continued to be practiced through the subsequent public health movements. Today, for instance, proper sanitation, clean water and unadulterated food are the mainstays of public health efforts throughout the world.

8.1.2 The Germ Movement

Beginning in 1880 with the discovery of the pathogen which caused typhoid, the germ era is the longest of the public health movements. The main idea of the germ epoch was that a single entity was responsible for a particular disease—the tubercle bacillus caused tuberculosis. Knowing that a specific agent caused a specific disease, methods of surveillance for that particular illness were created in the early germ movement. For instance, tuberculin testing made the diagnosis of tuberculosis simpler because a reaction to the tuberculin indicated the presence of the tubercle bacillus. New technologies, such as the development of the x-ray and fluoroscope, permitted the surveillance of infectious diseases, particularly tuberculosis, in ways previously unavailable. Mass screening—the hallmark of tuberculosis surveillance—was possible only through the creation of the miniature x-ray machine.

Education of the public played a large role during the germ movement. Voluntary health associations were among the first organizations to promote public health

education. With respect to tuberculosis, the public was educated about the nature of the disease in an effort to foster willingness to participate in tuberculosis eradication efforts. Young children and teenagers were taught about proper hygiene and health in school, and were also subjected to school medical inspections. Public health education, coupled with the focus on a single disease-causing organism, also served to shift the responsibility of health from the community to the individual (McCuaig, 1999).

Nurses were crucial in educating the public about diseases, health and proper hygiene and treatment regimens for those recovering from illness. Nurses also played a critical role in disease surveillance. The school nurse looked for cases of infectious disease among school children while the public health and district nurses were involved in contact tracing and observing of family members for signs of disease in households where an infectious individual resided.

Around the 1950s, mortality and morbidity rates for infectious diseases had dropped and the rates for non-infectious diseases, like heart disease and cancer, were on the rise. The early, underlying idea of the germ movement—that diseases were caused by a single organism—no longer held as much merit as it once did because the non-infectious diseases affecting the population in the 1950s often did not have one sole agent. Despite this shift in focus to diseases with multiple contributing factors, the movement continued to exist and its practice also relied on those elements found in the earlier part of the period: public health education and disease surveillance.

8.1.3 *The “New” Public Health Movement*

As previously mentioned, it is debatable whether society has entered the third phase in public health, the “new” public health. What is clear is that this movement is different from the germ era in many respects but, at the same time, overlaps with some of the ideas and methods of the previous movement. This overlap also occurred when the germ theory overtook the sanitary theory as the dominant public health model. Little is known about how much or little the “new” public health movement will differ or resemble the ideas or practices of the prior germ age until the new movement is well established.

One such common element in both movements is the use of community-based support. Early in the germ era community action—primarily through voluntary agencies—played a big role in furthering public health. The “new” public health movement also relies on community-based support, especially through volunteer groups (Curtis and Taket, 1996; Shah, 1998).

A basic idea found in both the sanitary and the “new” public health movements is that the environment and health are linked. In both the “new” public health and the sanitary era it is, and was, held that improving living conditions will prevent or slow down the progress of a disease. Today in countries around the world, efforts are underway to involve communities in creating a healthier living environment and thus improving the health of the population (Curtis and Taket, 1996).

8.2 Discussion

In compiling historical information on tuberculosis in Hamilton connections among different themes became apparent. For instance, public health education was related to surveillance efforts. Health education not only served to educate the public with respect to tuberculosis but it also sought to motivate individuals to participate in surveillance activities such as mass screenings. Some individuals, armed with tuberculosis information, aided in the surveillance effort by encouraging friends and family to attend the chest clinic upon the appearance of tuberculosis-like symptoms. The education of nurses similarly supported case-finding activities. Through rotating shifts at the chest clinic, district nurses learned the symptoms of tuberculosis. With this knowledge, these nurses, through their activities in the community, observed individuals for these symptoms and referred them to the chest clinic. Similarly, student nurses, schooled in the public health aspects of tuberculosis and the role of the chest clinic, could observe for signs of tuberculosis in individuals in their future employment setting and refer these persons to the chest clinic. Mass screenings also played a role in tuberculosis education. Through the mass surveys individuals would learn of the need for screening and the role of the chest clinic.

Public health education was also related to responsibility for tuberculosis eradication. Educating the public on the nature of tuberculosis, for instance, served to shift the responsibility of tuberculosis prevention to the individual. Proper diet, rest and exercise, plenty of fresh air and good sleeping habits were offered as treatment to tuberculous persons in the Sanatorium. Once discharged from the Sanatorium, these

individuals were encouraged to teach other members of their households the value of such a lifestyle. Children, taught at school, and adults, taught through public campaigns, were encouraged to live this “healthy” lifestyle to boost their immune systems in an effort to prevent tuberculosis. Prevention of the disease, through public health education, thus became the responsibility of the individual. Tuberculous persons had an additional responsibility to prevent the spread of the disease. Tuberculosis education was expected by the Hamilton Health Association and the Board of Health to encourage tuberculous individuals to participate in “self-surveillance”, a monitoring and modifying of their own behaviours (Foucault in Magill, 1997). Educated in the infectious nature of their disease, these individuals were expected to change their lifestyles in order to prevent the transmission of their tuberculosis to others.

8.2.1 Education

Public health education, with respect to tuberculosis, began in Hamilton in the early 20th century with a motion by the Board of Health to print a pamphlet on the disease. Over the next 20 years, public education on the nature of tuberculosis and on living a healthy lifestyle would become an important part of the tuberculosis movement.

