



Urban Crowding, Public Health, and the Decline of Infectious Disease: The Role of Housing and Transportation in Reducing Tuberculosis, Diphtheria, and Cholera

Paul TE Cusack

Independent Researcher, Canada

Citation: Paul TE Cusack (2026) *Urban Crowding, Public Health, and the Decline of Infectious Disease: The Role of Housing and Transportation in Reducing Tuberculosis, Diphtheria, and Cholera*. *J of Preventive Medi, Infec Dise & Therapy* 3(4), 01-04. WMJ/JPMIDT-136

Abstract

During the nineteenth and early twentieth centuries, infectious diseases were among the leading causes of death in North America and Europe. Tuberculosis (commonly known as consumption), diphtheria, and cholera thrived in densely populated urban environments characterized by overcrowded tenement housing, inadequate sanitation, poor ventilation, and limited access to clean water. As industrial cities expanded, public health officials increasingly recognized the relationship between urban crowding and disease transmission. This paper examines the prevalence of these diseases during the era of tenement housing and mass public transportation and evaluates the extent to which declining residential density contributed to improvements in public health. The evidence suggests that while medical advances such as vaccination and antibiotics played critical roles, reductions in crowding, improvements in housing quality, enhanced sanitation infrastructure, and access to clean water were equally important in reducing disease incidence and mortality.

***Corresponding author:** Paul TE Cusack, Independent Researcher, 23 Park Ave, Saint John, Canada.

Submitted: 27.06.2026

Accepted: 06.07.2026

Published: 15.07.2026

Introduction

The nineteenth century witnessed rapid urbanization throughout Europe and North America. Industrialization attracted large numbers of workers to cities, where housing construction often failed to keep pace with population growth. The result was widespread overcrowding in tenement districts. Families frequently occupied a single room, shared

sanitation facilities with multiple households, and lived in poorly ventilated buildings.

At the same time, urban populations relied heavily upon crowded streetcars, trains, ferries, and horse-drawn transit systems. These conditions created an environment highly conducive to the spread of infectious disease.

Among the most significant diseases of the era were tuberculosis, diphtheria, and cholera. Together, they caused millions of deaths worldwide and shaped the development of modern public health systems.

Tuberculosis and Urban Crowding

Tuberculosis was the most deadly infectious disease of the nineteenth century. Before the development of effective antibiotics in the 1940s, tuberculosis accounted for approximately one in every seven deaths in many industrialized nations.

The disease spreads primarily through airborne droplets expelled when infected individuals cough, sneeze, or speak. Consequently, overcrowded housing was particularly effective at facilitating transmission. Families living in confined spaces experienced prolonged exposure to infected household members, often resulting in multiple infections within a single residence.

Medical historians have noted that tuberculosis mortality began declining decades before the introduction of antibiotic therapy. Improvements in nutrition, housing quality, ventilation, and living standards appear to have played a substantial role. Public health campaigns encouraged exposure to fresh air and sunlight, while the construction of larger dwellings reduced household density.

As populations moved from crowded urban tenements into less densely occupied neighbourhoods and suburbs during the twentieth century, opportunities for repeated exposure declined significantly.

Diphtheria and the Urban Environment

Diphtheria was one of the most feared childhood diseases of the nineteenth and early twentieth centuries. Caused by the bacterium *Corynebacterium diphtheriae*, the disease spreads through respiratory droplets and close personal contact.

Children living in crowded urban districts were especially vulnerable. Schools, tenement buildings, and public transportation systems facilitated rapid transmission. Outbreaks frequently swept through cities, producing high mortality rates among young children.

The development of diphtheria antitoxin in the 1890s and widespread vaccination during the twentieth century dramatically reduced mortality. Nevertheless, public health improvements had already begun reducing transmission. Better housing, lower occupancy rates, improved ventilation, and greater awareness of disease prevention contributed to declining incidence even before universal vaccination programs were established.

Cholera and Sanitation

Unlike tuberculosis and diphtheria, cholera is primarily a waterborne disease. It spreads through contaminated drinking water rather than direct person-to-person contact.

Urban crowding nevertheless contributed indirectly to cholera epidemics. Rapid population growth overwhelmed municipal sanitation systems. Human waste often contaminated wells, rivers, and reservoirs that served as sources of drinking water.

The devastating cholera epidemics of the nineteenth century prompted major investments in public infrastructure. Cities constructed sewer systems, improved drainage networks, and developed water treatment facilities. These interventions dramatically reduced cholera transmission.

The famous work of physician John Snow during the London cholera outbreak of 1854 demonstrated the connection between contaminated water and disease. His findings laid the foundation for modern epidemiology and public sanitation policy.

As clean water became widely available throughout North America and Europe, cholera virtually disappeared from most developed nations.

Public Transportation and Disease Transmission

Before the widespread adoption of the automobile, urban residents relied heavily on public transportation. Streetcars, trains, ferries, and buses often operated at or beyond capacity.

