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"Death strikes down the innocent and the young": Tracheotomy in the saving of a child's life during the diphtheria outbreaks of Victorian London, 1850-1900.

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Abstract

The diphtheria outbreaks among children in nineteenth-century London required surgical intervention by means of tracheotomy to prevent death by suffocation. Tracheotomy was not universally accepted, and was contested by many circles as a high-risk procedure that offered no guarantee of success. Employing a detailed primary source analysis of contemporary medical records, case notes, textbooks, and journals, as well as newspapers accessed through the British Newspaper Archive and other databases, I analyze the various ways stakeholders (physicians, parents, social reformers) contended with risk to accept or reject tracheotomy as a procedure which could save the lives of diphtheritic children. Various understandings of risk and success greatly influenced the use of tracheotomy, and this prevented its universal acceptance despite the recorded benefits of this procedure.

Keywords

Tracheotomy, Diphtheria, Suffocation, Victorian, Newspaper

Summary for Lay Audience

The spread of diphtheria in the child population of London in the nineteenth century was of epidemic proportions. In a time of medical uncertainty, one surgical procedure – the tracheotomy – was employed to provide immediate relief and a temporary artificial passage for breathing in cases of asphyxiation by diphtheritic membrane. Tracheotomy was extremely controversial. Opening the windpipe of a child was, in many cases, treated as a last resort in the treatment of diphtheria. However, tracheotomy served as the only effective treatment to alleviate this symptom of diphtheria. It was not until the late 1880s and 1890s that alternative treatments began to show promising numbers in recovery from diphtheritic suffocation. Given its continued use, why was tracheotomy so controversial? The first chapter examines the medical profession and discourse surrounding tracheotomy as medical stakeholders assess the validity, dangers, and effectiveness of this procedure when performed on diphtheritic children. The second chapter examines public perceptions of diphtheria and tracheotomy as communicated through the Victorian newspaper press. In addressing diphtheria outbreaks, the lay narrative emphasizes preventative measures, rather than medical treatments, to combat this disease and improve public health overall. Ultimately, this thesis analyzes the risks involved in allowing for the operation of tracheotomy to be performed on diphtheritic children and how various stakeholders contended with risk and success to accept or reject tracheotomy as a solution to the diphtheria problem.

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INTRODUCTION

Dying by suffocation is a common fear. Suffocation occurs when an individual's air is cut off to their lungs, making breathing impossible and unless intercepted, causes death. When a person suffocates, their face swells, their cheeks turn blue, and their eyes bulge.¹ Their body becomes weak as oxygen is no longer carried to the brain, pain pierces their lungs, and their vision is eventually lost. As panic sets in, a person may use their hands to scratch at the throat as their body writhes in pain. There is virtually nothing that the person experiencing suffocation can do to stop their suffering once suffocation begins. Outside help is the only way to halt suffocation. If help is not provided in time, suffocation will kill. The act of suffocating to death is a slow and agonizing process. It is a death painful to experience and to observe. Sadly, suffocation was a significant cause of death for a large number of children under the age of 15 during the nineteenth century.

From 1850 to the end of the nineteenth century, diphtheria, also known as “The Strangling Angel of Children,” was killing children by suffocation at an alarming rate.² During this time, London was becoming increasingly urbanized and the population of the city was growing rapidly. Rapid expansion created many ugly by-products within the city, including the rise of infectious diseases due to overcrowded and unhealthy living and working conditions. Diphtheria was a highly infectious disease, spreading epidemically with each outbreak London experienced. Although diphtheria could infect persons of any age, it was one of the most feared childhood diseases of the nineteenth century as it primarily affected children under the age of

¹ Lennox Browne, *Diphtheria and Its Associates* (Bailiere, Tindball & Cox: London, 1895): 109.

² Michael Dwyer, *Strangling Angel: Diphtheria and Childhood Immunization in Ireland* (Liverpool, Liverpool University Press, 2018), 2.

15.³ Diphtheria in children was far more dangerous and most often fatal, with harrowing numbers of deaths resulting from the disease in London.

To counter the suffocation battled by the majority of diphtheria-stricken children, physicians performed a tracheotomy operation with which they were familiar. A tracheotomy operation was a surgical intervention to reopen the airway and to intercept suffocation. Tracheotomy became a highly utilised procedure in cases of diphtheria-stricken patients under threat of suffocation, although its purpose and success were misunderstood by many within and outside of the medical field. This caused a great deal of contention as to the use of tracheotomy during diphtheria outbreaks.

1.1 Introducing Uncertainty

In order to understand the challenges that those within the medical profession experienced in distinguishing a treatment for diphtheria, one must first understand the suffering caused to the patient resulting from the disease, as well as how diphtheria was almost completely imperceptible among other infectious diseases of the Victorian period. Diphtheria is an infection caused by a bacterium called *Corynebacterium diphtheriae*.⁴ The duration of the disease can last anywhere between 24 hours and 14 days.⁵ The bacterium produces a toxin which, at first, generates a general malaise in the patient. Primary symptoms may include headache, nausea, pain in the back and limbs, and the early presence of a sore throat.⁶ As symptoms progress, the neck becomes sore and the voice becomes hoarse.⁷ Swelling and redness, along with an excess of

³ “Health of London During the Week.” *Morning Post*, 03 December, 1851.

⁴ Annick Opinel and Gabriel Gachelin, “French 19th Century Contributions to the Development of Treatments of Diphtheria.” *Journal of the Royal Society of Medicine* 104, no. 4 (2011): 175.

⁵ William Jenner, *Diphtheria: Its Symptoms and Treatment* (Walton & Maberly: London, 1861): 50.

⁶ Browne, *Diphtheria and Its Associates*, 109.

⁷ *Ibid.*

mucous, are extremely common. These symptoms were strikingly similar to other prevailing diseases of the nineteenth century, including scarlatina, typhus, whooping cough, and tonsillitis, which made it particularly difficult for physicians to diagnose their patients with diphtheria with certainty. It was not until the most distinguishable and severe symptom of diphtheria became present that physicians could be certain they were treating diphtheria – a leathery pseudo-membrane which grows on the tonsils and can extend down toward the larynx and into the trachea.⁸ Unfortunately, in most cases, presence of this pseudo-membrane almost certainly means death. It can take on many forms, varying in density, colour, and consistency.⁹ As the pseudo-membrane grows, the trachea becomes blocked, and asphyxiation occurs. If not intercepted, the patient is likely to die by suffocation. When possible death by suffocation is present, the operation of tracheotomy is often employed to reopen the blocked airway. During this procedure, the pseudo-membrane is detached from the tracheal wall and removed through the opening in the throat. Breathing is then returned to the patient.

Despite the clear airway following the removal of the pseudo-membrane, diphtheria also has the ability to cause blood-poisoning resulting from the toxin produced by the bacterium. As the disease progresses, this blood-poisoning may weaken the patient by causing the pulse to become rapid and feeble.¹⁰ It is because of this blood-poisoning that, in many cases, death results from exhaustion.¹¹ As well, this toxin is responsible for complications that can occur in the later stages of the disease, including myocarditis and peripheral neuropathy.¹² As such, cases of

⁸ Jenner, *Diphtheria*, 17.

⁹ *Ibid.*

¹⁰ *Ibid.*, 76.

¹¹ Sir Morell Mackenzie, *Diphtheria; its Nature and Treatment, Etc.* (Philadelphia: Lindsay & Blakiston, 1879): 69.

¹² Opinel, “French 19th Century”, 175.

diphtheria are rarely unattended by danger.¹³ Whether the case is mild or severe, diphtheria may end in death if not identified and treated with haste.

The speed with which the disease spread through the child population and was able to progress toward extreme and severe symptoms in children raised concern for stakeholders outside of the medical profession, including middle-class parents and social reformers. During the diphtheria outbreaks that occurred in the second half of the nineteenth century, a general shift occurred in the value placed on the lives of children. Over the period, childhood became a more precious part of life, and with increased attention in the welfare of children, it became the responsibility of the adult population to ensure the protection of children. As well, a particular medical interest in the health of children was established which sought to increase medical care for this vulnerable population.¹⁴ Diphtheria was a direct threat to childhood. The treatment surgery of tracheotomy was, in some circles, also considered a threat to the preciousness of the child body as it was considered a risky procedure that offered no guarantee of success in curing of the disease. Debate regarding the efficacy of tracheotomy in cases of diphtheritic children caused a lack of consensus among medical circles that was influential in shaping a middle-class opinion on the operation.

1.2 Uncertainty Throughout History

Diphtheria was not the first infectious disease to perplex medical circles of nineteenth-century Britain. The country was plagued with multiple infectious diseases that spread

Myocarditis is the inflammation of the heart muscle which can cause sudden death, chest pain, and heart failure. Peripheral neuropathy is the result of a damage to the nerves outside of the brain and spinal cord.

¹³ Jenner, *Diphtheria*, 62.

¹⁴ Katharina Boehm, *Charles Dickens and the Sciences of Childhood: Popular Medicine, Child Health and Victorian Culture* (United Kingdom: Palgrave Macmillan, 2013), 79.

epidemicly throughout the population. In 1831, the first widespread epidemic of cholera spread through Britain and carried with it a high mortality rate.¹⁵ Cholera continued to infect the British population epidemicly throughout the rest of the century and established a complex discussion among medical circles surrounding infection and the contagious nature of diseases.¹⁶ Other infectious diseases, such as scarlatina and smallpox, were also considered major threats to the health of the British population. Typhoid fever was particularly rampant, with increased infection rates peaking in the latter half of the nineteenth century.¹⁷ From cholera, scarlatina, smallpox, and typhoid fever developed ideas of filth and sanitary intervention in disease prevention discourse. These directly influenced and overlapped with the prevention of diphtheria and brought forth the erection of multiple hospitals designated for the treatment of infectious diseases in London.¹⁸ However, familiarity with infectious diseases in Britain did not prepare the population for the swiftness and high mortality rate that diphtheria generated among their child population.

So too, the outbreaks of diphtheria in nineteenth-century London were not the first instances where diphtheria evaded physicians. In fact, the disease had confounded physicians for centuries. One of the first recordings of what may have been symptoms of diphtheria is found in *Epidemics III*, by Hippocrates.¹⁹ During the fifth-century, a disease, named *askara* (a word connected with the verb *śākhār*, to stop up) spread through what is now Egypt, Syria and

¹⁵ E. Ashworth Underwood, "The History of Cholera in Britain." *Proceedings of the Royal Society of Medicine: Section of Epidemiology and State Medicine*. (Nov. 3, 1947): 167.

¹⁶ *Ibid*

¹⁷ Jacob Steere-Williams, *The Filth Disease: Typhoid Fever and the Practices of Epidemiology in Victorian England* (Rochester: Boydell & Brewer, 2020): 1.

¹⁸ Matthew Newsom Kerr, *Contagion, Isolation, and Biopolitics in Victorian London* (Switzerland: Palgrave Macmillan, 2017): 36.

¹⁹ "Etymologia: Diphtheria." *Emerging Infectious Diseases* 19, no. 11 (2013): 1838.

Palestine.²⁰ The term was described as “a ship’s cable in the opening of the throat...”.²¹ Based on this description, Freidrich Loeffler was able to make the direct connection between *askara* and diphtheria in his 1908 written history of diphtheria.²² A brief account of the various times malignant sore throat prevailed from the Middle Ages to the eighteenth-century is best described by Russell Trall in his book titled *Diphtheria: Its Nature, History, Causes, Prevention, and Treatment on Hygienic Principles; with a Resumé of the Various Theories and Practices of the Medical Profession* (1862). He describes how,

“In 1337 a fatal epidemic of sore throat occurred in Holland. In 1576 it prevailed epidemically in Paris. In 1618-19 it destroyed five thousand victims in Naples; and about this period it prevailed as an epidemic in Spain for forty years. In 1636 it prevailed at Kingston, Jamaica; in 1736 it appeared in Boston, and in 1743 it reappeared in Paris, where it continued until 1748. It appeared at Cremona and in England. In 1770 it was first noticed in New York and described by Dr. Samuel Bard.”²³

Although the presence of malignant sore throat was seen throughout history, the disease only assumed the name of *diphtherite* when French physician Pierre-Fidèle Bretonneau made the clinical distinction of the disease and coined the term during the outbreak at Tours in 1818.²⁴ This term is derived from the Greek word *diphthera*, meaning hide or leather, the disease being defined by the presence of the pseudo-membrane.²⁵ However, it is widely understood that previous accounts of malignant sore throat coincide with the symptoms of diphtheria and have therefore been considered as such in more recent histories.

²⁰ Ibid, 2.

²¹ Ibid.

²² Ibid,

²³ Russell Trall, *Diphtheria: Its Nature, History, Causes, Prevention, and Treatment on Hygienic Principles; with a Resumé of the Various Theories and Practices of the Medical Profession* (New York: R. T. Trall & Co. Publishers, 1862): 76.

²⁴ Opinel, “French 19th Century”, 173.

²⁵ Ibid.