The educational efforts of the Hamilton Board of Health can be separated into 3 activities. The first was to reduce the number of tuberculosis germs in the environment. Educational undertakings to this effect included an anti-spitting campaign as well as teaching individuals about the routes of transmission for tuberculosis. Tuberculous individuals were encouraged through education to cease spitting in public, to properly

destroy sputum, to avoid interacting with children while infectious, to take all their prescribed anti-tuberculosis medication and to admit themselves to the Sanatorium. The second category of activities was to increase resistance to disease. Ex-Sanatorium patients were expected to teach members of their household the lifestyle followed in the Sanatorium—plenty of good food, rest and fresh air and proper exercise and sleeping habits—to lessen the risk of the non-tuberculous contracting the disease. The visiting nurse reinforced, through education, the benefit of this “healthy” lifestyle to both the patient and the residents of the home during her visits. It was the opinion of Dr. Holbrook of the Hamilton Health Association that more emphasis in schools should be given to teach children “healthy” living in order to improve their resistance to tuberculosis (see 6.3). Today, tuberculous individuals continue to be taught about the nature of the disease and the benefit of living a healthy lifestyle. The third group of educational activities was directed at the nursing profession. Education of nurses in the nature and treatment of tuberculosis aided in the surveillance of the disease. Nurses, including student nurses, having been exposed to the operation of the clinic and taught to recognize tuberculosis symptoms, could refer symptomatic individuals to the clinic for diagnosis.

Tuberculosis education also served to promote, as indicated above, the “healthy” lifestyle. This promotion of a particular lifestyle, according to Gastaldo, interfered with the choice of individuals to live their lives according to their wishes (Gastaldo, 1997). Gastaldo states that in traditional health education, such as that undertaken by the HHA and the Board of Health, that the “healthy choice is the only choice” (Gastaldo, 1997,

p.117). This is confirmed by Dr. Holbrook of the HHA stating that individuals choosing not to follow the “healthy” lifestyle prescription were “negligent”, placing the lives of others “in danger” and making impossible the eradication of tuberculosis (HHA, 1913, p.29). Tuberculosis education thus was “an experience of being governed from the outside . . . [along with] a request for self-discipline” (Gastaldo, 1997, p.188).

8.2.2 *Surveillance*

In the late 1800s, surveillance of tuberculosis in Hamilton was directed at the disease in meat and dairy products. It was with the creation of the Hamilton Health Association that surveillance of human tuberculosis became an activity. The Downtown Dispensary, opened by the HHA, and its clinic became the first vehicle for tuberculosis surveillance in Hamilton.

“Bio-power”, according to Michael Foucault, refers to the mechanism employed by society to manage the population and discipline individuals (Gastaldo, 1997). The “bio-power” system, described by Foucault, operates through institutions, such as the clinic and prisons, and employs various methods to manage populations (Gastaldo, 1997; Magill, 1997). With respect to the tuberculosis movement in Hamilton, the Downtown Dispensary and its clinic was precisely the location through which the management of the tuberculous population occurred. The Dispensary was constructed by the HHA, according to the Edinburgh system, as the centre of the tuberculosis eradication efforts in Hamilton. The methods by which the tuberculous population was managed through the

clinic included the requirement of regular visits to the clinic for assessment, education in the nature of the disease and home visits by the visiting, public health and district nurses.

Over the course of the tuberculosis movement in Hamilton, individuals became more difficult to manage and efforts to overcome this required new tactics. For instance, individuals who did not attend the clinic for x-ray received reminder phone calls, letters and visits from the public health nurse. Random urine testing to screen for drug resistance became the policy at the chest clinic for those on tuberculosis chemotherapy due to an increase in non-compliance to the drug regimen by tuberculous individuals. While there may have been numerous reasons for these difficulties, in following Foucault's "bio-power" system, management of populations requires discipline. There was no recourse for the Board of Health in terms of disciplining unco-operative persons. For instance, some Annual Reports of the Board of Health indicate that occasionally parents had to be persuaded by the public health and district nurses to have their tuberculin positive children x-rayed at the chest clinic. Even after a home visit by the nurse, some parents refused. There was no mention of action taken by the Board in these situations. Similarly, the 1959 Annual Report of Health Department records that individuals refused to continue x-ray supervision due to "the erroneous impressions conveyed by the publicity given to the effects of radiation" (Annual Report, 1959, p.23); again, there was no indication that the Department had any recourse. In the Department of Health's 1935 and 1953 Annual Reports, suggestions were given to the effect that legislation was needed in order to secure the co-operation of individuals—"[t]he only way some people can be taught is to 'get tough' with them" (Annual Report, 1953, p.2).

Hamilton did pass a by-law banning public expectoration before 1905. From Annual Reports of the Hamilton Health Association, it was evident that these by-laws were never enforced because the HHA urged that Hamilton City Hall prosecute a few “spitters” to get the message across to the public that such behaviour was no longer tolerated in the city (HHA, 1912). The first mention of disciplinary action on the part of the Health Department occurred in the 1959 Annual Report of the Department. Individuals were charged under the Sanatoria for Consumptives Act for refusing to stay in or being discharged for disciplinary reasons from the Sanatorium. There is no indication that this Act could be applied to individuals who refused to participate in screening activities. Today, the Social and Public Health Services Division is able, by a judge’s orders, to have non-compliant individuals sent to West Park Hospital in Toronto (North, 2001, pers. comm.). It appears, therefore, that until 1959, the Board of Health in Hamilton relied on the willingness of the public to participate in tuberculosis surveillance and treatment activities. Its power to discipline unwilling individuals was very limited.

The early tuberculosis movement is one of the most dramatic examples of individual rights subsumed in favour of community protection. If the interest of the individual and the community clashed, “the interest of the community [was] paramount” (McCuaig, 1999, p.60). Individuals were expected to participate in tuberculosis eradication efforts for the benefit of the entire community. Beginning very slowly after World War II, a general movement took shape where individuals began to assert their medical rights; people began to question medical authority. This movement for patient rights helps to explain the difficulties experienced by the Hamilton Department of Health

in obtaining the co-operation of citizens in tuberculosis eradication efforts over the course of the tuberculosis movement in Hamilton.