These crowded environments increased opportunities for respiratory disease transmission. However, transportation exposure was generally brief compared with conditions within the home. Historians and epidemiologists therefore regard overcrowded housing

as a more significant contributor to disease spread than public transportation.

Nevertheless, public transit undoubtedly facilitated the movement of infectious individuals throughout urban areas, accelerating the spread of outbreaks.

The Rise of Suburban Living

The twentieth century witnessed significant changes in urban form. Increasing automobile ownership enabled many families to move from dense urban cores to lower-density residential districts.

Suburban housing generally provided more living space per person, better ventilation, improved sanitation, and access to municipal services. These improvements reduced exposure to infectious diseases and complemented advances in medicine and public health.

The decline of tuberculosis mortality before antibiotics provides particularly strong evidence that improvements in living conditions can substantially reduce disease transmission. Similar trends occurred with diphtheria prior to universal immunization.

While suburbanization alone did not eliminate infectious disease, it formed part of a broader transformation that included improved nutrition, public health regulations, vaccination programs, and modern medical treatment.

Conclusion

Tuberculosis, diphtheria, and cholera were widespread and often deadly diseases during the era of crowded tenement housing and mass public transportation. Overcrowded living conditions facilitated the spread of respiratory diseases such as tuberculosis and diphtheria, while inadequate sanitation infrastructure promoted cholera epidemics.

The decline of these diseases resulted from multiple interacting factors. Improved housing, reduced crowding, better ventilation, enhanced nutrition, modern sewer systems, clean water supplies, vaccination programs, and antibiotics all contributed to improved public health outcomes. The transition from densely populated tenement districts to less crowded residential environments appears to have

been an important factor in reducing the burden of infectious disease, particularly for tuberculosis and diphtheria.

The historical experience demonstrates that public health depends not only upon medical treatment but also upon the quality of the built environment in which people live.

The history of infectious disease in Saint John demonstrates that urban form and public health are inseparable. During the nineteenth century, crowded housing, inadequate sanitation, and rapid population growth created conditions that favoured the spread of tuberculosis, diphtheria, and cholera. The city's role as a major Atlantic port further increased its exposure to imported diseases and epidemics.

The eventual decline of these diseases reflected not only advances in medicine but also a transformation of the city's physical environment. Investments in water systems, sewer infrastructure, housing quality, and lower-density residential development reduced opportunities for disease transmission and improved overall health. Long before the introduction of antibiotics and widespread vaccination programs, mortality rates from several infectious diseases had already begun to decline, suggesting that improvements in living conditions were themselves powerful public health interventions.

For Saint John, the reduction in infectious disease roughly coincided with three major historical transitions: the rebuilding of the city following the Great Fire of 1877, the installation of modern water and sewer infrastructure around the turn of the twentieth century, and the gradual movement of much of the population from the crowded South End and waterfront districts into streetcar suburbs and later automobile-oriented suburban neighbourhoods. Together, these developments transformed the city's health profile and contributed to dramatic increases in life expectancy.

At the same time, this history raises an important question for contemporary urban planners and public health officials. While reduced residential crowding helped suppress many infectious diseases, the later shift toward suburbanization may also have produced new economic, environmental, and social challenges. The dispersal

of population and commercial activity contributed to the decline of traditional urban neighbourhoods, increased dependence on automobiles, expanded infrastructure costs, and weakened the economic vitality of the historic city centre. Thus, the very process that improved public health may also have contributed to some of the urban challenges faced by Saint John in the late twentieth and early twenty-first centuries.

The experience of Saint John suggests that the central challenge of urban development is not simply choosing between density and dispersion, but rather creating healthy, prosperous communities that combine the public health advantages of modern sanitation and housing with the economic, social, and cultural benefits of vibrant urban neighbourhoods. As cities continue to confront new public health threats, housing shortages, and questions of sustainable development, the lessons of Saint John's past remain highly relevant. The city's history demonstrates that public health depends as much upon housing, sanitation, and urban planning as it does upon hospitals, physicians, and medical technology [1-11].

References

1. Dubos R, Dubos J (1952) *The White Plague: Tuberculosis, Man and Society*. Rutgers University Press.
2. Evans RJ (1987) *Death in Hamburg: Society and Politics in the Cholera Years 1830-1910*. Oxford University Press.
3. Hamlin C (2009) *Cholera: The Biography*. Oxford University Press.
4. McKeown T (1976) *The Modern Rise of Population*. Academic Press.
5. Porter D (1999) *Health, Civilization and the State: A History of Public Health from Ancient to Modern Times*. Routledge.
6. Rosen G (1993) *A History of Public Health*. Johns Hopkins University Press.
7. Snow J (1855) *On the Mode of Communication of Cholera* (2nd ed). London: John Churchill.
8. Szreter S (1988) The importance of social intervention in Britain's mortality decline. *Social History of Medicine*, 1: 1-37.
9. World Health Organization. (2025) *Tuberculosis Fact Sheet*.
10. World Health Organization. (2025) *Cholera Fact Sheet*.
11. World Health Organization. (2025) *Diphtheria Fact Sheet*.