Before diphtheria was given its name, an epidemic of what is now known as diphtheria occurred in America, and was recorded as miliary fever with an angina ulcusculosa.²⁶ The outbreak had taken place in the New England colonies and had lasted between 1735 and 1740.²⁷ During this period, one person in every forty died from the disease, and the vast majority of these were children.²⁸ Physician William Douglass, who recorded the details of the outbreak which occurred in the township of Kingston, fifty miles east of Boston, describes the disease as having taken all forty of the victims it infected, occasioning suffocation of the patients within a short period of time.²⁹ Within in a few weeks, the disease spread beyond Kingston and into neighbouring townships, spreading considerably among children and presenting more violent symptoms.³⁰ In total, the epidemic in the New England colonies killed more than 5,000 children within 5 years.³¹ The swiftness with which the disease spread through and took such a high number of children made this epidemic come to be regarded by historians as, “the most horrible epidemic of a children’s disease in American history,” well into the 1960s.³²

Returning to Europe less than a century later, diphtheria made its first reappearance at Tours, France in 1818.³³ The disease spread quickly, and the larynx became the seat of the disease.³⁴ By 1824, the disease spread from Tours to the small township of La Ferrière, and in

²⁶ William Douglass, *The Practical History of a New England Epidemical Eruptive Miliary Fever, with an Angina Ulcusculosa which prevailed in Boston New-England in the years 1735 and 1736* (Boston: Thomas Fleet, 1736), 1.

²⁷ Stanford T. Shulman, “The History of Pediatric Infectious Diseases.” *Pediatric research* 55, no. 1 (2004): 165.

²⁸ Lawrence C. Kleinman, “To End an Epidemic: Lessons from the History of Diphtheria.” *The New England Journal of Medicine* 326, no. 11 (1992): 773.

²⁹ Douglass, *The Practical History*, 1.

³⁰ *Ibid*, 1-2.

³¹ Stanley B. Burns, "A pictorial history of healing: Diphtheria antitoxin." *Clinician Reviews* 12, no. 3 (2002): 112.

³² Shulman, “The History of Pediatric Infectious Diseases”, 165.

³³ Trall, *Diphtheria*, 76.

³⁴ *Ibid*, 77.

the following year, Orleans too suffered from the disease.³⁵ Annual reports from the French Academy of Medicine suggests that there was seldom a time in which diphtheria did not exist following the outbreak at Tours.³⁶ It was during this outbreak that Bretonneau was able to make clinical observations of malignant sore throat. While employed as Médecin Chef at the Hôpital de Tours, Bretonneau published a book in which he compiled the first comprehensive analysis of the disease.³⁷ Here he confirms the reoccurrence of what he coined as diphtheria throughout history, as he states that, “At whatever period I have met with Malignant Angina, I have constantly found it in the identical characters which have been remarked by the Spanish and Italian physicians of the seventeenth century.”³⁸ Highly conscious of the growing need to treat and cure patients, Bretonneau introduced the operation of tracheotomy in cases of diphtheria to remove the obstructive membrane and clear the airway. In 1818 and 1820, he performed two unsuccessful tracheotomies, but in 1825, Bretonneau performed the first successful tracheotomy in croup and laryngeal diphtheria on a 4-year-old girl.³⁹ Encouraged by his success, Bretonneau taught tracheotomy for cases of childhood diphtheria to his pupils.⁴⁰ One of his most notable pupils, Armand Trousseau, highly encouraged the operation and made it very popular in Paris.

³⁵ Ibid.

³⁶ Ibid.

³⁷ Christian Nezelof, “Pierre Fidèle Bretonneau 1778-1862. A pioneer in understanding infectious disease.” *Annals of Diagnostic Pathology* 6, no, 1 (2002): 78.

³⁸ Robert Hunter Semple, *Memoirs on Diphtheria. From the Writings of Bretonneau, Guersant, Trousseau, Bouchut, Empis and Daviot*, trans. Robert Hunter Semple (London: The New Syndham Society, 1859): 3.

³⁹ Nezelof, “Pierre Fidèle Bretonneau”, 78.

Contemporary understanding of croup was that it was its own distinct disease, however, late in the nineteenth century, croup was determined to be a symptom of tracheal ailments, not a disease in its own right.

L F. Haas, “Pierre Fidèle Bretonneau 1778-1862.” *Journal of neurology, neurosurgery, and psychiatry* 57, no. 4 (1994): 403.

Bretonneau performed tracheotomy on Elisabeth de Puysegur, the daughter of one of his closest friends, who had already lost three children. He performed the procedure successfully and remained for several hours looking after the child. The girl recovered.

⁴⁰ Nezelof, “Pierre Fidèle Bretonneau”, 78.

By the middle of the century, the disease is believed to have carried over from France into the British countryside, perhaps changing types, and becoming most serious in London.⁴¹

Despite some physicians advocating for the use of tracheotomy in diphtheritic children, the operation received significant opposition in France and Britain. This was because of a number of risks that concerned physicians and parents. Surgery in the nineteenth century was already high risk, as controlling pain, bleeding, and infection was problematic for physicians. In addition, the tactile ability of physicians to perform the procedure put the success of the operation at risk. When the operation was completed and respiration was returned, there was no guarantee that the child would recover from diphtheria, so parents questioned why they should put their child at risk of possible infection from an open surgical wound. Physicians and parents wavered with the benefits and risks of the operation, and this prevented tracheotomy from being employed in all cases of diphtheria where suffocation was present.

1.3 Historiography

In the nineteenth century, disease understanding was highly uncertain and heavily contested. Surgery, such as a tracheotomy procedure, was a risky treatment which could result in various outcomes. This was especially true when surgery was performed on children. There was no certainty that surgical intervention would produce successful results. This uncertainty created a lack of consensus surrounding disease causation and altogether questioned the role of surgery in the nineteenth century. In addition, increased awareness of various disease causation ideas resulted in an increased discussion of the role of preventative measures on infection rates. Thus, a complex relationship between the medical profession and the urban middle class was

⁴¹ Michael Worboys, *Spreading Germs: Disease Theories and Medical Practice in Britain, 1865-1900* (Cambridge: Cambridge University Press, 2000): 146.

established which danced with multiple disease theories, creating a complicated approach to the treatment of diphtheria in children.

Late historian Owsei Temkin, recognized as one of the foremost experts on the interaction of medicine and culture throughout history, described the history of medicine as a scholarship that “goes beyond the history of its basic and clinical sciences and deals with great physicians, hospitals, medical colleges, diseases and epidemics, quacks, drugs, and surgical operations, and with the peoples’ thoughts on health, disease, and cure.”⁴² Initially, the history of medicine was written by doctors for the service of the profession.⁴³ This has changed significantly as the medical sciences have become far more intelligible by those who lack formal medical training. This ability for historians to interact with and understand medical history without a formal training in medical sciences has allowed for a wider range of perspectives when approaching Victorian medical theories, disease understanding and experience, and surgical operations. Different approaches to the study of medicine allows for a deeper understanding of the medical climate of the Victorian period and provides a more holistic history that extends beyond the established narrative of the great men of the medical field – a narrative primarily written autobiographically and biographically, discussing the accomplishments and downfalls of important medical figures.⁴⁴ Throughout the twentieth century, historians have been able to make clearer the mechanisms of disease control, government policy surrounding public health, and the different class experiences regarding disease outbreak during the nineteenth century. New approaches to the history of medicine are reflections of modernity, as medical historians of the

⁴² Owsei Temkin, “Historiography of Ideas in Medicine” in *Modern Methods of the History of Medicine* ed. Edwin Clarke (London: Athlone Press, 1971): 1

⁴³ W. F. Bynum and Roy Porter, *Companion Encyclopedia of the History of Medicine* (London: Routledge, 1993), 24.

⁴⁴ *Ibid.*

past wrote what can effectively be described as an administrative history of the work of doctors and statisticians. It was not until physician and medical historian George Rosen set forth a shift in the history of medicine, as he urged his colleagues to expand the scope of medical history to provide a more extensive study of people, disease, and emotion in an article published in the *Bulletin in the History of Medicine* in 1967.⁴⁵

Based on the writings of contemporary physicians, early historians of medicine identified and were confident that medical thought followed one of two distinct and easily definable approaches to disease theory. These consisted of contagion supporters, who believed that diseases were living organisms, and anti-contagion supporters, who maintained their belief in miasma theory, and the two were in direct opposition of one another.⁴⁶ However, following Rosen's call, the 1970s brought forth a new understanding of Victorian disease understanding that no longer viewed it as a binary competition between two disease theories. Instead, historians identified a spectrum of possible disease theories circulating during the nineteenth century. Cholera was a chief preoccupation in this regard. One of the founders of this idea of multiple and possibly overlapping disease theories is Margaret Pelling, who directly rejects the binary understanding by early historians in *Cholera, Fever and English Medicine, 1825-1865* (1978). Pelling argues that theories of disease actually covered a wide spectrum which could not be divided into just two methods of thinking.⁴⁷ By doing so, she invites historians of medicine to evaluate Victorian understanding of infectious diseases in new ways. This established a lens in the scholarship that particularly focuses on infectious disease, one which became particularly popular in the twenty-first century.

⁴⁵ Ibid, 25.

⁴⁶ Margaret Pelling, *Cholera, Fever and English Medicine 1825-1865* (Oxford: Oxford University Press, 1978), 45.

⁴⁷ Ibid, 17.

Notably, Michael Worboys continues this analysis of multiple disease theories found in Victorian Britain in his influential book titled *Spreading Germs: Disease Theories and Medical Practice in Britain 1865-1900* (2000). He states that, “[t]here are two broad phases in the development and spread of germ theories of disease: from 1865 to 1882, the era of ‘germs’, and from 1882 to 1900 and beyond, the era of ‘bacteria’.”⁴⁸ This turn toward the importance of germ theories showcases the clinical consequences of different germ theories and how these impacted medical understanding in practical terms rather than theoretical ones. By analyzing the changing relationship between disease theory and medical practice, many other historians, such as James Edgar Strick, Stephen Halliday, and Carolyn Anne Jacobson, were able to draw conclusions as to how these understandings influenced physicians’ abilities to decide and make effective medical interventions and how this was understood outside of the medical community. Concentration of areas where major developments in germ theories originated also increased historical studies of surgical practices, state medicine, and laboratory medicine. These coincided with a rise in the social history of medicine, which focused on social reformers and their attempt to enforce medical theory into public practice.⁴⁹

Understanding the sanitary movement of the nineteenth century is a primary topic in the social history of medicine. Early historians argued that the sanitary movement brought about a new and more effective improvement in health, stating that the sanitary movement of the Victorian era preceded the bacteriological movement.⁵⁰ However, historians such as Margaret Pelling, Jacob Steere-Williams, and Wietske Smeele argue that the sanitary movement actually followed the earliest discoveries of bacteriology. This argument has not been widely accepted

⁴⁸ Worboys, *Spreading Germs*, 278.

⁴⁹ Roger Cooter, “After Death/After-“Life”: The Social History of Medicine in Post-Postmodernity.” *Social History of Medicine* 20, no. 2 (2007): 441.

⁵⁰ Pelling, *Cholera*, 297.

and has continued to be contested by historians, as many reassert that the sanitary movement was well underway prior to any discoveries in bacteriological theory. However, analyzing the sanitary movement established a better idea of Victorian understanding of public health beyond the medical field. An example of this can be seen in Christopher Hamlin's *Public Health and Social Justice in the Age of Chadwick: Britain 1800-1854* (1998). Here, Hamlin reinforces the idea that the sanitary movement was not one that can be attributed to specific individuals. Instead, Hamlin focuses on Edwin Chadwick, one of the social bureaucrats who is most often recognized with instituting major urban sanitation and public health reforms, stating that he did not discover the sanitary science whose purpose was to reduce death and disease.⁵¹ Rather, he was able to employ a popular rejection of contagion understanding that was then largely adopted in Britain.

A deeper analysis of Victorian public health reformation illuminates a complicated relationship between the social history and scientific history of medicine. Historians such as Graham Mooney, Matthew Newsom Kerr, and Simon Szreter acknowledge the complexity of disease theory prior to the widespread acceptance of germ theory; however, application of this centers on infectious disease surveillance and intervention tactics by the state. This thematic approach to the history of medicine incorporates a political perspective alongside a historical one, and analyzes the legislative dimensions of disease notification, as well as subsequent resistance from contemporary radical liberals.⁵² The examination of London's hospital governments suggests that they operated as a power structure over citizens who came under their

⁵¹ Christopher Hamlin, *Public Health and Social Justice in the age of Chadwick: Britain 1800-1854* (New York: Cambridge University Press, 1998): 340.

⁵² Graham Mooney, "Public Health versus Private Practice: The Contested Development of Compulsory Infectious Disease Notification in Late-Nineteenth-Century Britain." *Bulletin of the History of Medicine* 73, no. 2 (1999): 241.

supervision, involuntarily or by choice.⁵³ Thus, the rise of the Metropolitan Asylums Board was not a product of changing understandings of disease theory, but rather a method to regulate the behaviour of the sick. These historians argue that the motives of social reformers were to reduce the feeling of emergency and crisis that accompanied the outbreak of infectious diseases, not to understand or treat them. The ability to analyze the history of medicine in this way was preceded by the work of other socio-political approaches to the history of medicine. Peter Baldwin's *Contagion and the State in Europe, 1830-1930* (1999) discusses the politics of prevention, the ideology that accompanies preventative strategies, and looks intricately at the processes of policy making. Here, a discussion of quarantinist (isolation) views vs environmental (cleanliness) views is explored. Identifying Britain as an environmentally driven state in their prevention of infectious disease, Baldwin opens the scholarship for historians to make these political connections between legislation, surveillance, and intervention.

In order to gain better insight into the effect of infectious diseases on overall public health, the analysis of mortality patterns in Britain was required. The failure of previous historians to include mortality patterns was corrected by a critical analysis that would establish a deeper understanding of the effects of infectious diseases in the Victorian era. Specifically, historian Anne Hardy analyzes these mortality patterns in *The Epidemic Streets: Infectious Diseases and the Rise of Preventive Medicine, 1856-1900* (1993). By doing so, she argues that the decline of infectious diseases did not begin mid-century, as historians had previously believed, but rather began as late as 1880. Hardy states how “the epidemiological record clearly suggests... that it was not better nutrition that broke the spiral of deaths from infectious disease after 1870, but intervention by preventative authorities, together with natural modifications in

⁵³ Kerr, *Contagion, Isolation, and Biopolitics*, 291.

disease virulence.”⁵⁴ Overall, historians agree that the work of social reformers aided in the decline of infection rates. However, by discussing the relationship between infectious disease and preventative efforts taking place in the domestic sphere, historians give a new recognition to previously unidentified players. Private hygiene and household management became the focus of these preventative efforts, and historians welcomed a new discussion of domesticity and medical theory.