8.2.3 Responsibility

In the past 150 years of public health, responsibility for health has shifted numerous times from the individual to the community and back. Prior to the sanitary era, individuals were viewed as responsible for health. Poor habits, such as the over-consumption of alcohol, inadequate exercise and diet, contributed to ill health. With the commencement of the sanitary idea (that health and the environment were linked), the responsibility for health transferred to the community because the environment was common to all. Epidemics also affected entire communities, thereby reinforcing the community's responsibility. The discovery of specific etiologic agents for infectious diseases in the 1880s served to shift responsibility for health to the individual as well as the community. The Hamilton Department's Annual Report for 1924 summarizes this shared responsibility: "... the cure of disease can always be left to the individual, [but] the work of prevention requires organization" (Annual Report, 1924, p.54). After World War II, with decreased infectious disease rates and increased rates in non-contagious diseases like cancer and heart disease, the pre-sanitary idea that poor lifestyles resulted in poor health was resurrected, thus placing responsibility for health with the individual. This "lifestyle" theory of health remains in existence today but, in support of the notion of a new era in public health, the responsibility for health is shifting once again to the community.

Responsibility for tuberculosis eradication followed, for the most part, the pattern in public health. In the sanitary era, tuberculosis was one of many infectious diseases affecting communities. Like many contagious diseases, the cause of tuberculosis was unknown and it was thought to have a number of possible sources. Responsibility for tuberculosis, as with other contagious diseases found in that era, was shouldered by the community through the Boards of Health. This was due to two reasons: first, the physical environment (thought to be the source of disease) was common to all; and second, epidemics of infectious disease affected entire communities.

The discovery in the 1880s of the etiologic agent for tuberculosis—tubercle bacillus—split the responsibility for tuberculosis elimination between the individual and the community. Early tuberculosis volunteer associations viewed the disease as being social in nature and thus requiring action on the part of the community. Community involvement included the building of sanatoria, the opening of chest clinics and the hiring of tuberculosis and visiting nurses. Individuals were responsible for efforts to stop the spread of tuberculosis, such as boosting their immune systems, changing their lifestyle and following the prescribed treatment regimen. By the mid-1930s, community involvement in the tuberculosis movement expanded with the introduction of mass screenings for the disease. The discovery of anti-tuberculosis medication in the 1940s did not immediately serve to increase the responsibility of the individual in the eradication of tuberculosis. Instead the individual's responsibility expanded as the treatment for tuberculosis slowly incorporated chemotherapy into the treatment regimen and stays in sanatoria grew shorter. Eventually—with the closing of the sanatoria in the

early 1970s, leaving chemotherapy as the sole means of treatment for tuberculosis—the responsibility for tuberculosis prevention rested entirely with the tuberculous individual. It was the individual's responsibility to take their medication as prescribed in order to prevent drug resistance and the spread of that strain of the disease to others. The community, including the Health Units, was responsible for disease surveillance but the individual was responsible for disease prevention. At the beginning of the new millennium, this division of responsibility with respect to tuberculosis remains.

In Hamilton, the responsibility for tuberculosis elimination reflected closely that of the general trend in public health as well as the pattern in the larger tuberculosis movement. Prior to the establishment of the Hamilton Board of Health in 1884, there was no information regarding tuberculosis eradication efforts. Between 1884 and 1905, the Board of Health was responsible for tuberculosis. In 1905, the Hamilton Health Association was created and assumed responsibility for tuberculosis surveillance, treatment and education in Hamilton. Thus between 1884 and 1905, responsibility for tuberculosis was solely a community responsibility. Following the opening of the Mountain Sanatorium in 1906 and the Downtown Dispensary 1909, responsibility for tuberculosis eradication was shared between the individual and the community. As mentioned above, the individual's role was of prevention, while the community's was surveillance and treatment. This was to remain the case in Hamilton until the present (see below).

The Hamilton and North American tuberculosis experience differed from that of public health. After World War II, with a rise in non-infectious diseases such as cancer

and heart disease and a decrease in contagious diseases, the “lifestyle” theory became prominent in public health. This theory held that lifestyle choices such as smoking, the over-consumption of alcohol, eating a poor diet and not participating in regular exercise, contributed to ill health. This theory, however, already applied to tuberculosis. The early tuberculosis treatments and education promoted the “healthy” lifestyle as a method to prevent the disease and to speed recovery in tuberculous individuals. While the responsibility of health post-World War II shifted to the individual, the responsibility for the individual with respect to tuberculosis remained, as it had from the early 20th century, the same—prevention of the disease.

8.3 Conclusions

The Objectives for this research were a) to explore the surveillance, treatment and prevention activities in Hamilton from historical and present-day perspectives; b) to gather historical and present-day statistics on tuberculosis in Hamilton; and c) to examine how the surveillance, prevention and treatment methods for tuberculosis in Hamilton have coincided with movements in and theories of public health. The first two objectives were realized in the body of this research. Evidence to support the third objective is offered below.

The history of tuberculosis in Hamilton supports certain theories of public health. The sanitation and inspection activities of the Board of Health in the late 1800s and the early 1900s support the sanitary era’s theory that health and the environment were linked. While tuberculosis is caused by the tubercle bacillus bacterium, the state of the

environment can either promote or prevent the spread of the disease. Recognizing this association between tuberculosis and the environment, the Hamilton Board of Health, prior to the pasteurization by-laws, sought to reduce the prevalence of bovine tuberculosis through the score card system for dairy farmers and the testing of milk sold in the city for the presence of tuberculosis. In terms of the built environment, the Hamilton Health Association attempted to improve the home environment of poor tuberculous individuals and their families by donating food, clothing, books, blankets, rent and coal. The Hamilton tuberculosis experience similarly supports the “lifestyle” theory of public health. In fact, the promotion of a healthy lifestyle in order to prevent disease was advocated by the public education and treatment methods of the Board of Health and the Hamilton Health Association in the early 20th century. Good food, plenty of fresh air, exercise and rest, were suggested to speed the recovery of tuberculous individuals and to prevent the disease in healthy persons.

