Urbanization and Medicine in Mid-18th to Mid-19th Century Britain

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This period from 1750 to 1850 in Britain marks relatively rapid improvements in medicine, compared to previous time periods. Urbanization is a characterizing factor of the period and advancement in medicine. In this period, urbanization had the direct effect of congregating medical knowledge, creating medical schools and centers for research and further learning of anatomy and new surgical techniques. This paper will cover three major facets of medicine for the period of 1750-1850 in Britain: a brief history, later views on medicine and attitudes of the period and effects of urbanization on major indicators of health. With the focus being major indicators of overall health, including sanitation, the conditions of the poor, and infant mortality.

**A Brief History of Medicine in Britain: 1745 to 1865**

This period from 1750 to 1850 in Britain marks relatively rapid improvements in medicine, compared to previous time periods, progressing from humoral theory to miasma theory, and the beginnings of research which lead to modern germ theory towards the end of the 19th century. Humoral theory has its systemic origins in ancient Greece, and was central to the teaching of Hippocrates. The central tenet of humoral theory was that illness was caused by an imbalance in one of the so-called four humors of the body, and these imbalances could be treated by a combination of diet, exercise, purging the body, treatment with hot irons to blister skin, and most famously: bloodletting. Humoral theory was prominent in Europe until the early 1800s.¹

The miasma theory of medicine coexisted with humoral theory for many centuries and dominated medical practice in Britain for the first half of the 19th-century, before the discoveries lead to the modern germ theory of medicine. The miasma theory of medicine states that diseases are caused by “miasmas” or decaying particles suspended in the air which often gave off foul odours.\(^2\) The miasma theory was prescribed to by prominent medical figures at the time, including Florence Nightingale.

Miasma theory had short-lived prominence, as germ theory, which is the current model used today, had strides in the middle of the century, notably in 1861 when Louis Pasteur discovered that so-called germs originated from other germs and did not spawn spontaneously, and in 1876 when Robert Koch identified the first bacteria, anthrax specifically. These discoveries, among others, lead germ theory to become the most widely accepted theory by the end of the 19th century.\(^3\)

Beyond the general theory of medicine changing, specific changes in the practice and education of medicine changed. “In 1745 the two professions [of barbers and surgeons] were [officially] separated by King George II, who established the London College of Surgeons.”\(^4\) This period saw an increase in medical schools, and an enforcement of standards of medical education and official qualifications to practice medicine, rather than the previously accepted model of an apprenticeship. At this time, physicians, who practiced general medicine, and


surgeons, who performed amputations and excisions of cancers among other procedures, were differentiated and differently educated professions.\(^5\)

While not an exhaustive list, the most prominent medical advancements of the period included the first vaccination, the first demonstrations of the benefits of sanitation, and the early use of antiseptics in surgery. In 1794, Edward Jenner demonstrated that vaccination with cowpox protected against smallpox.\(^6\) In 1854, John Snow proved a correlation between cholera cases and contaminated water supply on Broad Street. In 1865, Joseph Lister began using antiseptics to reduce deaths after surgery.\(^7\) More than specific medical discoveries, this period is marked by a rapid increase in anatomical and epidemiological knowledge, and measures to combat public health issues on a broad scale. Two major results of this can be seen in the founding of the British Medical Journal in 1840\(^8\), and the publication of the first edition of Gray’s Anatomy in 1858.\(^9\)

**Later Critical Views of the Medicine of the Period**

Whereas this paper will simply discuss medicine in aggregate, critics McKeown and Szereter draw a distinction between:

*“curative technical medicine”—invasive surgery and biochemical 'treatments'—at the expense of *preventive, humanist medicine*—efforts to understand and modify the health

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\(^8\) “History of The BMJ.” *The BMJ*, www.bmj.com/about-bmj/history-of-the-bmj.

implications of the environment in its widest sense, including lifestyle, behaviour, and diet.”

McKeown’s thesis argues that the main contributors to the decline in mortality in the period were improved sanitation, and the building of natural immunity by better nutrition and other standards of living, by the “invisible hand” rather than by human agency in conscientiously creating policies of preventative health measures to improve sanitation and access to nutrition. The unequal access to new improvements and resources by different classes was largely ignored in McKeown’s methodology.

Revisionists of McKeown’s theory, specifically Simon Szreter, argue that urbanization lead to improvements in public health and preventative health measures which alleviate some of the health hazards of urbanization, and can account for overall lowering mortality and improving health across the population, even when individuals such as the poorest citizens suffered from worse health than they had in rural areas.

In Szreter’s critical work of Mckeown’s thesis, urbanization is examined as both a cause of negative health trends, and as a catalyst for solving many of these problems, specifically though public health, in contrast to McKeown as:

“...the leading role played by the public health movement and its locally administered preventive health measures in combating the urban congestion created by industrialization...This will suggest that human agency...preventive public health provisions and services at the local level, rather than the impersonal ‘invisible hand’ of inexorably rising nutritional and living standards, should be reinstated at the centre of our attempts to explain the modern mortality decline in Britain.”