The domestic sphere became a topic of interest for historians, as they were able to investigate medical intervention while applying a feminist approach, giving a voice to women and how the medical field affected them beyond the nursing occupation. Historians such as Nancy Tomes, Rachel Carr, and Ellen Singer-More adopt this feminist analysis and argue that germ theory piggybacked on sanitary measures that were already established in middle-class homes. Feminist theory discusses how the origins of germ consciousness transitioned from a strictly scientific investigation into a discourse understood within the household.⁵⁵ Here, attention shifts onto daily life, and a feminist perspective identifies and explores the burdens these sanitary measures placed on the lives of women. Feminist historians do not give credit to social reformers for inventing a new sanitary science, but instead argue that households were already equipped with a sanitary science that simply required reformation in order to improve their health, including addressing deficient plumbing, ventilation, and general housekeeping.⁵⁶

When researching nineteenth-century public health, early historians were primarily concerned with the living conditions and experiences of the different classes of the Victorian period. Historians such as John Burnett and Anthony Wohl consider the social and economic

⁵⁴ Anne Hardy, *The Epidemic Streets: Infectious Diseases and the Rise of Preventive Medicine 1865-1900* (Oxford: Oxford University Press, 1993): 293.

⁵⁵ Nancy Tomes, *The Gospel of Germs* (Massachusetts: Harvard University Press, 1998): 158.

⁵⁶ *Ibid*, 64.

factors attributed to each of the classes, using the study of food consumption or government policy regarding living conditions to illuminate a larger social history directly affected by the spike in population seen in London. This led to the discourse surrounding public policy and the housing of the working class. Approaches to public health established a new lens of urban history. Under this lens, a noticeable shift occurred where public policy transformed from *laissez faire* to a highly increased state of government intervention.⁵⁷ The history of public health began to incorporate a medical component into understanding complicated legislation surrounding public health. This emphasized the pressure placed on parliament to solve the housing problem that was occurring within the working-class population of London.⁵⁸ These historians agreed that population rise was a major cause for the various changes seen in public health standards that were initiated in the nineteenth century. How these changes were enacted and the effect they had on the community brought forward a discussion of the working-class experience and the rise of industrialism.

The working-class experience became a popular scholarship for historians, as it offered a ‘history from below’ perspective. Historians such as John Belchem and Kirsten Leng discuss this experience and reject the previous understanding that there was a consensus of values that were accepted regardless of class. Classes experienced different reforms.⁵⁹ As the working class was the most affected by infectious disease, analyses of how the state handled the working class, the overcrowding of the city, and the rise of these infectious diseases shed light on how the state targeted the working class as the cause of filth in the city. Protecting health became a social

⁵⁷ Anthony S. Wohl, *The Eternal Slum: Housing and Social Policy in Victorian London* (London: Edward Arnold, 1977): 47.

⁵⁸ *Ibid.*

⁵⁹ John Belchem, *Industrialization and the Working Class: the English Experience, 1750-1900* (Aldershot, Hants, England: Scolar Press, 1990): 99.

responsibility and the methods with which the state attempted to reform a demographic that could not afford to leave the city has become a heavily analyzed topic.⁶⁰

The process of modernization became of particular interest to historians of public health. Historians such as Tom Crook, Keir Waddington, and Richard A. McKay suggest that public health cannot at any time be attributed to specific people but is rather a complex group of shifting ideas amalgamated together. Public health in Britain became a modern system when public health seemed like a problem that was solvable by modern solutions.⁶¹ Under this framework, the Victorian concern with sanitation and infectious disease is argued as the basis upon which the modernizing process in medicine began.

Similar to surgery's transition to become its own specialized field in medicine, the history of surgery has become a scholarship apart from the history of medicine. Early historians of surgery describe the work of surgeons using romantic language.⁶² This established a narrative of individual struggle, exclaiming surgical 'genius' and heroism for surgeons who discovered or improved techniques in their field.⁶³ This was the result of a separation between physician and surgeon during the Middle Ages.⁶⁴ The field of surgery, which was originally written by historians as a rags to riches, barber-surgeon to brain surgeon tale, has recently undergone new research that contrasts this previous view of the profession.⁶⁵ Instead, an analysis of the use of surgery as a last-resort treatment in the nineteenth century has arisen. This primarily results from

⁶⁰ Institute of Medicine (US) Committee for the Study of the Future of Public Health (Washington: National Academies Press (US), 1988): 59.

⁶¹ Tom Crook, *Governing Systems: Modernity and the Making of Public Health in England, 1830-1910* (Berkeley and Los Angeles: University of California Press, 2016): 195.

⁶² Leo M. Zimmerman and Ilza Veith, *Great Ideas in the History of Surgery* (New York: Dover Publications, 1967), 7.

⁶³ *Ibid.*

⁶⁴ *Ibid.*, 2.

⁶⁵ *Ibid.*

an inability to control pain, bleeding, and infection when performing surgery. Throughout most of the nineteenth century, the endeavours of the surgeon were the treatment of fractures and injuries and the removal of lesions.⁶⁶ Physicians were equipped with the knowledge to perform surgical operations; however, surgeons were not equipped with the medical knowledge to advise and treat as a physician could and as such were not warranted to treat patients afflicted with ailments or malaise. Physicians could practice as surgeons, but surgeons could not practice as physicians.

Another common approach to the history of surgery is the making of modern surgery. Historians such as Thomas Schlich, Christopher Lawrence, and Michael Bliss use the history of surgery to suggest how mistakes and successes of the past have influenced how medical and surgical practice is understood and performed today. This approach typically includes an analysis of case study innovations that founded modern medicine as a whole, including the improvement of surgical techniques and the implementation of preventative strategies.⁶⁷ Within this discourse, historians have determined that surgery and medicine are inseparably integrated. Advancements in modern surgery in the nineteenth and twentieth century combine the two disciplines into an indivisible whole and have provided the foundation for medicine and surgery as it is practiced today.

This thesis offers an alternative approach to the study of the history of medicine as it focuses on diphtheria's impact within London during the pre-vaccination period and centers on tracheotomy as the treatment to address the particular symptom of asphyxiation in diphtheritic children. While studying diphtheria, many historians have chosen to focus on outbreaks that

⁶⁶ Harold Ellis and Sala Abdalla, *A History of Surgery: Third Edition* (Boca Raton, Florida: CRC Press, 2018): 47.

⁶⁷ Michael Bliss, *The Making of Modern Medicine: Turning Points in the Treatment of Disease* (Chicago: University of Chicago Press, 2011): 4.

occurred in locations other than London. Historian Michael Dwyer explores the anti-diphtheria campaign that resulted from fatal outbreaks of diphtheria in Ireland in the late nineteenth and early twentieth centuries in his book titled *Strangling Angel: Diphtheria and Childhood Immunization in Ireland* (2018). So too, historian Evelyn Maxine Hammonds explores the advances in immunology and bacteriology which occurred America in the late nineteenth and early twentieth centuries to treat and prevent diphtheria in New York City in her book titled *Childhood's Deadly Scourge: the campaign to control diphtheria in New York City, 1880-1930* (1999). Additionally, many historians, such as those mentioned above, focus their study on the immunization and post-vaccination period. This thesis offers an analysis of the pre-vaccination period in London and identifies the implications of risk and success through the increased need for tracheotomy in the saving of the lives of children in the nineteenth century.

Ultimately, this thesis investigates how the messiness of medical understanding, and its subsequent media coverage, showcased the risk and success factors of tracheotomy which influenced the acceptance and rejection of the operation within the medical profession and the middle-class public. I examine contemporary medical literature which provides insight into case experiences of practising physicians and illuminates how room for interpretation can sway understanding of disease and surgical theory. Additionally, I explore contemporary newspaper reports on diphtheria outbreaks through which I identify a shift in medical and middle-class opinion regarding the use of tracheotomy over a period of time.

In Chapter One, I will assess how tracheotomy was situated within nineteenth-century medical thought as a procedure used to treat the most severe symptom of diphtheria. In doing so, I will examine the ways in which physicians advocated for and against the operation, as tracheotomy's association with diphtheria's high mortality rate left those not entirely convinced

of the value of the operation even more room to doubt its efficacy. Additionally, I will examine how the apparent risk of performing a tracheotomy contributed to a lack of consensus within the medical field. I will explore how, despite this high mortality rate, key leading voices among medical circles continued to advocate for the use of the operation. In contrast, I will also examine the issues and insecurities opposing physicians presented when questioning the true value of tracheotomy in their own practices where they were required to treat diphtheritic children. As a result, I will argue that despite its risks and opposition, the efficacy of tracheotomy to be the most effective method of reopening the airway when diphtheritic children reached the point of suffocation allowed for its continued use throughout the nineteenth century.

This chapter draws on a number of primary source material including personal case notes, treatises, lectures, journal publications, as well as utilizing the Historic Hospital Admission Records Project (HHARP). The HHARP provides statistical information of four hospitals in Britain based on admission reports between 1852 and 1921. The database offers a number of fields which allows one to search case records based on variables including but not restricted to the particular hospital, age, gender, date of admission, disease name, and outcome. The database provides critical information that gives a general idea of how many children were being admitted to hospitals as a result of diphtheria. Information on whether tracheotomies performed within these hospitals can be found in case notes attached to the patient record. Unfortunately, only a portion of case reports available on the HHARP have case notes with further detail attached to them. In regard to this study, this is problematic as tracheotomies were solely recorded within the additional case notes, so it is possible that there were children who received tracheotomies that cannot be accounted for as there was no case note attached to their record. However, the

inclusion of some patient reports that contain case notes provides rich information into the practices found within the hospital walls.

In Chapter Two, I will analyze the influence of the contemporary newspaper market on urban middle-class opinion surrounding the outbreak of diphtheria in London. The Victorian newspaper press, and its readership, was extremely robust. With increasing literacy, newspaper titles, and faster distribution, the news had quickly become an essential part of everyday life.⁶⁸ The role of the press was continuously changing as it gained popularity among the British population. By the 1860s, social reformers were far more aware of the influence of the press and used it as a tool to identify areas of public concern and to express their views to the general public.⁶⁹ The press also acted as a platform for discussion of hot topics between members of the medical profession, social reformers, and the middle-class. This allowed the middle-class voice to gain agency in public health reformation. I will examine the way in which the tracheotomy was initially viewed as a surgical procedure and how this perception changed alongside newspaper representation of diphtheria as the outbreak spread and increased in virulence. Repeated coverage of concern surrounding infection rates suggests that there was a sustained discussion between the middle-class, medical professionals, and social reformers regarding the disease. As such, I will examine the shifting concern to emphasize and initiate preventative measures within the city to reduce the spread of infection among children. As a result, I argue that uncertainty within the medical field surrounding tracheotomy encouraged the employment of alternative measures in urban areas in an attempt to reduce the number of children infected

⁶⁸ Matthew Rubery, *The Novelty of Newspapers: Victorian Fiction after the Invention of the News* (Philadelphia: Oxford University Press, 2009): 3.

⁶⁹ Ed King, "British Newspapers 1860-1900." *British Library Newspapers* (Detroit: Gale, 2007): 2.

with diphtheria, ultimately reducing the number of children that may need to undergo a tracheotomy.

This chapter draws heavily on the British Newspaper Archive's (BNA) database, which provides access to thousands of newspaper publications which circulated within the United Kingdom between 1800 and 1950. For the purposes of this chapter, two newspaper titles, the *London Evening Standard* and the *Morning Post*, are particularly referenced. The *London Evening Standard* was first distributed in 1827 and was set up to compete against *The Times*. By 1859, the title had increased in popularity and an evening edition was printed.⁷⁰ The BNA provides access to 28,320 total issues of the *London Evening Standard* between 1827 and 1870. With earlier beginnings, the *Morning Post* was first published in 1772 and covered news from home and abroad and reported most notably on high society.⁷¹ The BNA provides access to 33,416 total issues of the *Morning Post* between 1801 and 1909. Both titles were conservative in orientation, with the *London Evening Standard* considered 'staunchly conservative'; the *Morning Post* faced similar critiques as it covered fashionable news and conservative politics and was considered a champion of conservatism for well over a century.⁷² It is important to note that these titles were targeted and read by middle-class and upper-class readers.⁷³ As London daily papers, their cost began at five pence, a price that the working class, and even some in the lower middle class, could not afford.⁷⁴ It was not until 1858 that the price of both titles eventually

⁷⁰ Alvar Ellegård, "The Readership of the Periodical Press in Mid-Victorian Britain: II. Directory." *Victorian Periodicals Newsletter* 13, no. 4 (1971), 4.

⁷¹ *Ibid.*

⁷² Wilfred Hindle, *The Morning Post, 1772-1937: A Portrait* (United Kingdom: George Routledge & Sons, 1937): 4.

⁷³ Ellegård, "The Readership of the Periodical Press", 4.

⁷⁴ Richard Altick, *The English Common Reader: A Social History of the Mass Reading Public, 1800-1900* (Columbus: Ohio State University Press, 1957): 348-349.

dropped to one penny, a price far more affordable for the general reading public.⁷⁵ The value of a narrow focus is that these titles provide insight into dominant concepts of medical intervention that focused on the conservative philosophy of paternalistic and religious approaches to medicine as covered in newspaper reports.⁷⁶ Thus, the reports found in these titles compliment the growing ideology held by the middle and upper classes which supported the eradication of filth to improve public health.⁷⁷ However, not all titles addressed events in this way and as such other titles are briefly referenced to provide further context of contemporary newspaper publications that were circulating within the period.