The tuberculosis movement in Hamilton likewise supported the movements of public health. The early efforts of the Board of Health with respect to food and dwelling inspection and the eradication of bovine tuberculosis reflected activities associated with the sanitary era. Surveillance of the population through the efforts of the visiting, public health, district and school nurses, contact tracing, mass screenings of students, industry, the community and other populations at risk of contracting the disease and public tuberculosis education, reflect activities associated with the germ movement. The Hamilton tuberculosis experience also supports the notion of a new era in public health—the “new” public health. The presentations on tuberculosis by the Hamilton-Wentworth

Regional Public Health Department to the community and professionals supports the idea of the “new” epoch, namely a focus on community. It is the hope of the Social and Public Health Services Division of the City of Hamilton that in the near future a regional tuberculosis clinic will be opened in Hamilton. The emphasis on tuberculosis control is moving toward greater community involvement in the effort to stop the spread of the disease. For instance, guidelines specific to Hamilton are being considered as part of a regional tuberculosis policy (North, 2001, pers. comm.; Tolomeo, 2001, pers. comm.).

8.4 Contributions of This Research

There is limited literature written on tuberculosis in Canada. There exists even less literature on tuberculosis in Ontario. With respect to the disease in Hamilton, the literature published focuses mainly on the Sanatorium. There is no known historical account of the surveillance, prevention and treatment of tuberculosis in Hamilton by the Board of Health and the Hamilton Health Association which excludes discussions of the Sanatorium. This research is the first to have examined exclusively the activities of the HHA and the Board of Health with respect to the treatment, prevention and surveillance of tuberculosis in the general population in Hamilton. This research can be employed as a reference for public health workers in terms of previous efforts of the Board of Health with respect to tuberculosis in Hamilton.

The second contribution of this literature is that it compares both historical and present-day tuberculosis surveillance, treatment and prevention to the theories of and movements in public health. The majority of literature on tuberculosis focuses on the

early tuberculosis movement. Discussions regarding tuberculosis surveillance, treatment and prevention and public health were offered from a historical perspective only. This research not only offers a historical comparison of tuberculosis and public health, but present-day tuberculosis surveillance, treatment and prevention activities are discussed within the context of the present public health movement.

8.5 Tuberculosis in Hamilton: The Future

At the beginning of the new millennium, tuberculosis surveillance appears to be mimicking the methods found in the early part of the 20th century. Surveillance of the disease today is primarily through contact tracing; public health nurses, in an attempt to learn about the disease, are currently rotating through the tuberculosis clinic at the Firestone Chest Clinic in Hamilton²⁹ (North, 2001, pers. comm.), much as they did in the 1930s; nurses in the 1990s were re-assigned specifically to undertake surveillance of the disease in the city; and tuberculin testing and x-raying are the still primary methods to diagnose tuberculosis. Treatment for the disease remains as it did in the late 1960s and early 1970s, through chemotherapy. Individuals today are required to take tuberculosis medications for periods lasting approximately one year. Nurses also observe for signs of drug resistance. These methods are identical to the treatment of the disease thirty years ago. Education about tuberculosis is much different than in the early 20th century. Today public education, unlike in the early 1900s, is aimed at doctors, rather than the community. Every March 25th, World Tuberculosis Day, the Social and Public Health

Services Division of the City of Hamilton distributes literature about the disease to area physicians. The Division also offers consultation about tuberculosis to doctors (North, 2001, pers. comm.).

The future of tuberculosis diffusion and abatement is uncertain. In the last decade, tuberculosis rates in Canada were higher than those between the late 1970s and the mid-1980s (see 3.3). It is expected that, as immigration from tuberculosis endemic countries increases and the HIV epidemic continues, rates of tuberculosis in Canada will continue to increase. This appears to be the same fate for Hamilton. It is interesting to note that in Hamilton the surveillance and treatment of tuberculosis has not changed greatly over the past 100 years. It is possible, if rates of the disease continue to rise, that more of the early 20th century tuberculosis coping methods will be resurrected. It may be, once again, that mass surveys of the population are conducted and that public education campaigns with respect to the nature of the disease will re-appear.

²⁹ The Firestone Chest Clinic is not operated by the Social and Public Health Services Division of the City of Hamilton. If opened, the regional clinic would be operated by the Division.

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Appendix

Table A1. Tuberculosis Diagnoses as Found in the Annual Reports of the Board of Health, 1905-1968

	1905	1908	1909	1910	1912
Acute phthisis					
Adenitis					
Bones					
Bowels		2	2	5	
Cystitis					1
Disseminated					
Endometritis					
General					
Genitourinary					
Glands					
Grinder's phthisis					
Hip		1			
Intestines					2
Jaw					
Joints					
Kidneys		1	2		
Larynx					1
Lymphatic system					
Meninges	10	8	9	2	2
Miliary					2
Neck					
Not specified					
Other organs					
Peritoneum	1				5
Pleurisy with effusion					
Pott's disease			1	3	
Pulmonary	59	69	91	71	53
Renal					
Silico-tuberculosis					
Spontaneous pneumothorax					
(probably Tuberculosis)					
Tabes mesenterica	1				
Tubercular enteritis	1				
Tuberculous pneumonia					
Vertebral column					1
Totals	72	81	105	81	67