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Overall, urbanization lead to great strides in medicine, but urbanization cannot be said to have simply improved health overall, and history has disagreed with how beneficial or harmful urbanization has been to the health of individuals in the period between 1750-1850 in Britain.

**General Effects of Urbanization on Medicine**

Urbanization leads to more rapid medical advancement which benefits later decades, but urbanization itself contributes to worse health for the poor who live in urban areas at this time. Improvements to health indicators come from preventive health improvements and rising consciousness of public health, while specific medical discoveries only begin to largely impact health towards the end of the 19th-century and early 20th-century as they become more widespread and refined.

The main positive effects of urbanization on medicine comes from the fall in mortality rates due to improved hygiene demanded by urban pressures, and the emphasis on preventive medicine.

“Population growth in eighteenth-century England was due mainly to a fall in mortality...The fall affected all socioeconomic groups...In addition to an explanation involving the introduction of smallpox inoculation, the major hypothesis...is that the significant improvement in domestic hygiene associated with the rebuilding of housing in brick and tile brought about a major reduction in mortality.”

“Thus crude death rates fell from 21.6 per thousand in 1841 to 14.6 in 1901. Here, the main factors were public hygiene and better nutrition thanks to higher earnings - that is, prevention rather than cure.”

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However, this only arises after the severe health crises caused by poor sanitation and the epidemics of cholera and tuberculosis. Urbanization lead to poor sanitation and other health hazards which mandated public health measures.

“public health measures such as clean water and milk supplies assumed greater importance, while changing social conditions, to which McKeown had attributed beneficial effects such as improvements in nutrition, were in fact a detrimental influence, resulting in, for example, overcrowded and poorly constructed housing resulting from rapid urbanization.”

**Sanitation and Disease**

For most of our period, before these advances of hygiene and declining mortality, urban areas of Britain were overcrowded and lacked basic sanitation; for example, the streets were full of rotting food and sewage which contaminated water supplies. This began to change in the early 19th-century, as sanitation practices became more widespread and understood as a way to prevent disease.

The cholera epidemics are exemplar of the sanitation crisis in areas such as London. The newspaper illustration on the following page depicts the sanitation efforts after a cholera outbreak.

“This newspaper image shows workmen spraying and mopping the streets of London in order to prevent the spread of cholera, an infectious intestinal virus that can cause rapid death through dehydration. Between 1832 and 1854 there were recurrent cholera epidemics throughout urban Britain...[a] tragic outbreak was important in establishing a causal link between poor sanitation and cholera: the district doctor John Snow...was later able to prove that the general water supply in Broad Street was being pumped from polluted parts of the Thames.”

Of this discovery, Dr. Snow wrote:

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“among the population having the impure water of the Thames, from Battersea Fields, the mortality from cholera has been ten times as great as among the population having the improved water from Thames Ditton.”

![Image](image_url)

'An Anti-Cholera Specific: Washing the Streets Round Covent Garden'


Prior to this, the major theory of diseases such as cholera was that they were miasmic, as previously defined. This discovery of a link between cholera and polluted water was an early breakthrough for germ theory.\textsuperscript{19}

“A major breakthrough came during the 1854 cholera outbreak, when Dr John Snow demonstrated that infection has spread not by miasmas but by contaminated water from a public pump in crowded Soho. When the pump handle was removed, cholera subsided. It was then possible for public health officials such as Sir John Simon to push forward projects to provide clean water, separate sewage systems and rubbish removal in urban areas.”\textsuperscript{20}

Other than Snow, who championed preventive measures of sanitation, another major proponent, specifically in healthcare settings, was Florence Nightingale. Nightingale is known as the founder of modern nursing, for pioneering sanitation techniques, the basis of which are still used today. Nightingale’s prescribed treatments are exemplified in a letter to a Mr. Chadwick, prescribing treatment to be in “open air during the greater part of the day]...bedroom ventilation at night, diet, founded upon improved digestion, the result of the open-air exercise, sometimes gentle gymnastics, much cold water sponging and little wet-sheet packing.”\textsuperscript{21} Nightingale,

“while serving as a nurse in Crimea from 1854 to 1856...noticed that more soldiers in her care were dying from infectious diseases than were dying from wounds. She thought this was due to overcrowding and malnutrition, but her proposed solutions – better ventilation and better sanitation – were effectively the foundation of modern nursing.”\textsuperscript{22}

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Along with the preventive health measures which combated cholera, tuberculosis (the other major fatal epidemic of the time) mortality rates began to fall, as hospital treatments became more accessible in the city.

“...in London the decline [of tuberculosis] followed the Poor Law of 1834...the decline in England and Wales occurred because of the practice of caring for the sick poor in hospitals...from 1870 to 1920 the proportion of total deaths occurring in public institutions (poor law infirmaries and public hospitals) had risen from 8.3% to 24.3%...historically, before its rationale was understood, and when hospital treatment was being given solely for humanitarian reasons, this hospital treatment played an important part in reducing the death rate from tuberculosis.”