In the concluding chapter of this thesis, I will bring together the arguments of Chapter One and Chapter Two to show how misunderstanding the measures of success can directly influence the acceptance or rejection of a surgical procedure. Tracheotomy did not produce the outcome that physicians or parents wanted when used on diphtheritic children. It could not cure diphtheria. The true measure of success for tracheotomy meant reopening the airway. However, the misconstrued understanding of success resulted in detractors of the procedure within both the medical field and the urban middle class. The efficacy of the procedure was questioned, and alternative measures were implemented to avoid the need for tracheotomy. Regardless of these efforts to prevent the use of tracheotomy, diphtheria continued to infect children at alarming rates, and tracheotomy continued to be employed to do the job it was meant to do – reopen the airway.

Chapter One – Medical Debate surrounding Tracheotomy in the Treatment of Childhood Diphtheria

⁷⁵ Ibid, 354-355.

⁷⁶ Megan Coyer, “The Rise of Public Health in the Popular Periodical Press: The Political Medicine of W. P. Alison, Robert Gooch, and Robert Ferguson.” in *Literature and Medicine in the Nineteenth-Century Periodical Press: Blackwood’s Edinburgh Magazine, 1817-1858* (United Kingdom: Edinburgh University Press, 2017): 173

⁷⁷ Ibid, 172-173.

“When you find that your patient, whatever be the original disease – croup or diphtheria – is not improving by the treatment you have been adopting; when you find that effusion is going on to produce suffocation; when the tendency is to death by apnoea more than by exhaustion, then *you ought to step in and perform tracheotomy for the purpose of preventing immediate death*, [author’s emphasis] and so give longer time for the patient to live through the disease and ultimately throw it off.”⁷⁸

Before the outbreaks of the second half of the nineteenth century, diphtheria was a disease unknown to the physicians of Britain.⁷⁹ The pathology of the disease was not yet understood, and many were unsure how to approach treatment. The onset of asphyxiation in severe cases of diphtheria required an immediate treatment that could produce immediate results to prevent patient death. Tracheotomy was able to do so and thus employed by many physicians. From the above quote, leading contemporary physician George Buchanan presses upon his colleagues the importance and value of performing a tracheotomy, as it may afford the patient an extension of life. However, tracheotomy was difficult to perform and was fraught with risks that created a considerable lack of consensus within the medical field. Despite this, the diphtheria outbreaks in London required urgency for care, which allowed tracheotomy to be continuously performed. As cases of recorded tracheotomies increased, as well as new critiques and innovations, so too did dissension surrounding the operation. To trach, or not to trach, that was the question debated among nineteenth-century physicians who grappled with not only the care of such a vulnerable child population, but also with their medical skill, legitimacy, and authority.

Diphtheria outbreaks spread throughout the child population of London at an alarming rate. In treating this fatal symptom of diphtheria, physicians were limited in their treatment options to alleviate asphyxia. In order to soothe the suffering child from suffocation, many

⁷⁸ George Buchanan, *Abstract of a Lecture on the Operation of Tracheotomy: with Cases* (London: T. Richards, 1871): 4.

⁷⁹ Ernest A. Hart, *On Diphtheria: Its History, Progress, Symptoms, Treatment, and Prevention* (London: J. Churchill, 1859), 10.

physicians employed tracheotomy as a desperate, though effective, method to reopen the airway. Tracheotomy was a risky operation for physicians as it carried with it a high mortality rate, and this established a clear lack of consensus toward the operation among medical circles.⁸⁰ However, for Buchanan, tracheotomy provided more benefits in the treatment of diphtheria than risks and he promoted the use of the operation by showcasing his personal case notes to his medical colleagues.⁸¹ His experience with the operation and his repeated use and success with tracheotomy in cases of childhood diphtheria encouraged him to promote the benefits of the operation. Several other physicians also promoted the benefits of tracheotomy and advocated that it should always be exercised in cases of diphtheria cases when asphyxia presented in patients. Physician Charles West, founder of The Hospital for Sick Children, located on Great Ormond Street in London, encouraged physicians employed at the hospital to exercise tracheotomy when warranted in cases of diphtheritic children, as evidenced by surviving hospital records of patients.⁸² Physician Sir Morell Mackenzie, internationally recognized as a pioneer in laryngology, also wrote extensively of the benefits of employing tracheotomy in cases of diphtheria in his textbooks.⁸³ His influential textbooks contributed significantly to a greater dissemination of information about tracheotomy and the promotion of this procedure among practising physicians.⁸⁴

⁸⁰ Anne Hardy, "Tracheotomy Versus Intubation: Surgical Intervention in Diphtheria in Europe and the United States, 1825-1930." *Bulletin of the History of Medicine* 66, no. 4 (1992): 541.

⁸¹ Buchanan, *Abstract of a Lecture*, 1-12.

⁸² HHARP: the Historic Hospital Admission Records Project (<https://hharp.org>).

The Hospital for Sick Children first admitted patients in 1852 when child mortality rates were shockingly high in London. Today, it is known as the Great Ormond Street Hospital (GOSH) and is one of the world's leading children's hospitals.

⁸³ "Sir Morell Mackenzie (1837-1892)." *Nature* 140, no. 16 (1937).

⁸⁴ *Ibid.*

Despite the advocacy of tracheotomy by notable physicians, there existed pockets of resistance to its use. Physicians who opposed the use of tracheotomy argued that the operation was too risky. Tracheotomy did not cure diphtheria. There was no guarantee that tracheotomy would have a 100% success rate in extending the life of the child. This was because tracheotomy was a difficult procedure that required a significant amount of skill by the physician, whose efforts may ultimately be put to waste. The divide among tracheotomy supporters and detractors was reinforced by different understandings of disease theory. What physicians believed to be the cause of diphtheria influenced what treatment they administered. As well, high mortality rates in children post-operation made physicians question the true efficacy of tracheotomy.⁸⁵ Additional questions arose regarding the skills and qualifications necessary to allow for physicians to employ the operation.⁸⁶ If physicians did choose to operate, there were multiple complications that could arise in the aftercare of tracheotomy that were easily avoided by refraining from operating. In addition, the rise of intubation in the late 1880s offered physicians a possible alternative to tracheotomy that was far less invasive and proved to produce lower mortality rates.⁸⁷ A clear lack of medical consensus existed surrounding tracheotomy due to the mortality rates associated with its use in diphtheritic children. Supporters of tracheotomy understood the true purpose of the operation and thus promoted its use to halt suffocation in diphtheritic children. Rejectors opined that the operation did not have a 100% success rate, with many cases resulting in death following the procedure and leaving room to doubt its overall value. In examining the intense debate among supporters and detractors of this procedure, I will argue that

⁸⁵ Robert Parker, "Tracheotomy in Children: Why Unsuccessful?" *Transactions. Medico-Chirurgical Society of Edinburgh* 34, no. 5 (1888): 410.

⁸⁶ Alexander Thom, "Tracheotomy in Children: Why Unsuccessful?" *Transactions. Medico-Chirurgical Society of Edinburgh* 7 (1888): 240.

⁸⁷ George H. Mackenzie, *Intubation of the Larynx in Laryngeal Diphtheria: with Notes of Fifteen Cases* (Edinburgh: Oliver & Boyd, 1892): 3.

this lack of consensus demonstrates how risk has a critical role in the medical decision-making process and how measures of success significantly affected the use of tracheotomy despite its benefits in treating diphtheritic children.

2.1 Treatment Options

During the nineteenth century, physicians exercised a number of different treatment options in order to identify which were most effective in reducing symptoms of infectious disease in children. At this time, many physicians would test a variety of treatments in order to determine which treatments were best suited to their needs, their skills, and the demands of the various patient cases they treated. A physician's understanding of disease causation or patient symptoms shaped which treatments they chose to administer. Medical and surgical periodicals experienced a great proliferation during the Victorian era, keeping physicians informed of current and changing scientific knowledge in addition to the conferences and meetings that were held which acted as venues for professional debate amongst members of the medical profession.⁸⁸ As new information surrounding medical knowledge and treatment was disseminated through medical journals and personal networks, physicians were able to adjust their treatment plans with increased frequency. If physicians were experiencing high mortality rates, whether due to the use of highly contested methods or a lack of effective treatment altogether, they had to be prepared to defend their choice of treatment plan to maintain patient and community trust.

Before the outbreaks of diphtheria in the second half of the century, other infectious diseases, such as cholera and scarlet fever, were prevalent in London.⁸⁹ As such, a standard

⁸⁸ Jeanne M. Peterson, "Specialist Journals and Professional Rivalries in Victorian Medicine." *Victorian Periodicals Review* 12, no. 1 (1979): 26.

⁸⁹ Hardy, *The Epidemic Streets*, 1.

treatment plan was established by physicians which generally treated most infectious diseases, including diphtheria, based on contemporary understandings of disease theory.⁹⁰ This treatment plan was divided into 4 steps, each of which were applied based on the severity of the disease in each patient. The first step of treatment was hygienic treatment. Physicians would isolate the patient to a separate room, ensuring the space had good ventilation and an even temperature, and would use a steaming kettle to keep the air moist.⁹¹ These efforts satisfied one of the dominant disease theories of the century, miasma theory. Miasma theory required the removal of noxious air that may be causing the disease and its replacement with fresh air.⁹² Often grouped with the first step of treatment, the second step was constitutional treatments. Once hygienic treatments were established, physicians would determine and administer the appropriate amount of alcohol and nourishing foods to maintain the physical health of the patient.⁹³ If the infection became more severe, the next step was to apply local treatments, including solvents, antiseptics, and escharotics, to the affected area. For diphtheria, this meant applying these treatments to the growing pseudo-membrane on the tonsils and along the tracheal wall.⁹⁴ Finally, if all other treatments failed to subdue the infection and symptoms became critical, symptomatic treatments, consisting mainly of surgical intervention, would be employed.⁹⁵ Each heading required more

⁹⁰ There were many disease theories during the nineteenth century, many of which overlapped and made medical understanding far more difficult. The two dominant theories of the century were miasma theory, the belief that noxious or foul air cause disease, and germ theory, the belief that microorganisms cause disease.

⁹¹ Nestor I. C. Tirard, and E. Quin Thornton, *A Textbook of the Medical Treatment of Diseases and Symptoms* (Philadelphia: Lea Brothers & Co., 1900), 503.

⁹² Lolita Petrova Nikolova, "Miasma Theory of Disease." in *Encyclopedia of Consumption and Waste: The Social Science of Garbage*, edited by Zimring, Carl A., and William L. Rathje (Thousand Oaks, CA: SAGE Publications, Inc., 2012): 540-541.

⁹³ *Ibid.*

⁹⁴ *Ibid.*

⁹⁵ *Ibid.*

knowledge and skill than its predecessor, and as such, the possible risks in providing these treatments grew with each heading.

For many physicians, hygienic and constitutional treatments were the answer for diphtheria, as early Victorian understanding of disease was rooted in miasma theory.⁹⁶ As a result, foul air and insufficient space were understood as the source of infection. Providing the child with a warm bed, plenty of ventilation, and a restricted diet became the commonly practiced course of action, as physicians believed they were dealing with the infection directly.⁹⁷ If symptoms became more severe and progressed beyond the abilities of hygienic and constitutional treatment, only then would physicians exercise local treatment by adding the use of branded lozenges or cocktails of acids to soothe the sore symptoms of the throat.⁹⁸

For most, if the child was unable to recover after being administered these treatments, there was little more that could be done noninvasively. Unfortunately, symptoms of infection could change and rapidly progress from mild to severe, and children were highly susceptible to succumbing to the disease rather than recovering from it. If the disease progressed beyond mild or moderate, hygienic, constitutional, and even local treatments became insufficient. Surgical intervention was the only option to address the most severe symptom of diphtheria, which was trachea obstruction leading to patient suffocation. Performing an invasive surgical procedure offered the opportunity to treat and calm the most severe symptoms, which in turn allowed

⁹⁶ Ibid.

⁹⁷ Tirard and Thornton, *A Textbook of Medical Treatment*, 504.

⁹⁸ Roy Porter, *Health for sale: Quackery in England, 1660-1850* (Manchester: Manchester University Press, 1989), 200.

There were many physicians who attempted to sell their own medical inventions and cures so as to garner more business and establish themselves as experts of the disease. They were often medical gimmicks and offered little in the way of actually treating the symptoms of the disease.

physicians to once again employ hygienic, constitutional, and local treatments, acting as a support for the body in its fight against the disease.

The most severe symptom of diphtheria physicians frequently had to address was suffocation caused by the pseudo-membrane. With the obstruction stemming from the trachea, it was difficult for physicians to remove the pseudo-membrane through the mouth. As such, an invasive surgery was necessary in order to directly access the site of infection within the trachea. Tracheotomy was thus employed to open the trachea, remove the obstruction, and provide immediate relief at the reopening of the airway. Tracheotomy was considered a risky surgical procedure, especially when performed on children, and its efficacy on diphtheritic children became controversial.⁹⁹

The use of tracheotomy precedes the diphtheria outbreaks of the nineteenth century with recorded performance of this operation dating back to approximately 2000 BC.¹⁰⁰ Historically, tracheotomy has come in and out of use, abandoned during the Middle Ages and reappearing throughout the Renaissance.¹⁰¹ Between 1600 and 1800, the operation was employed relatively infrequently, and it was not until the early 1810s, when the diphtheria epidemic spread throughout France, that the use of the operation gained significant traction. Prior to this, tracheotomy was performed in emergency cases only.¹⁰² This included suffocation from foreign

⁹⁹ Hardy, "Tracheotomy versus Intubation", 538.