	1913	1914	1915	1916	1917
Acute phthisis					
Adenitis					
Bones					
Bowels					
Cystitis					
Disseminated					
Endometritis					
General	1				
Genitourinary					
Glands				1	
Grinder's phthisis					
Hip					
Intestines	1	2	1	7	1
Jaw		1			1
Joints	1		1		2
Kidneys				1	
Larynx	1				
Lymphatic system					
Meninges	8	1	5		4
Miliary					
Neck	1				
Not specified					
Other organs					
Peritoneum	3	1	2	5	2
Pleurisy with effusion					
Pott's disease					
Pulmonary	73	89	69	77	66
Renal					
Silico-tuberculosis					
Spontaneous pneumothorax (probably Tuberculosis)					
Tabes mesenterica					
Tubercular enteritis					
Tuberculous pneumonia					
Vertebral column	2	1	1		1
Totals	91	95	79	91	77

	1918	1919	1920	1921	1922
Acute phthisis					
Adenitis					
Bones					
Bowels					
Cystitis					
Disseminated					
Endrometritis					
General					
Genitourinary					
Glands	1				
Grinder's phthisis					
Hip					
Intestines	4	1	2	1	2
Jaw					
Joints	1		2		
Kidneys	1	4		3	1
Larynx			1		
Lymphatic system					
Meninges	7	9	5	10	7
Miliary					
Neck					
Not specified					
Other organs					
Peritoneum	2			2	
Pleurisy with effusion					
Pott's disease					
Pulmonary	54	46	44	54	42
Renal					
Silico-tuberculosis					
Spontaneous pneumothorax (probably Tuberculosis)					
Tabes mesenterica					
Tubercular enteritis					
Tuberculous pneumonia					
Vertebral column	2			1	1
Totals	72	60	54	71	53

	1923	1924	1925	1926	1927
Acute phthisis					
Adenitis					
Bones	1				2
Bowels					
Cystitis					
Disseminated					
Endrometritis					
General					
Genitourinary					
Glands		1	2		
Grinder's phthisis					
Hip					
Intestines	1		1		2
Jaw					
Joints					
Kidneys			1		
Larynx					
Lymphatic system					
Meninges	6	3	10	6	10
Miliary					
Neck					
Not specified					
Other organs					
Peritoneum				1	2
Pleurisy with effusion					
Pott's disease					
Pulmonary	37	49	46	56	45
Renal					
Silico-tuberculosis					
Spontaneous pneumothorax					
(probably Tuberculosis)					
Tabes mesenterica					
Tubercular enteritis					
Tuberculous pneumonia					
Vertebral column	3		1		2
Totals	48	53	61	63	63

	1928	1929	1930	1931	1932
Acute phthisis		1			
Adenitis					
Bones	1				
Bowels					
Cystitis					
Disseminated					
Endometritis					
General					
Genitourinary					
Glands					
Grinder's phthisis		1			
Hip					
Intestines	2			1	
Jaw					
Joints					
Kidneys	3				1
Larynx	2				
Lymphatic system					
Meninges	7	8		7	
Miliary		2		2	1
Neck					
Not specified		3		1	
Other organs			14		
Peritoneum		3			1
Pleurisy with effusion					
Pott's disease					
Pulmonary	50	44	45	54	60
Renal	3				
Silico-tuberculosis					
Spontaneous pneumothorax (probably Tuberculosis)		1			
Tabes mesenterica					
Tubercular enteritis					
Tuberculous pneumonia					
Vertebral column	1	1			
Totals	69	64	59	65	63

	1933	1934	1935	1936	1937
Acute phthisis					
Adenitis					
Bones					
Bowels					
Cystitis					
Disseminated	1	1			
Endometritis					
General					1
Genitourinary					2
Glands					
Grinder's phthisis					
Hip					
Intestines		3	1	2	1
Jaw					
Joints					
Kidneys					
Larynx					
Lymphatic system	1		1		
Meninges	3	7	1	6	1
Miliary					
Neck					
Not specified	1				
Other organs				1	
Peritoneum					
Pleurisy with effusion					
Pott's disease					
Pulmonary	39	45	37	32	45
Renal					
Silico-tuberculosis					
Spontaneous pneumothorax (probably Tuberculosis)					
Tabes mesenterica					
Tubercular enteritis					
Tuberculous pneumonia					
Vertebral column			1	1	
Totals	45	56	41	42	50

	1938	1939	1940	1952	1953
Acute phthisis					
Adenitis					
Bones					
Bowels					
Cystitis					
Disseminated					
Endometritis					
General	1	1			
Genitourinary		2			
Glands					
Grinder's phthisis					
Hip					
Intestines	1	3			
Jaw					
Joints	1				
Kidneys					
Larynx					
Lymphatic system					
Meninges	2	3	6	2	1
Miliary					
Neck					
Not specified					
Other organs					
Peritoneum					
Pleurisy with effusion					
Pott's disease					
Pulmonary	37	35	19		7
Renal					1
Silico-tuberculosis					
Spontaneous pneumothorax (probably Tuberculosis)					
Tabes mesenterica					
Tubercular enteritis					
Tuberculous pneumonia					
Vertebral column	1				
Totals	43	44	25	2	9

	1954	1955	1956	1957	1958
Acute phthisis					
Adenitis					
Bones					
Bowels					
Cystitis					
Disseminated					
Endometritis					
General					
Genitourinary					
Glands					
Grinder's phthisis					
Hip					
Intestines					
Jaw					
Joints					
Kidneys					
Larynx					
Lymphatic system					
Meninges	2	1			
Miliary		1			
Neck					
Not specified					
Other organs					
Peritoneum					
Pleurisy with effusion					
Pott's disease					
Pulmonary	13	7	5	5	7
Renal					
Silico-tuberculosis					
Spontaneous pneumothorax (probably Tuberculosis)					
Tabes mesenterica					
Tubercular enteritis					
Tuberculous pneumonia					
Vertebral column					
Totals	15	9	5	5	7