Urbanization of the period created the overcrowding which allowed for the pervasive contamination of water of the spread of diseases such as cholera and tuberculosis. However, urbanization also allowed for the consolidation of medical knowledge and practitioners, which allowed for the discoveries of Dr. Snow and for the improvements and increased access to hospital based treatments, which were not available to many in rural areas, except for, often, the

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very wealthy. Urbanization also allowed for access to the smallpox vaccine, when “smallpox was endemic. From 1853 vaccination was compulsory.”

**Anatomical Research and Exploitation of the Poor**

The interior of a dissecting-room

Anatomists dissected humans and animals to improve the understanding how the human body worked and how it differed from other species on earth. This increased access to medical knowledge and the increased emphasis on anatomical research may have allowed for new

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surgical techniques and rapidly increasing knowledge of the human body. However, this rise of urban centers as anatomical research centers, specifically around medical schools, lead to increases in crime and a profound exploitation of the poor and the working class, which did not reap the benefits of health from urbanization - notably decreased mortality, guaranteed access to hospitals and the best care within them, and improved nutrition - the way the wealthier did.

“The expansion in anatomical and medical training continued into the 19th century...Prior to 1832 the relative shortage of bodies for the number of anatomists and medical students meant that corpses were always in demand, and trade in body snatching was lucrative.”

The most infamous crime that arose in this period is bodysnatching, or, the stealing of newly buried bodies from their graves to sell to medical schools and researchers. The fresher the body, the more money was paid for it, and this inspired the infamous crimes of Burke and Hare in Edinburgh, who murdered people in order to sell their bodies for the maximum price possible. To combat these crimes of bodysnatching, and the subsequent incentive for murder, the Anatomy Act of 1832 was passed.

“Following the Anatomy Act of 1832, body snatching from graves became unnecessary, as the dead bodies of all unclaimed poor from workhouses and charitable hospitals could legally undergo dissection. In fact, one of the principal reasons for introducing the Act was to prevent body snatching from graves.”

“Attitudes to the practice of dissection varied significantly between the rich and the poor. The wealthy who determined the law were happy for dissection to continue because scientific research was regarded as worthy at that time. Furthermore, it was not the rich who were dissected but the poor, either voluntarily when a corpse was sold by a desperately poor family, or against their wishes when death occurred in the workhouse or a charitable hospital and the body was unclaimed.”

The Anatomy Act led to further exploitation of the poor, which were already victims of worse nutrition, mortality rates, and sanitation. People who died in workhouses, or whose bodies went unclaimed, such as bastard children, prostitutes, and those without family in the city, were legally allowed to have their bodies claimed by medical schools and researchers, which disincentivized the treatment of the poor for diseases, and the preventive measures of sanitation.
in poor areas, for access to much desired bodies to further anatomical knowledge and medical improvements which largely benefitted the urban wealthy at the time.

**Infant Mortality and Nutrition**

For this period, infants in urban areas had a mortality rate of about double that in rural areas. Diarrheal diseases, as well as highly contagious diseases such as measles and scarlet fever were more prevalent causes of death in urban areas than rural ones. When the previously mentioned spread of diseases and lack of sanitation is recalled, it makes sense that infants are among the most vulnerable to these conditions, and thus fare worse than rural counterparts who do not come into contact with as many other people or other sources of disease.\(^{34}\)

“Between 1840 and 1900 the rates varied between 148 and 160 deaths per 1000 live births, and they were frequently higher in industrial towns...The most significant causes of infant death were not infectious diseases but "convulsions" and "teething," which together accounted for 1322 per million deaths in 1848-1854..."Convulsions" are a known symptom of nutritional tetany. While "teething"...frequently led to weaning; weaning in turn often deprived the child of its only source of calcium - the mothers' milk - which could lead to tetany...[an involuntary contraction of muscles, which can hinder breathing]."\(^{35}\)

While the upper classes saw improved access to a wider array of foods, the lower classes saw a decrease in nutritional quality with the increase of urbanization. “After the Poor Law of 1834, which relieved the parishes of the responsibility of finding work for people and giving them the family allowances.” Diets were filled with cheaper calories, largely bread and other wheat products, and diets were low in magnesium, which can account for increased cases of nutritional tetany in infants.\(^{36}\)

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Conclusions

Urbanization in Britain during the period from 1750-1850 allowed for innovations and advancements in medicine which paved the way for research and discoveries which laid the basis for modern medicine today, including modern germ theory, anatomical models, medical school systems, vaccinations and the use of anesthetics and sanitation practices during surgery. However, despite these long-term benefits of urbanization to medicine, urbanization had detrimental effects of those living in urban areas at the time, especially those of the lower classes. Poor workers experienced the worst of the overcrowding, spread of epidemic diseases, polluted water, and high infant mortality in the slums and workhouses of the city. The poor were also the most likely to be dissected and sold as cadavers for the benefit of medical knowledge, which benefited the wealthy long before discoveries or advancements benefited them. Towards the end of the 19th century, conditions in urban areas began to improve and the impacts of urbanization on the poor began to level out, but people in urban areas still faced worse health than rural or wealthy counterparts for decades onwards, despite the rapid rise in hospitals and medical knowledge.
Works Cited