¹⁰⁰ Peter Szmuk et al., "A Brief History of Tracheostomy and Tracheal Intubation from the Bronze Age to the Space Age." *Intensive Medical Care* 34, no. 2 (2008): 222.

¹⁰¹ J.J. Watkinson, M.N. Gaze, and J.A. Wilson, "Tracheostomy," *Stell and Maran's head and neck surgery, 4th edn.* (Butterworth Heinemann, 2000): 153–168, as cited in Szmuk et al, "A Brief History," 223.

In a rare mention of tracheotomy in the thirteenth century, the operation is described as a "semi-slaughter and a scandal of surgery," offering a possible explanation as to why the operation was abandoned during this period.

¹⁰² *Ibid*, 225.

objects, and instances of drowning.¹⁰³ However, the clear benefits of the operation to halt asphyxiation in cases of childhood diphtheria increased its use during the epidemic in France. French physician Armand Trousseau, an avid supporter of tracheotomy in cases of childhood diphtheria, performed the operation frequently, and in doing so granted himself the title of one of the leading physicians in the operation.¹⁰⁴ With Trousseau advocating for the operation, tracheotomy became a standard tool in treating asphyxia in severe cases of diphtheria. British physicians soon adopted the procedure thereafter when battling diphtheria outbreaks during the 1850s.

By definition, tracheotomy is the surgical procedure of opening the trachea through the neck to allow the passage of air disrupted by an obstruction.¹⁰⁵ The operation requires a great deal of skill, especially in its use on diphtheritic children. To begin, the patient is put under the influence of chloroform which acts as an anaesthetic to prepare for the operation.¹⁰⁶ The application of chloroform was in itself dangerous if not administered with diligence.¹⁰⁷ However, in many cases, physicians have recorded cases where they did not employ any sort of anaesthesia as the symptoms of apnoea were so severe that the patient was not at risk of feeling any pain from the operation.¹⁰⁸ Once the patient is prepared, the incision is made in the neck from half an inch below the cricoid cartilage, located below the epiglottis and thyroid cartilage, and just above

¹⁰³ Ibid.

¹⁰⁴ Opinel, "French 19th Century," 173.

¹⁰⁵ "Tracheotomy," Merriam-Webster. Accessed April 15, 2021.

<https://www.merriam-webster.com/dictionary/tracheotomy>

¹⁰⁶ Buchanan, *Abstract of a Lecture*, 5.

¹⁰⁷ C. Ball, and R.N. Westhorpe, "The first controversy over monitoring in anaesthesia." *Anaesthesia and Intensive Care* 36, no. 2 (2008): 141.

Many cases where chloroform was administered ended in fatality resulting from the chloroform, not the operation or the disease.

¹⁰⁸ Lloyd G. Stevenson, "Suspended Animation and the History of Anesthesia." *Bulletin of the History of Medicine* 49, no. 4 (1975): 486.

the trachea.¹⁰⁹ It is important for physicians to be precise in the length and strength of the incision, so as to make only one cut into the neck and to penetrate both the skin and the cellular tissues. The layers of skin and tissue are then to be divided and pulled aside, and a straight incision is then made into the trachea.¹¹⁰ Physicians must also be prepared to stanch the bleeding, as many cases of tracheotomy are accompanied by haemorrhaging.¹¹¹ Once the incision into the trachea is completed and bleeding has been stopped, the patient will feel immediate relief from suffocation and the physician may begin to remove the membrane which had caused the obstruction. Physicians must then employ one of many methods to remove the membrane, each requiring a different set of skills. One method is to pull the membrane away from the lining of the trachea with forceps.¹¹² Another is the use of a feather passed into the trachea and twirled so as to loosen the membrane and entangle it in its barbules.¹¹³ Once the mucous membrane is removed, physicians must determine which canula size most suits the patient, and it is then inserted and secured in place to maintain the open airway. Tracheotomy requires a complex set of surgical skill that grants physicians little room for mistakes.

In combination with these complex skills, there are many instruments physicians would have had to acquire and master the use of in order to perform a successful tracheotomy. A bistoury (a surgical knife with a long, narrow blade) was necessary to make the incision into the skin, tissue, and trachea.¹¹⁴ Forceps were a necessary tool to pull back the layers of the skin and

¹⁰⁹ Robert Parker, *Diphtheria: Its Nature and Treatment: with Special Reference to the Operation, After-Treatment, and Complications of Tracheotomy* (London: H. K. Lewis, 1891): 78-80.

¹¹⁰ Ibid, 94.

¹¹¹ Ibid, 94-95.

Arterial haemorrhaging may be tied off and venous haemorrhaging stops almost as soon as breathing is re-established.

¹¹² Albert Sanné, *A Treatise on Diphtheria: Historically and Practically Considered; Including Croup, Tracheotomy and Intubation*. trans. by Henry Z. Gill (St. Louis: J. H. Chambers & Co., 1887): 514.

¹¹³ Parker, *Diphtheria*, 97.

¹¹⁴ Sanné. *A Treatise on Diphtheria*, 508.

tissue, and a second pair were recommended to pull away the false membrane.¹¹⁵ A trachea dilator was argued by many physicians to be a helpful tool, as it keeps the incision open and acts as a stand-in assistant to the physician when there was not one actually present.¹¹⁶ The use of this dilator would free one of the hands of the operating physician and allow for the more precise insertion of the next necessary tool, the canula tube. A canula tube is one of the vital pieces of the operation, as this is the instrument that sustains a clear passage for airflow. There were many variations of the canula tuba as they all differed in length and angle depending on the manufacturer. One of the more popular canula tubes among physicians was the Lürer tube with a moveable collar.¹¹⁷ The added benefit of the moveable collar was that the opening remained in place but as the patient moved their neck and subsequently their larynx, the tube would adjust so as not to cause the patient discomfort.¹¹⁸ Physicians had to filter through these surgical instruments from the wide number of manufacturers attempting to stake their claim in the medical market in order to find those that best suited their needs and the needs of the patient. They also had to familiarize themselves with the use of these tools and become proficient in their use in order to combine the tools and skills together to perfect the operation and ensure success. Confidence in their knowledge and skill of tracheotomy often determined whether they employed it in their practice.

The question of when to perform a tracheotomy in cases of diphtheria became extremely important during the diphtheria outbreaks. Although timing was continuously argued within

¹¹⁵ Ibid, 514.

¹¹⁶ Parker, *Diphtheria*, 90.

¹¹⁷ Parker, *Diphtheria*, 87.

Mike Cadogan, "Hermann Adolph Wülfing-Lürer," LITFL Medical Eponym Library, accessed April 11, 2021, <https://litfl.com/hermann-adolph-wulfing-luer/>

Wülfing-Lürer was a German surgical instrument manufacturer.

¹¹⁸ Parker, *Diphtheria*, 90-92.

medical circles, the ongoing understanding of when to employ the operation was as such, "... tracheotomy is indicated in all cases of increasing and persistent dyspnoea, due to mechanical obstruction in the larynx and upper part of the trachea."¹¹⁹ As well, when the chest-wall recedes during inspiration and there is laboured breathing causing the abnormal movement of larynx, tracheotomy should be employed.¹²⁰ Questions of whether cases could arise which contradict this understanding were frequent; could the disease progress to a state where a physician may refuse to operate?¹²¹ Could a child be too young to operate on?¹²² Tracheotomy was known by medical men to be a risky operation and physicians were concerned for their success in its performance. In response to this concern, physician and notable advocate for the use of the operation, Charles West remarked, "many of the deaths after tracheotomy are, strictly speaking, far from being instances of failure."¹²³ For West, the benefits of the operation far outweighed the risks, and any subsequent deaths following the operation were caused from the disease itself, not from tracheotomy. This distinction was integral to the discourse surrounding the use of tracheotomy, acting as a pillar for pro-tracheotomy supporters.

Ultimately, the role of tracheotomy is to reopen a blocked airway. In severe cases of diphtheria, many physicians argued that tracheotomy was able to produce the result it was intended to accomplish. Tracheotomy was not intended to cure the body of the infection. Because of this, the blood poisoning caused by diphtheria was not addressed by the employment of tracheotomy, and the infection could progress further. Many believed that tracheotomy failed as a cure to save diphtheritic patients as diphtheria's ability to cause blood poisoning by toxin

¹¹⁹ Ibid, 73-74.

¹²⁰ Ibid, 74-75.

¹²¹ Ibid, 74.

¹²² Ibid.

¹²³ Ibid.

was only identified by English physicians in the 1860s.¹²⁴ Despite having identified the diphtheria toxin, early naysayers of the operation had already imposed a negative reputation onto tracheotomy.¹²⁵ Although many physicians attempted to remove this reputation and promote its value instead, medical circles remained contentious on the subject.

2.2 Advocating in Favour of Tracheotomy

Primarily led by notable physicians George Buchanan, Charles West, and Sir Morrell Mackenzie, a dominant school of thought in British medical circles proposed tracheotomy as possessing more advantages than disadvantage in the treatment of diphtheritic children. Buchanan, West, and Mackenzie attributed the reduction of mortality in diphtheritic children in part due to their use of the operation, their educational advice on the proper techniques in performing the operation, and their influence upon medical colleagues to follow their directives. For supporters of tracheotomy, the value of the operation was two-fold: the operation had the ability to extend the life of the patient, or it could provide the patient with a euthanasia that would free them from suffering a painful death. The operation's ability to relieve the patient was imperative to supporters of tracheotomy, and they were fervent in encouraging their medical colleagues to employ it in cases of asphyxia in diphtheritic children.

Scottish physician George Buchanan was highly praised during his medical practice in Glasgow and Edinburgh, which opened opportunities for him to extend his practices into London.¹²⁶ Once in London, Buchanan became highly influential and was appointed consulting physician at the London Fever Hospital.¹²⁷ Throughout his work, Buchanan recorded detailed

¹²⁴ Hardy, "Tracheotomy Versus Intubation," 543.

¹²⁵ Mackenzie, *Diphtheria; its Nature and Treatment*, 95.

¹²⁶ "Sir George Buchanan," Royal College of Physicians. Accessed April 14, 2021.

<https://history.rcplondon.ac.uk/inspiring-physicians/sir-george-buchanan>

¹²⁷ Ibid.

case notes of the patients he treated, many of which were children infected with diphtheria. As an active supporter of the use of tracheotomy, Buchanan exercised the operation in virtually all cases of childhood diphtheria that were presented to him.¹²⁸ As such, he reported a steady recovery rate of approximately 30%.¹²⁹ That was nearly 5% greater than the results of French physicians performing the operation decades earlier.¹³⁰ Given his success with tracheotomy, Buchanan was resolute in his recommendation of utilising the operation to afford the patient a chance at life. He once stated, “in a case of immediate danger of death by suffocation, the [physician] is not only warranted, but called on from motives of humanity, to give the patient the chance of life by performing tracheotomy.”¹³¹ In his opinion, it was immoral to withhold the operation, as the child would be destined for death if not exercised. Buchanan’s success proved that tracheotomy had the capability to reverse the most severe symptom of diphtheria and extend the patient’s life long enough that there was opportunity for them to recover.

In 1863, Buchanan recorded his being called to care for a young child, only 14 months of age, afflicted with the most severe symptoms of diphtheria.¹³² Suffocating in front of the eyes of Buchanan and its parents, the child was in desperate need of immediate care. At this point of the disease, hygienic, constitutional, and local treatments were no longer sufficient. Initially opposed to tracheotomy, the father had not granted Buchanan approval to perform the operation.¹³³ In an effort to convince the father, Buchanan outlined the dangers of tracheotomy, but also confirmed the sureness of death without its use.¹³⁴ He explained how with approval to perform the

¹²⁸ Hardy, “Tracheotomy Versus Intubation,” 541.

¹²⁹ Ibid.

¹³⁰ Ibid.

¹³¹ George Buchanan, *Tracheotomy in Croup and Diphtheria* (Glasgow: Willian Mackenzie, 1863): 11.

¹³² Ibid, 5.

¹³³ Ibid.

¹³⁴ Ibid.

operation, he could sooner soothe the child's pain. Seeing his child in such pain, the father agreed to allow Buchanan to operate and tracheotomy was quickly performed.¹³⁵ Upon opening the trachea, the child experienced immediate relief and was breathing with considerable ease.¹³⁶ Buchanan was thus able to remove a large amount of the leathery mucous building up in the child's throat. After this operation, Buchanan employed constitutional treatments once again, allowing a restricted diet of beef tea and milk, and the child was seemingly recovering.¹³⁷ However, the child's heart rate quickened considerably, and despite the open airway, the child was presenting symptoms of a lack of aeration to the blood.¹³⁸ The child died 16 hours after the operation.¹³⁹ In this case, the child's cause of death resulted from this lack of aeration in the blood. The opening in the trachea remained free from obstruction, and so suffocation from obstruction of the trachea was not possible.¹⁴⁰ In one year, Buchanan recorded 7 of the 21 tracheotomies he had performed on diphtheritic children as successful, the children having fully recovered.¹⁴¹ Throughout his medical career, Buchanan believed in the value of tracheotomy to relieve not only the child from their physical pain but also their parents from the emotional pain of seeing their child suffer.¹⁴²

The timing of tracheotomy became of great importance as the operation was not warranted beyond symptoms of asphyxia. The emergency that accompanied severe cases of diphtheria caused many physicians to consider tracheotomy as a last resort treatment. As such, the role of the operation became convoluted. It transformed from one that treats a symptom of

¹³⁵ Ibid.