	1959	1960	1961	1962	1963
Acute phthisis					
Adenitis					
Bones					
Bowels					
Cystitis					
Disseminated					
Endometritis					
General					
Genitourinary					
Glands					
Grinder's phthisis					
Hip					
Intestines					
Jaw					
Joints					
Kidneys					
Larynx					
Lymphatic system					
Meninges	2	1			1
Miliary					
Neck					
Not specified					
Other organs					
Peritoneum					
Pleurisy with effusion					
Pott's disease					
Pulmonary	5	5			2
Renal					
Silico-tuberculosis				1	
Spontaneous pneumothorax (probably Tuberculosis)					
Tabes mesenterica					
Tubercular enteritis					
Tuberculous pneumonia					
Vertebral column					
Totals	7	6	0	1	3

	1964	1965	1966	1967	1968
Acute phthisis					
Adenitis					5
Bones					
Bowels					
Cystitis					
Disseminated					
Endometritis					1
General					
Genitourinary					1
Glands					
Grinder's phthisis					
Hip					
Intestines					
Jaw					
Joints					
Kidneys					
Larynx					
Lymphatic system					
Meninges		1			
Miliary	1				
Neck					
Not specified					
Other organs					
Peritoneum					
Pleurisy with effusion					4
Pott's disease					
Pulmonary	3	6			17
Renal					
Silico-tuberculosis					
Spontaneous pneumothorax (probably Tuberculosis)					
Tabes mesenterica					
Tubercular enteritis					
Tuberculous pneumonia	2			1	
Vertebral column					
Totals	6	7	0	1	28

Table A2. Occupation of New and All Clinic Patients as Found in the Annual Reports of the Department of Health, 1925-1940

Cases (All=Known+New)	1925 New	1925 All	1933 All	1934 All
Accountant	2	2		
Aircraft Worker				
Artist	1	1		
Auditor				
Auto Trimmer			1	
Baker	2	4		
Bank Teller				
Banker	1	1		
Bench Hand				2
Blacksmith	1	4		
Boiler Maker			2	
Bookkeeper	5	5		
Brass Finisher			1	
Brass Molder	2	2		
Bricklayer	1	2		
Butcher	1	1		1
Cabinet Maker	1	1	5	2
Canvasser				
Car Tender				
Carpenter	4	14	1	2
Cashier				1
Charwomen	1	4	2	
Chauffeur	1	3		
Chemist	1	1		
Chipper				
Clergyman				
Clerical			17	
Clerk	8	35		9
Collector	1	2		
Conductor	3	7		
Cook		1	1	
Dairyman				
Deaconess	1	1		

	1925	1925	1933	1934
Decorator				3
Delivery Boy			1	
Die Grinder				
Die Maker	1	2		
Domestic			2	
Dressmaker	1	1		
Dyer				
Editor	1	2		
Electric Plater				1
Electrical Worker				
Electrician	4	4	2	3
Engine Erector			1	
Engineer			1	1
Entertainer				1
Examiner				
Factory Worker	15	25	19	11
Farmer	7	9	2	1
Firemen	1	1		1
Foreman			3	
Gardener	2	2		
Gas Station Attendant				
Glass Cutter				
Grocer			1	
Housewives*	128	296	82	161
Insurance Agent				
Ironworker				
Janitor	2	4		
Jeweller's Engraver				
Knitter				
Laborer	21	53	25	7
Lard Refiner				
Laundry Worker				
Lawyer	1	1		
Lineman				1

	1925	1925	1933	1934
Lithographer		1		
Machine Feeder				
Manager				
Mechanic and Machinist	13	26	3	5
Merchant	6	3		
Metal Worker		5		
Milkman			1	
Mill Hand and Wright	3	4		
Milliner	1		1	
Molder				
Music Teacher			2	
Nurse			9	6
Operator				
Orderly	1	1		
Packer	1	5	3	2
Painter	3	6	2	
Pantry Worker				
Parcel Clerk				
Plumber	1	2	1	4
Police	2	7		
Postal Clerk			3	3
Postman			1	
Pre-school age children	69	183	7	7
Printer	2	4		
Pro Golfer	1	1		
Retired				
Rubber Worker			4	
Sailor				
Sales Engineer	1	1		
Salesmen and Ladies	6	17	3	4
School children and students	367	1276	109	186
Seamstress	1	1		
Servant	4	4		
Shipper	2			

	1925	1925	1933	1934
Shoe Repairer				1
Shoemaker	1	1		
Sign Painter				1
Steel Worker	3	4		
Stenographer	3	7		2
Stereotyper				
Stoker				
Stone Sawyer				
Stove Mounter	1	1		
Street Car Operator			1	
Student (adult)				
Supervisor				
Tailor	4		1	3
Tanner	1	1		
Taxi Driver				1
Tea Room Proprietor				1
Teacher	4	4		1
Technician	1	1		
Telegraph Operator	1	4		
Tent Maker	1	2		
Tinsmith				
Tobacco Grader				1
Traffic Man				1
Trainmen	1	3		
Truck Driver			1	
Trustee	1	1		
Undergraduate Nurse				
Undertaker	1	1		
Unemployed			12	16
Upholsterer				
Usher				
Waitress				2
Watchman				
Welder				

	1925	1925	1933	1934
Winder				
Wood Worker			3	
Woodfinisher				
* and others whose occupation (if any) is in the home				
Totals	728	2068	336	455