¹³⁶ Ibid.

¹³⁷ Ibid.

¹³⁸ Ibid.

¹³⁹ Ibid.

¹⁴⁰ Ibid.

¹⁴¹ Ibid, 1-13.

¹⁴² Ibid, 11.

diphtheria to one that was expected to cure the infection. However, Buchanan did not misconstrue the true purpose of the operation and encouraged his colleagues to remember that the role of tracheotomy was to reopen the airway.¹⁴³ If the child was able to reinspire breathing, the operation must be considered a success. By this consideration of success, Buchanan argued that many of the cases he treated were successful, including those where the child ultimately died.¹⁴⁴

During the nineteenth century, the understanding of childhood and the treatment of children transformed.¹⁴⁵ Pediatric medicine was emerging as a specialism and children were to be cared for in new ways more suited to their needs.¹⁴⁶ Charles West, considered one of the founding fathers of British pediatrics, believed that there was a fundamental difference between the child's body and the adult's body, and they should be treated accordingly.¹⁴⁷ He saw children as "individuals who had characteristics and needs that were different from those of adults and who therefore required a different kind of care."¹⁴⁸ Based on his theory, West founded The Hospital for Sick Children in 1852, later renamed the Great Ormond Street Hospital (hereafter GOSH), the first of its kind in London to specifically admit and treat sick children.¹⁴⁹

With diphtheria outbreaks occurring throughout the child population of London, many of the patients admitted to the GOSH were infected with this same disease. It has been noted that,

¹⁴³ Buchanan, *On Tracheotomy in Diphtheria*, 1.

¹⁴⁴ *Ibid*, 7.

¹⁴⁵ Peter Stanley, *For Fear of Pain: British Surgery, 1790-1850* (New York: Editions Rodopi B. V., 2003): 242.

¹⁴⁶ *Ibid*, 245.

¹⁴⁷ Katharina Boehm, "'A Place for More than the Healing of Bodily Sickness': Charles Dickens, the Social Mission of Nineteenth-Century Pediatrics, and the Great Ormond Street Hospital for Sick Children." *Victorian Review* 35, no. 1 (2009): 156-157.

¹⁴⁸ Leticia Fernández-Fontecha Rumeu, "Little Patients: Photography and the Configuration of the Sick Child in Victorian Britain." in *Childhood, Literature and Science: Fragile Subjects*, ed. Jutta Ahlbeck, Paäivi Lappalainen, Kati Launis and Kirsi Tuohela (London: Routledge, 2017): 116.

¹⁴⁹ *Ibid*, 112.

“most of the patients at Great Ormond Street were the children of the poor...”.¹⁵⁰ Given the economic status of those admitted to the GOSH, few children would have received professional medical care prior to their admission to the hospital. As such, many of these poor children were admitted at the later, more severe stages of diphtheria.¹⁵¹ This meant that children admitted with diphtheria often entered as emergency cases. As suffocation was so swiftly present in these severe cases, these diphtheritic children would require the immediate attention of the medical staff at the hospital.

From its opening in 1852 to the end of the century, the GOSH saw more than 2000 children admitted for diphtheria.¹⁵² The hospital was overwhelmed with growing cases of children admitted for diphtheria. When the infection presented asphyxiation, West encouraged the use of tracheotomy and in most cases, the procedure succeeded in providing an alternative airway to counter tracheal obstruction by membrane growth in diphtheria-stricken patients.¹⁵³ The patients who underwent a tracheotomy were often at a critical junction, for with the operation offered a chance to prolong life; some patients died hours after the operation from recurring suffocation or blood poisoning, while other patients recovered completely.¹⁵⁴ There were multiple physicians working at the hospital who performed tracheotomies on their patients. Frederick Marsh was one physician who admitted multiple children to the hospital for diphtheria and performed tracheotomies on these patients.¹⁵⁵ Likewise, physicians John Smith, Timothy Holmes, Robert Parker, and William Dickenson performed tracheotomies on diphtheritic

¹⁵⁰ Ibid, 116.

¹⁵¹ HHARP: the Historic Hospital Admission Records Project (<https://hharp.org>).

¹⁵² Ibid.

¹⁵³ Hardy, “Tracheotomy Versus Intubation,” 546.

¹⁵⁴ HHARP: the Historic Hospital Admission Records Project (<https://hharp.org>).

¹⁵⁵ Ibid.

children at GOSH.¹⁵⁶ Buchanan also performed tracheotomies at this hospital. Clearly, tracheotomy was an operation used to treat severe cases of diphtheria in both private practice and in hospitals.

Eager to bolster a new surgical specialism, laryngologists supported tracheotomy.¹⁵⁷ Sir Morrell Mackenzie, considered the most renowned otorhinolaryngologist in England, popularised laryngology as a specialism in the field of medicine, and his writings became widely read and referenced in Britain.¹⁵⁸ His support of tracheotomy also propagated the operation within some medical circles. Early on, Mackenzie established himself as a physician particularly interested in diseases of the throat.¹⁵⁹ During his medical career, Mackenzie founded many medical institutions, emerging as a renowned teacher, and was also considered a notable writer, affording him notoriety in the medical field.¹⁶⁰ His popularity aided in his service being hired by Queen Victoria and other members of the government and aristocracy.¹⁶¹ Published in 1879, Mackenzie's treatise titled *Diphtheria; its Nature and Treatment, Etc.*, goes into great length to discuss the value of tracheotomy in treating asphyxiation in diphtheria. He states that, "considering the enormous mortality of laryngeal diphtheria, even the most unfavourable figures prove that in such cases tracheotomy is not only justifiable, but that it is a positive duty."¹⁶² For

¹⁵⁶ Ibid.

¹⁵⁷ J. Montgomery, and A. Robertson, "Vapours, gargles, darts and bougies: Victorian ENT treatments." *The Journal of Laryngology and Otology* 126, no. 11 (2012): 1159.

Kamrul Tarafder, "History of Laryngology". *Bangladesh Journal of Otorhinolaryngology* 22, no. 1 (2020): 1.

Laryngology was in its infancy in the nineteenth century. The discovery of the mirror laryngoscopy is given to Manuel Garcia in 1854 and set forth a new popularity in the specialism of laryngology.

¹⁵⁸ Ashraf Yakoot, "The Glory Days of Laryngology." *The Egyptian Journal of Otolaryngology* 29, no. 3 (2003): 224.

¹⁵⁹ "Sir Morell Mackenzie." *Arch Otolaryngol* 83, no. 2 (1966): 176.

¹⁶⁰ Ibid, 181.

¹⁶¹ Ibid, 178.

¹⁶² Mackenzie, *Diphtheria; its Nature and Treatment*, 95.

Mackenzie, the high mortality rates did not excuse the use of tracheotomy in the later stages of diphtheria. In fact, he goes on to state that,

“Probably not more than 10 per cent. of the patients recover under suitable treatment without tracheotomy. In this country tracheotomy is, comparatively, so little practiced in croup – in proportion to the number of cases – that nearly all the remainder prove fatal. If, however the remaining 90 per cent. were tracheotomized, 66 per cent. might recover according to the most favourable statistics...”¹⁶³

Mackenzie denounced the negative reputation that tracheotomy had received from opposing medical circles. He disagreed with their position that the early employment of the operation does not facilitate a higher chance of recovery for the patient.¹⁶⁴ Instead, he countered the notion by stating that tracheotomy should be employed as soon as it is clear that it is not possible to relieve asphyxia by other means.¹⁶⁵ If his advice was followed, he argued that tracheotomy had the highest possible chance of extending the patient’s life.

Mackenzie positioned himself as strong supporter of tracheotomy and its ability to provide a better chance of recovery for the patient as well as its value in cases where recovery was not possible. Similar to Buchanan, Mackenzie suggested to his medical colleagues to employ the operation in instances where it is confirmed that the child is going to die, simply to reduce their pain from suffocation. He believed that death from syncope or general exhaustion was far less painful than death from apnoea, and that the child should be provided an opportunity for a much easier death.¹⁶⁶ Thus, tracheotomy’s value went beyond its ability to extend the child’s life. In cases of diphtheria where death was inevitable, tracheotomy was able to provide the child immediate relief to fall into a more peaceful death, serving as treatment for suffocation, not a cure for the disease.

¹⁶³ Ibid, 89.

¹⁶⁴ Ibid, 95.

¹⁶⁵ Ibid.

¹⁶⁶ Ibid, 96.

2.3 Resisting the Use of Tracheotomy

While many physicians supported the use of tracheotomy, other physicians contested the use of this procedure in diphtheria-stricken patient cases. There were several reasons why some physicians resisted the use of tracheotomy. First, the mortality rate for diphtheritic children who had received the operation was high, with even skilled and experienced physicians recording high mortality rates.¹⁶⁷ Where advocates believed tracheotomy's mortality rate was proof of its efficacy, the high rate of death made some physicians question whether they were fit to perform the operation.¹⁶⁸ Second, there were many complications that could arise following the procedure during aftercare. Extended care for the patient following the operation was not a widely studied subject, as many physicians viewed tracheotomy as a marked end to treatment.¹⁶⁹ Often times, following the operation, there was no special aftercare or continued treatment provided.¹⁷⁰ Third, given the contentious debate surrounding tracheotomy, some physicians sought an alternative to the operation in order to address asphyxiation. The re-emergence of intubation in the 1880s became that alternative. A comparison of the benefits and risks of the two operations turned many physicians in favour of intubation. However, tracheotomy remained a viable operation for many practicing physicians and as such continued to be met with intense opposition in its use to treat diphtheritic children until the end of the diphtheria outbreaks in London.

Contemporary medical literature published unsuccessful cases of diphtheria and tracheotomy frequently.¹⁷¹ Some physicians who were reporting high numbers of unsuccessful cases were gaining a sense of discouragement. For example, in 1888, physician Alexander Thom

¹⁶⁷ Hardy, "Tracheotomy Versus Intubation," 541.

Throughout the 1860s, George Buchanan was producing a steady mortality rate of approximately 70%.

¹⁶⁸ Thom, "Tracheotomy in Children," 235-244.

¹⁶⁹ Hardy, "Tracheotomy Versus Intubation," 545.

¹⁷⁰ Ibid.

¹⁷¹ Parker, "Tracheotomy in Children," 410.

wrote into *Transactions: Medico-Chirurgical Society of Edinburgh* of his doubts in exercising tracheotomy and questioning his own ability to provide the operation to diphtheritic children. In his medical career, Thom had performed tracheotomy in seven cases of infected children.¹⁷² All seven cases proved fatal.¹⁷³ In his remarks, he found that early treatments that were agreed upon within the medical community, such as hygienic and constitutional treatments, were insufficient in preventing the disease from reaching the point where a tracheotomy was required.¹⁷⁴ Thom feared that his lack of success in these seven cases was the result of his own ability. Unsure of his work in the medical profession, he published his concern, asking “am I justified, with such a record, in continuing to perform the operation as a last resource, or even as a temporary relief, to prevent death by suffocation?”¹⁷⁵ Thom claims that in his experience and after reading the textbooks and treatises written by trusted physicians, he had never seen a case recover when the disease had reached the state he had seen when he performed those seven tracheotomies.¹⁷⁶ Should cases similar to his be the kind in which tracheotomy was almost certainly necessary, perhaps not all physicians were entitled to exercise the operation. Unsuccessful cases in tracheotomy made physicians question their own skill.¹⁷⁷ Recording high mortality rates, physicians began to resist the use of tracheotomy within their own care.

In addition to the risks involved in the performance of the operation, there were also postoperative risks that followed tracheotomy. These included complications in recovery from a wound of the neck and throat, and a want of proper aftercare. Although all diphtheritic children

¹⁷² Thom, “Tracheotomy in Children,” 235.

¹⁷³ Ibid.

¹⁷⁴ Ibid.

¹⁷⁵ Ibid, 239.

¹⁷⁶ Ibid.

¹⁷⁷ Ibid, 240.

Thom published himself publicly questioning his ability to perform tracheotomy asking, “Does the fault lie in the unskilful performance of the operation?”

were susceptible to postoperative risks, working-class children were most susceptible. Many of the patients that physicians were called to treat were from poor families, found in poor living conditions and were undernourished.¹⁷⁸ As such, children of the working-class required far more attention after the operation was completed that was not always available to them. When it was discovered that postoperative complications were becoming more frequent following tracheotomy, the efficacy of the operation became a much greater problem beyond its application – initially, many believed that tracheotomy marked the end of their care for the patient.¹⁷⁹ After a tracheotomy, diphtheritic children were still susceptible to infection at the opening of the trachea. Despite the membrane having been removed, diphtheritic infection presented at the wound in multiple cases.¹⁸⁰ The opening of the trachea required at least four consecutive days of cauterization as a means to prevent this infection.¹⁸¹ There was also concern for the loss of life due to an absence of recuperative powers. The wound from the incision often showed no sign of healing in these undernourished children.¹⁸² These children were more likely to succumb to the disease regardless of the application of stimulants.¹⁸³ Their bodies were weak prior to infection and these children often died of exhaustion resulting from the disease.¹⁸⁴

For physicians who treated patients at home, adequate care after performing tracheotomy was virtually unavailable.¹⁸⁵ There was a general want of care as trained nurses were not readily available, nor could they be devoted to care for one child for an extended period after

¹⁷⁸ Robert Parker, *Tracheotomy in Laryngeal Diphtheria: After-Treatment and Complications* (London: H. K. Lewis, 1885): 87.

¹⁷⁹ Hardy, “Tracheotomy Versus Intubation,” 545.

¹⁸⁰ Parker, *Tracheotomy in Laryngeal Diphtheria*, 78.

¹⁸¹ *Ibid*, 79.

¹⁸² *Ibid*, 87.

¹⁸³ *Ibid*.

¹⁸⁴ Mackenzie, *Diphtheria; its Nature and Treatment*, 95.

¹⁸⁵ Thom, “Tracheotomy in Children,” 241.

tracheotomy was performed.¹⁸⁶ Given the risk of complications possible following tracheotomy, a knowledgeable caregiver was necessary to ensure the continued recovery of the child. Parents were not equipped with the knowledge or the resources to care for their children adequately following the operation.¹⁸⁷ In many cases, parents simply carried out what was told of them by the physician.¹⁸⁸ This was insufficient, as tracheotomy required an educated assistant during and after operation to provide the best possible chance at recovery.¹⁸⁹ Children who were treated with the operation but were without extended care were far less likely to recover on their own. If the extension of life provided by tracheotomy led to further complications and prolonged suffering, resulting in death regardless of the operation, physicians questioned the purpose of tracheotomy.

In the 1880s, New York physician Joseph O’Dwyer developed a set of laryngeal tubes which would allow for a much less invasive alternative to tracheotomy – intubation.¹⁹⁰ Unlike tracheotomy, intubation does not require any incisions into the body, so there is no risk of infection from an open wound. Instead, it is the catheterization of the larynx by inserting a tube through the mouth and into the trachea.¹⁹¹ Upon removal, the tube leaves no visible mark on the patient. O’Dwyer’s tube design revolutionized intubation as they maintained the passage of air while allowing the epiglottis to close during the act of swallowing.¹⁹² O’Dwyer also developed a

¹⁸⁶ Ibid.

¹⁸⁷ Ibid.

¹⁸⁸ Ibid.

¹⁸⁹ Parker, *Diphtheria*, 92.

¹⁹⁰ Robert Gifford, “The O’Dwyer Tube: Development and Use in Laryngeal Diphtheria.” *Clinical Pediatrics* 9, no. 3 (1970): 179.

¹⁹¹ “Intubation.” Merriam-Webster. Accessed April 15, 2021. <https://www.merriam-webster.com/dictionary/intubation>

¹⁹² Gifford, “The O’Dwyer Tube,” 181.

number of tube sizes to suit various ages.¹⁹³ After the employment of intubation in a number of cases of childhood diphtheria, O'Dwyer tubes were recording a promising success rate.¹⁹⁴

It took many years for O'Dwyer to perfect his tubes. Initially, O'Dwyer continued to employ tracheotomy as his tubes were not producing sufficient statistics to allow for their full adoption.¹⁹⁵ However, once he had perfected his tubes, his intubation survival rate increased from 24% to approximately 50% in diphtheritic children between 1886 and 1887.¹⁹⁶ O'Dwyer's success with intubation ultimately promoted its adoption in both America and Europe. Case-based observation proved the increased benefits of intubation to promote recovery without surgical intervention. However, many physicians were resistant to adopting new techniques, which may have contributed to the continued use of tracheotomy despite the re-emergence and rise of intubation.¹⁹⁷ Eventually, as mortality rates of intubation remaining lower than tracheotomy, intubation effectively ended the practice of tracheotomy at the close of the century.¹⁹⁸

Adoption of intubation for use in cases of childhood diphtheria in Britain was slow.¹⁹⁹ However, a growing number of physicians were employing intubation within their own practices to get a feel for the skills necessary to perform the operation, as well as its potential outcomes. The operation was less difficult to perform technically than tracheotomy, however beginners to intubation were likely to have had to reinsert the tube multiple times before it was situated

¹⁹³ Mackenzie, *Intubation of the Larynx*, 3.

¹⁹⁴ Gifford, "The O'Dwyer Tube," 183.

¹⁹⁵ Thomas F. Baskett, "Joseph O'Dwyer and Laryngeal Intubation for Croup." *Resuscitation* 74, no. 2 (2007): 212.

¹⁹⁶ *Ibid.*

¹⁹⁷ Rosemary Wall, *Bacteria in Britain, 1880-1939* (London: Taylor & Francis Group, 2015): 35.

¹⁹⁸ Hardy, "Tracheotomy Versus Intubation," 547.

¹⁹⁹ Wall, *Bacteria in Britain*, 34.

correctly.²⁰⁰ Because intubation is an interventional procedure and not a surgical one, additional attempts were far less dangerous than in tracheotomy and did not deter beginners from continuing to use the operation.²⁰¹ As intubation is also a bloodless procedure which can be performed with great rapidity, physicians were encouraged to continue to try again until they succeeded.²⁰² As more physicians performed this procedure, data comparing intubation to tracheotomy results in cases of childhood diphtheria showed that recovery from intubation was approximately 10% higher than that of tracheotomy.²⁰³ So too, the mortality of intubation tended to diminish with increased practice of intubation as physicians acquired more experience.²⁰⁴ Children were relieved of asphyxiation just as quickly as in tracheotomy, and removal of the tube was much easier after intubation than in tracheotomy.²⁰⁵ As tracheotomy proved difficult to perform on young children, intubation proved the opposite. In his treatise, *Intubation in Diphtheria*, which analyzed statistics of a variety of physicians employing intubation, nineteenth-century physician James Ball states that, “there is no doubt that intubation gives better results than tracheotomy in the first year of life, and little doubt that it gives better results in the second year also.”²⁰⁶ Statistically and in practice, intubation posed far less risk when performed in cases of diphtheria-stricken patients at risk of asphyxiation than tracheotomy. Intubation also required far less aftercare.²⁰⁷ Therefore, more British physicians performed intubation and reduced their use of tracheotomy in treating airway obstruction.

²⁰⁰ Mackenzie, *Intubation of the Larynx*, 4.

²⁰¹ *Ibid.*

²⁰² *Ibid.*, 20.

²⁰³ *Ibid.*

²⁰⁴ *Ibid.*

²⁰⁵ *Ibid.*, 17.

²⁰⁶ James Ball, *Intubation of the Larynx* (London: H. K. Lewis, 1891): 37.

²⁰⁷ *Ibid.*, 39.

The diphtheria outbreaks in London during the second half of the nineteenth century created the context for the increased use of tracheotomy as a life-saving procedure to address the symptom of asphyxiation for hundreds of diphtheritic children. Nevertheless, it was a contested procedure. Differing schools of thought advocated for and argued against the use of tracheotomy on children, making the operation highly controversial during a time when it was most frequently required. Ultimately, there was a lack of medical consensus surrounding the procedure. Supporters of tracheotomy argued it was vital in the extension of life. Resisters of tracheotomy argued it offered no such value. The urgency for care resulting from the rapid outbreaks of diphtheria among the child population of London allowed tracheotomy to be continuously performed despite opposition. However, many physicians were not satisfied with tracheotomy, and medical discourse surrounding the operation remained contentious throughout the nineteenth century.

Medical discourse surrounding tracheotomy was widely publicized for public consumption. Public understanding of diphtheria differed from that of the medical community, and so tracheotomy was not as widely accepted by the general public. While the medical community was parsing the value and use of tracheotomy in cases of severe childhood diphtheria, the public was simultaneously looking for other means of reducing the spread of diphtheria in the city.

Chapter Two – Urban Middle-Class Discourse surrounding the Prevention and Reduction of Childhood Diphtheria.

“My only wonder is that *every inmate in the house* [author’s emphasis] has not been attacked with diphtheria.”²⁰⁸

Nineteenth-century physician Dr. W. R. Gould made this “wonder” remark when asked by a newspaper reporter to discuss the outbreak of diphtheria cases among a family of eight individuals living within a two-room London home in 1892. Four children in this family became infected with diphtheria, of which one died, and the outbreak highlighted many of the disease-

²⁰⁸ “An Insanitary Dwelling.” *London Evening Standard*, 23 September, 1892.

spreading elements that sanitary reformers warned in the newspapers for the population to be weary of. These elements included a lack of adequate living space and poor ventilation. Foul odours produced by poor sanitary conditions and the increased production of filth created conditions for disease to spread and left the members of the household susceptible to infection. Characteristics of this situation were common for many families in working class districts of London, and the rise in childhood diphtheria cases and deaths provoked increased attention toward a solution. Social reformers and members of the middle class recognized and began to respond to the unsanitary conditions of the city, which had emerged as ugly by-products of overcrowding and urbanization and supported sanitary reformation to improve urban living conditions.²⁰⁹ This response fit within a miasmatic disease theory framework of disease causation and a strategy of maintaining, even improving, individual health and wellbeing.

While medical circles debated the use of tracheotomy in treating diphtheritic patients during the late nineteenth century, groups within the public expressed their concerns surrounding the medical management and public health measures taken in response to the diphtheria outbreaks. Middle-class parents and social reformers were particularly active in this discourse. Public consternation included and extended beyond tracheotomy as a treatment of diphtheria as the operation was not 100% successful, and so alternative measures needed to be outlined. Before the outbreak, cases of tracheotomy were frequently reported on by newspapers and peaked a general public interest. However, through the second half of the century, there was a decline in newspaper reports of tracheotomy as they primarily served to educate readers about the procedure. Instead, members of the middle class became interested in methods they were able

²⁰⁹ “The Sanitary Condition of the City of London.” *London Evening Standard*, 10 November, 1849. This article was first reported on by the *Morning Chronicle*, 07 November, 1849, followed by the *Evening Mail*, 09 November, 1849. These publications were exactly the same and published in full the report on the condition of the city sewers by medical officer of health, Mr. Simon.

to employ themselves, initiating a new discourse between these stakeholders and members of the medical profession through newspaper correspondence. In response to the diphtheria outbreaks, this new discourse focused on preventative disease measures as a strategy to reduce infection rates in the steadily urbanizing city of London.

Generally, media coverage reflects and shapes public concerns and understanding of complex events, including disease outbreaks. In the nineteenth century, print was understood as a publicly accessible and accountable medium of communication.²¹⁰ Major city newspapers published morning and evening editions, and non-English newspapers served regional or local markets where English was not the dominant language. Newspaper reporting played an important role in shaping various public understandings of disease and medical treatments during the Victorian period. Increased literacy and improved printing and distribution technology in the Victorian period, as well as an explosion in urban populations, allowed for increased publishing and circulation of newspaper titles.²¹¹ More people in the city meant more buyers of London papers, and the repeal of “taxes on knowledge” that occurred between 1836 and 1861 made newspapers more affordable.²¹² By the second half of the century, information was easily and readily available for everyone.

During the nineteenth century, the middle class experienced growing prosperity alongside a cheapness of labour which enabled men and women to hire others to complete tasks they would

²¹⁰ Aled Jones, *Powers of the Press: Newspapers, Power and the Public in Nineteenth-Century England* (London and New York: Routledge, 1996): 12.

²¹¹ Rubery, *The Novelty of the Newspapers*, 6.

²¹² Martin Hewitt, *The Dawn of the Cheap Press in Victorian Britain: the End of the “Taxes on Knowledge”, 1849-1869* (London: Bloomsbury Academic, 2014): 6.

There were four “taxes on knowledge” (duties and taxes on newspapers) which essentially outlined restrictions for the newspaper press. These included a 10% ad valorem duty on the importation of foreign books, the advertisement duty, the newspaper stamp, and the excise on paper.

have otherwise done themselves.²¹³ This created an increase in leisure time which was notably filled with the activity of reading. In contrast, the lower working classes were working long 14–16-hour days and had little time for leisure.²¹⁴ Due to their growing prosperity, the middle class was able to afford subscriptions to reading-rooms where they would have access to a large selection of London papers.²¹⁵ For a large part of the century, the middle and upper classes were the primary audience which many newspaper titles were targeting. However, the lower working classes were increasing their literacy and quite often newspapers would filter down and circulate throughout working class hands. Despite the specific audience some newspapers were targeting, it cannot be assumed that these titles were being exclusively read by the middle and upper classes. Newspaper titles were steadily entering the daily lives of the working classes that were concentrated in cities and towns.²¹⁶

This chapter focuses primarily on the readership of the *London Evening Standard* and the *Morning Post*. This readership is dominantly that of the urban lower and upper middle class, who were largely concerned with sanitary reform and public health. Multiple news reports and advertisements published within them expose the complicated relationship between medical circles and the middle class in responding to the diphtheria outbreaks in London.²¹⁷ By focusing on these two titles, I am attempting to show a change over time in the content published in these

²¹³ Altick, *The English Common Reader*, 85.

²¹⁴ Ibid, 86.

²¹⁵ Ibid, 322-323.

²¹⁶ Ibid, 324.

²¹⁷ Ellegård, “The Readership of the Periodical Press”, 4.

<https://www.standard.co.uk/news/london/born-1827-and-still-going-strong-a-history-of-the-london-evening-standard-in-pictures-9105149.html>

The *London Evening Standard* was first published on May 21, 1827 and garnered considerable readership. The *Morning Post* was first published in 1772 and was soon the direct competition of *The Times*. Both titles are conservative in orientation, which during the Victorian period, would have placed a great deal of emphasis on news stemming from the medical community. Conservative interest typically surrounded topics of professionalism such as the medical field.

titles regarding diphtheria and tracheotomy. However, the robustness of the Victorian newspaper press cannot be ignored. Newspapers proliferated with more operators and competition became increasingly fierce so that many reports of particular interest could be found in a number titles circulating in and outside of the city of London.²¹⁸ By identifying reports which received wider publication from other newspaper titles, I emphasize how topics of medical and urban welfare were of particular demand, intrigue, and concern for both reporters and readers regardless of readership or political orientation. Medical periodicals, notably the *Lancet*, were commonly referenced by newspaper titles as a source for continued and updated medical information. This information became popular among the lay press, as dissension and polemic discourse by opposing medical circles made for enjoyable reading material. The *Lancet* gained considerable popularity during its beginnings, with over 8,000 subscribers by 1830.²¹⁹ Published weekly, information in the *Lancet* was up-to-date and cheaper to acquire than its monthly competitors, making access to its information relatively easy for publishers. Readers could keep up with information coming out of the medical field and have confidence that it was sourced from credible medical professionals.