	1935	1936	1937	1938
Cases (All=Known+New)	All	All	All	All
Accountant				
Aircraft Worker				
Artist				
Auditor	1			
Auto Trimmer				
Baker				
Bank Teller			1	
Banker				
Bench Hand	1			
Blacksmith		1		
Boiler Maker				
Bookkeeper	1			
Brass Finisher				
Brass Molder				
Bricklayer				
Butcher				
Cabinet Maker	1			
Canvasser		1		
Car Tender	1			
Carpenter	2			
Cashier				
Charwomen				
Chauffeur	1			
Chemist				
Chipper	1			
Clergyman				
Clerical				
Clerk	12	1	2	2
Collector				
Conductor				
Cook				
Dairyman				
Deaconess				

	1935	1936	1937	1938
Decorator				
Delivery Boy	1			
Die Grinder	2			
Die Maker				
Domestic		1		1
Dressmaker				
Dyer	1			
Editor				
Electric Plater				
Electrical Worker	1			
Electrician				
Engine Erector				
Engineer				
Entertainer				
Examiner	1			
Factory Worker	2			
Farmer	5		1	
Firemen				
Foreman				1
Gardener				
Gas Station Attendant				2
Glass Cutter	1			
Grocer				
Housewives*	199	20	12	19
Insurance Agent	1		1	
Ironworker				1
Janitor	1	1		
Jeweller's Engraver		1		
Knitter				1
Laborer	18	1		
Lard Refiner	1			
Laundry Worker				
Lawyer				
Lineman				

	1935	1936	1937	1938
Lithographer		1		
Machine Feeder				1
Manager		1		1
Mechanic and Machinist	2			
Merchant				
Metal Worker				
Milkman				
Mill Hand and Wright				
Milliner				
Molder				
Music Teacher				
Nurse	9			
Operator			1	
Orderly				
Packer				
Painter	2			
Pantry Worker			1	
Parcel Clerk	2			
Plumber	2			
Police				
Postal Clerk	3			
Postman	2			
Pre-school age children	9	1	3	1
Printer				
Pro Golfer				
Retired			1	
Rubber Worker				
Sailor		1		
Sales Engineer				
Salesmen and Ladies	4			
School children and students	181	17	2	1
Seamstress				
Servant				
Shipper				

	1935	1936	1937	1938
Shoe Repairer				
Shoemaker				
Sign Painter				
Steel Worker				
Stenographer				
Stereotyper				1
Stoker				1
Stone Sawyer			1	
Stove Mounter				
Street Car Operator				
Student (adult)		1		
Supervisor	1			
Tailor				
Tanner				
Taxi Driver				
Tea Room Proprietor				
Teacher				
Technician				
Telegraph Operator				
Tent Maker				
Tinsmith			1	
Tobacco Grader				
Traffic Man				
Trainmen				
Truck Driver	1	2		
Trustee				
Undergraduate Nurse				
Undertaker				
Unemployed	34	29	12	17
Upholsterer				
Usher				1
Waitress	2			
Watchman				1
Welder				

	1935	1936	1937	1938
Winder	1			1
Wood Worker				
Woodfinisher	1			
* and others whose occupation (if any) is in the home				
Totals	511	80	39	53

	1939	1940
Cases (All=Known+New)	All	All
Accountant		
Aircraft Worker		1
Artist		
Auditor		
Auto Trimmer		
Baker		
Bank Teller		
Banker		
Bench Hand		
Blacksmith		
Boiler Maker		
Bookkeeper		
Brass Finisher		
Brass Molder		
Bricklayer		
Butcher		
Cabinet Maker		
Canvasser		
Car Tender		
Carpenter		1
Cashier		
Charwomen		
Chauffeur		
Chemist		
Chipper		
Clergyman		1
Clerical		
Clerk	2	6
Collector		
Conductor		
Cook		
Dairyman	1	
Deaconess		

	1939	1940
Decorator		
Delivery Boy		
Die Grinder		
Die Maker		
Domestic		
Dressmaker		
Dyer		
Editor		
Electric Plater		
Electrical Worker		
Electrician		
Engine Erector		
Engineer		
Entertainer		
Examiner		
Factory Worker	4	
Farmer	2	
Firemen		
Foreman		
Gardener		
Gas Station Attendant		
Glass Cutter		
Grocer		
Housewives*	13	17
Insurance Agent		
Ironworker		
Janitor		
Jeweller's Engraver		
Knitter		
Laborer		4
Lard Refiner		
Laundry Worker	1	
Lawyer		
Lineman		

	1939	1940
Lithographer		
Machine Feeder		
Manager		
Mechanic and Machinist		1
Merchant		
Metal Worker		
Milkman		
Mill Hand and Wright		
Milliner		
Molder		1
Music Teacher		
Nurse		1
Operator		
Orderly		
Packer		
Painter		
Pantry Worker		
Parcel Clerk		
Plumber		
Police		
Postal Clerk		
Postman		
Pre-school age children	5	1
Printer		
Pro Golfer		
Retired		
Rubber Worker		
Sailor		
Sales Engineer		
Salesmen and Ladies		3
School children and students	25	3
Seamstress		
Servant		
Shipper		

	1939	1940
Shoe Repairer		
Shoemaker		
Sign Painter		
Steel Worker		1
Stenographer		
Stereotyper		
Stoker		
Stone Sawyer		
Stove Mounter		
Street Car Operator		
Student (adult)		
Supervisor		
Tailor		
Tanner		
Taxi Driver		
Tea Room Proprietor		
Teacher		
Technician		
Telegraph Operator		
Tent Maker		
Tinsmith		
Tobacco Grader		
Traffic Man		
Trainmen		
Truck Driver		2
Trustee		
Undergraduate Nurse	1	
Undertaker		
Unemployed	22	38
Upholsterer	1	
Usher		
Waitress		
Watchman		
Welder		1

	1939	1940
Winder		
Wood Worker		
Woodfinisher		
* and others whose occupation (if any)		
is in the home		
Totals	77	82

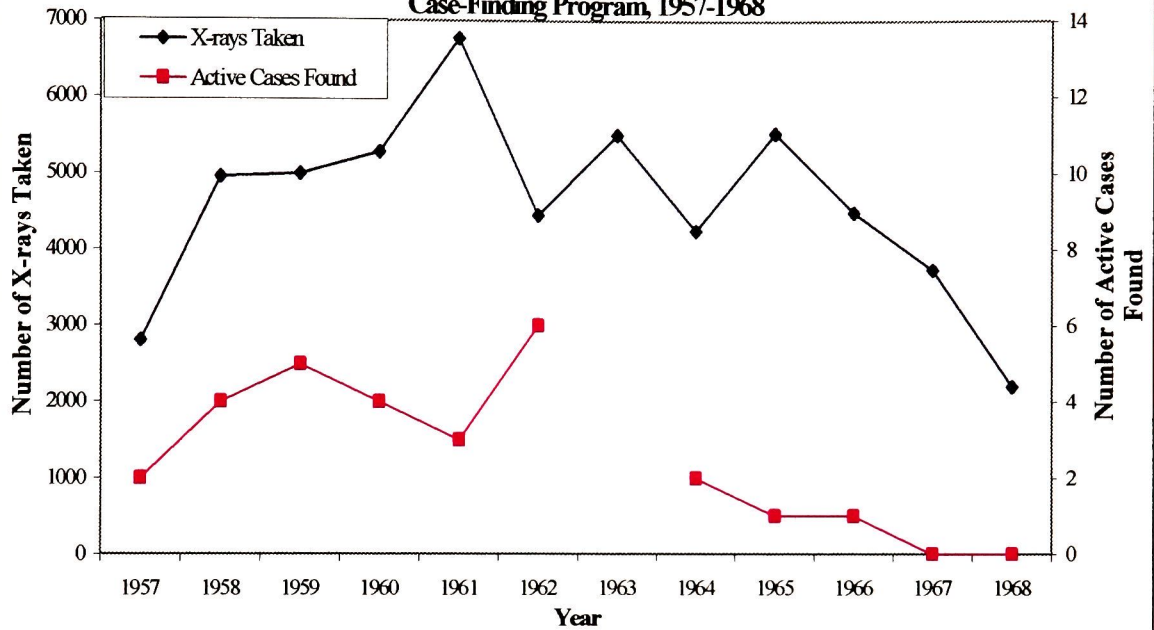
Table A3. Nationality of New and All Clinic Patients as Found in the Annual Reports
of the Board of Health, 1917-1940

	1917	1920	1922	1923	1925	1925
Cases	New	New	New	New	New	All
Canadian	277	293	327	394	533	1608
English	132	142	112	82	97	259
Scotch	36	10	20	13	19	34
Irish	9	8	6	6	10	17
American	25	12	17	15	17	34
Rumanian [sic], Russian, Italian, Austrian, Turks and Hungarians	59					
Russian, Italian, Chinese and Others		67	25	55		
Indian (American)					5	10
South American					1	1
French					2	6
Swedish					1	1
Danish					1	2
Finnish					2	2
Dutch					1	3
German					1	2
Polish					6	11
Austrian					7	14
Russian					4	8
Bulgarian					2	2
Greek					2	3
Italian					10	38
Sicilian					1	1
Portugese					1	1
Chinese					2	4
Roumanian [sic]					3	6
Hungarian						
Ukranian						
Lithuanian						
Australian						
Bohemian						
Jew/Hebrew						1
Jugo-Slavian [sic]						
Slav[sic]						
Serbian						
Other						
Totals	538	532	507	565	728	2068

	1933	1934	1935	1936	1937	1938
Cases	All	All	All	All	All	All
Canadian	233	311	355	43	28	32
English	29	45	59	11	5	7
Scotch	19	22	24	8		3
Irish	7	10	10	1		1
American	6	8	6	2	1	
Rumanian [sic], Russian, Italian, Austrian, Turks and Hungarians						
Russian, Italian, Chinese and Others						
Indian (American)						
South American						
French	3	2	4			
Swedish	1					
Danish						
Finnish	1	2				
Dutch						
German	1	1		1		
Polish	4	19	13	5		
Austrian		1	1			
Russian	3	3	3	1		
Bulgarian						
Greek						
Italian	3	1	3	2		
Sicilian						
Portugese						
Chinese						
Roumanian [sic]	4	1	2			
Hungarian	14	15	20	1		
Ukranian	4	9	8	1		
Lithuanian	1			1		
Australian	1					
Bohemian	1					
Jew/Hebrew		2	2	1		
Jugo-Slavian [sic]		3				
Slav[sic]		1				
Serbian				2		
Other					5	10
Totals	335	456	510	80	39	53

	1939	1940
Cases	All	All
Canadian	53	37
English	7	16
Scotch	2	6
Irish	1	1
American		1
Rumanian [sic],		
Russian, Italian,		
Austrian, Turks and		
Hungarians		
Russian, Italian,		
Chinese and Others		
Indian (American)		
South American		
French		
Swedish		
Danish		
Finnish		
Dutch		
German		
Polish		
Austrian		
Russian		
Bulgarian		
Greek		
Italian		
Sicilian		
Portugese		
Chinese		
Roumanian [sic]		
Hungarian		
Ukranian		
Lithuanian		
Australian		
Bohemian		
Jew/Hebrew		
Jugo-Slavian [sic]		
Slav[sic]		
Serbian		
Other	14	21
Totals	77	82

Figure A1. Annual X-rays Taken and Active Cases Found in Hamilton Employment Office Case-Finding Program, 1957-1968



Source: Annual Report, 1957-1968