Ultimately, this chapter argues that middle class understanding and concern surrounding diphtheria shifted from a consenting stance that first accepted tracheotomy as a risky, last-resort operation accepted as enough to deal with the diphtheria outbreaks to a more vocal position that called for increased preventative measures and sanitary reform in urban centers to reduce disease

²¹⁸ Lionel Bentley, “The Confusion, Uncertainty, and Dissatisfaction with Legal Protection of Newspaper and Periodical Titles in Nineteenth-Century England.” *Victorian Periodicals Review* 51, no. 4 (2018): 692.

²¹⁹ Brittany Pladek, “‘A Variety of Tastes’: The ‘Lancet’ in the Early-Nineteenth-Century Periodical Press.” *Bulletin of the History of Medicine* 85, no. 4 (2011): 565.

This number was approximately two times the number of practitioners in London, suggesting that the readership of the *Lancet* included provincial and foreign readers, as well as lay people.

infection rates as a strategy to remove the need for tracheotomies. This shift analysis is supported by distinct disease cases in which the middle class proposed, even demanded, new disease measures, illuminating their influence and response to the diphtheria outbreaks of London in the second half of the nineteenth century.

3.1 Tracheotomy in the Papers

Between 1800 and 1851, newspaper accounts involving tracheotomy consisted almost solely of acute cases of medical emergency. Medical coverage in the newspapers largely published medical advertisements and health advice for public consumption. Newspapers also became the platform for physicians to report their medical findings, as well as their political and social views on a variety of subjects.²²⁰ Additionally, updates to public health legislation were commonly published in newspapers. Case accounts of acute illnesses or afflictions were uncommon, though when they were reported, they garnered an increase in public attention. Many newspapers of the early Victorian period ran these stories as often as they appeared, as the Victorians often indulged themselves in ‘sensational’ stories by reading these newspapers.²²¹

In rare circumstances, such as drowning or suffocation, a physician was required to react quickly and provide the specialized and challenging operation of tracheotomy in order to save the patient's life. The value of the operation to physician and patient was immense; the operation showcased the physician's medical ability to operate under great stress, and the patient's ability to recover after such a high-risk operation showcased the body's strength to withstand an

²²⁰ Jeanne M. Peterson, “Medicine.” in *Victorian Periodicals and Victorian Society*, edited by Rosemary VanArsdel and J. Don Vann (Toronto: University of Toronto Press, 1995): 22.

²²¹ Michael Diamond, *Victorian Sensation: Or, the Spectacular, the Shocking and the Scandalous in Nineteenth-Century Britain* (Anthem Press: London, 2003): 1.

Diamond explains how the Victorians were sensation seekers, defining sensation as “a condition of excited feeling produced in a community by some occurrence, as well as the occurrence itself,” and describing how this was easily met in contemporary newspapers.

invasive operation.²²² In the first half of the century, tracheotomy developed a reputation as a life-saving surgical procedure and gained mass appeal. However, the literate public were not particularly familiar with the intricacies of the operation as it was so rarely reported on.²²³ Thus, stories of tracheotomy reported on in the newspapers maintained a sense of urgency, fear, and required leadership of a medical professional who possessed stoicism and bravery.

These characteristics are evident in a newspaper report published by the *London Evening Standard* in 1837. A gentleman, 60 years of age, was experiencing suffocation caused by an unrecorded disease and required a tracheotomy.²²⁴ Following the operation, the gentleman was able to breathe for some time, given the insertion of the cannula.²²⁵ The report describes the attending physician as having performed the “formidable surgical operation of tracheotomy” successfully, and the patient is described as having recovered entirely.²²⁶ The frequency of newspaper reporting of tracheotomy performed on older patients due to throat afflictions was low because afflictions of the throat were not as common in the older demographic as they were

²²² “Extraordinary Operation of Tracheotomy at St. Guy’s Hospital.” *London Evening Standard*, 5 August, 1847.

The exact same article was also reported on 7 August, 1847 by *Home News for India, China and the Colonies*, the *Lady’s Newspaper and Pictorial Times*, and the *London Mercury*, 9 August, 1847 by *Bell’s Weekly Messenger* and *The Pilot*, and 10 August, 1847 by the *Sussex Advertiser* and the *Dundee, Perth, and Cupar Advertiser*.

²²³ *Ibid.*

Of the small number of publications involving tracheotomy between 1800 and 1851, there were only a few reports which explained what the operation is in either great depth or succinct terms. When stories of tracheotomy were published, often the public had to be reminded of the dangers and drama that accompanied the operation

²²⁴ *London Evening Standard*, 11 October, 1837.

This event was extremely popular among British readerships. This exact article was first reported on 10 October, 1837 by the *London Courier and Evening Gazette*. It then appeared on 11 October, 1837 by the *Public Ledger and Daily Advertiser*, 12 October, 1837 by the *Saint James’s Chronicle*, 13 October, 1837 by the *Durham Chronicle*, 14 October, 1837 by the *Straffordshire Advertiser*, the *Bedfordshire Mercury*, and the *Cambridge Chronicle and Journal*, 16 October, 1837 by the *Sherborne Mercury*, 17 October, 1837 by the *Cumberland Pacquet*, and *Ware’s Whitehaven Advertiser*, and 19 October, 1837 by the *Dorset County Chronicle*.

²²⁵ *Ibid.*

²²⁶ *Ibid.*

in their younger counterpart. Thus, the performance of tracheotomy on an older patient was relatively uncommon and earned the attending physician the notoriety of stoicism and bravery for having attempted and succeeded at the surgery.²²⁷ That is not to say there was an increase in risk performing tracheotomy on an older patient. In fact, tracheotomy was far more dangerous when performed on children.²²⁸ Published well into the beginning of the century, the previously mentioned case is one of the first instances where the *London Evening Standard* had reported the use of tracheotomy to treat an illness rather than a rare, obscure cause.

The role of tracheotomy to open up an airway and reinspire breathing is clearly defined in cases where the operation was employed in the first half of the century. Only two publications citing a tracheotomy pre-date the one above. The first describes its use in an attempt to reverse a suicidal death by drowning (1828), and the other in a case of anaphylactic shock resulting from multiple bee stings (1827).²²⁹ The latter, a highly unique instance of medical phenomena, had also been covered in the *Morning Post*, as well as other titles.²³⁰ Through the entire year of 1838, there were only two reports of tracheotomy published by the *London Evening Standard*. The first, the case of a notable man, Hart Logan Esq., M.P. of the County of Suffolk, receiving

²²⁷ "THE ALBERT MEDAL", *The Times*, December 25, 1880.

Published in *The Times* in 1880, the Albert Medal was awarded to surgeon Henry Grier for his operation of tracheotomy on Lieutenant Graham stationed in Malta. Graham suffered from a severe case of diphtheria, and Grier, after opening the throat, sucked the poisonous membrane out of the wound, temporarily restoring life to Graham. Graham died a day or two following the operation, however, Grier was awarded for his gallant and heroic conduct.

²²⁸ Parker, *Diphtheria*, 74-76.

²²⁹ *London Evening Standard*, 17 December, 1828., *London Evening Standard*, 19, December, 1827.

²³⁰ "A Man Stung to Death by Bees." *London Evening Standard*, 19 December, 1827.

This clipping was taken from the *London Medical Gazette* and was first published in 18 December 1827, by the *Star*, then on 19 December, 1827 by the *Sun*, 20 December, 1827 by the *Public Ledger and Daily Advertiser* and *The Times*, 21, December 1827 by the *Evening Mail*, 22 December, 1827 by the *Hampshire Advertiser*, the *Warwick and Warwickshire Advertiser*, and the *Oxford University and City Herald*, 24 December, 1827, by the *Sussex Advertiser* and the *Belfast Commercial Chronicle*, 26 December 1827, by the *Tipperary Free Press*, 28 December, 1827, but the *Cambridge Chronicle and Journal* and the *Inverness Journal and Northern Advertiser*, and 29 December 1827 by the *Dublin Weekly Register*.

tracheotomy after his common cold grew into an affliction of the throat, dying approximately three hours after the operation.²³¹ The second, outlining the successes of tracheotomy in its use outside of general medical science and employed in veterinary science.²³² Almost 10 years later, in 1847, the *London Evening Standard* and the *Morning Post* reported a case where a stone was lodged in the throat of a 14-year-old boy admitted to St. Guy's Hospital.²³³ The physician who performed the tracheotomy supposedly did so in a matter of seconds, and the boy was able to recover completely.²³⁴

Between 1800 and 1851, few tracheotomy reports were published which described the use of the operation on children. More specifically, few reports described its use on children experiencing an infection of the throat. In fact, 10 of 22 newspaper articles published by the *London Evening Standard* containing the term 'tracheotomy' were repeated publications of the same advertisement for a treatise written by medical writer George Macilwain.²³⁵ This treatise

²³¹ "Death of Hart Logan Esq., M.P. for the County of Suffolk." *London Evening Standard*, 14 April, 1838.

This article was first reported on by the *Morning Chronicle* and the clipping was taken and published 18 April, 1838 by the *Bury and Norwich Post*, 21 April, 1838 by the *Norfolk Chronicle*. 20 April, 1838, the *Essex Standard* published a detailed report on the events leading up to the operation and his subsequent death. *The Times* briefly mentions his passing in a paper published 26 April, 1838. His passing was covered in a great number of newspaper titles beyond those mentioned here.

²³² *London Evening Standard*, 11 September, 1838.

²³³ *Morning Chronicle*, 17 May, 1843.

Similarly, the *Morning Chronicle* published a case where tracheotomy was employed for the removal of a coin stuck in the throat. The operation was not what removed the coin from the patient. Rather, it aided in the ultimate removal of the coin from the mouth by preventing any spasmodic action of the glottis while the patient was coughing in an inverted position.

²³⁴ "Extraordinary Operation of Tracheotomy at Guy's Hospital." *London Evening Standard*, 5 August, 1847.

²³⁵ *London Evening Standard*, 1 February, 1832, 2 February, 1832, 8 February, 1832, 11 February, 1834, 13 February, 1834, 25 March, 1834, 26 March, 1834, 27 March, 1834, 10 May, 1834, 12 May 1834.

This advertisement was published by a great number of newspaper titles, including *The Times*, the *London Courier and Evening Gazette*, the *Morning Herald*, *The Examiner*, and the *Globe* throughout the decade.

King, "British Newspapers," 4.

As the newspaper press was becoming increasingly more commercial, advertising became a dominant source of revenue and sales for titles, increasing the advertising found within the papers.

discusses the use of strictures in a plethora of medical operations in the urethra, rectum, and esophagus.²³⁶ The advertisement was not intended to attract the attention of the general public. It was targeted directly at the medical community, as it states that "the volume must find a place in every surgical library. It is a work of great practical utility and should be in the hands of every practitioner."²³⁷ In addition, 3 of the 23 papers were reports of the successful use of tracheotomy on horses rather than people.²³⁸ The *Morning Post* published similar numbers, with 30 total published reports including the term 'tracheotomy' between 1800-1851. Of these, 15 were the same advertisement of Macilwain's treatise.²³⁹ Given this sample, more than half the publications containing the term 'tracheotomy' were advertisements rather than accounts of the operation's completion. In 1851, a report finally covered tracheotomy on a young child, although reasons for its use were not related to any infection of the throat. The child had placed its mouth over the spout of a boiling kettle, causing intense blistering of the mouth.²⁴⁰ After calling for a coroner, a tracheotomy was performed to provide relief from suffocation caused by the blistering. The child died not soon after.²⁴¹ This case of suffocation from blistering was one of the last unique stories seen in the *London Evening Standard* and the *Morning Post* that combines a child and tracheotomy in the same case. As seen in both titles, publications discussing tracheotomy became far more frequent, almost solely in the context of diphtheria, until the end of the century.

²³⁶ Ibid.

²³⁷ Ibid.

²³⁸ *London Evening Standard*, 17 December, 1828, 11 September, 1838, 22 April, 1839.

²³⁹ *Morning Post*, 21 April, 1830, 6 May, 1830, 10 May, 1830, 30 December, 1830, 12 December, 1831, 15 December, 1831, 21 December 1831, 21 March, 1832, 28 March, 1832, 8 January, 1833, 10 January, 1833, 12 January 1833, 27 August, 1834, 2 March, 1837, 6 March, 1837.

²⁴⁰ *London Evening Standard*. 11 January, 1851.

This exact article was first reported 10 January, 1851 by the *Chelmsford Chronicle*, and continued to be published on 11 January, 1851 by the *Morning Herald*, and 13 January, 1851 by the *Morning Advertiser*. The death of the child and the operation of tracheotomy were briefly mentioned in a report published 25 January, 1851 by the *Lady's Newspaper and Pictorial Times*.

²⁴¹ Ibid.

By the 1860s, resulting from the ever-growing number of children infected with diphtheria, newspaper coverage of the operation changed from its use in acute cases of asphyxiation to a far more exercised operation on diphtheritic children. The increased reporting of physicians performing tracheotomies transitioned the familiarity of the operation from one exercised infrequently to one used more often in diphtheria cases with asphyxia complications. Without any developments or changes to the methods of operation, the significant increase in the number of tracheotomies performed on children gave way to an increased mortality rate. Even the top contemporary operating physicians were experiencing high mortality rates following the performance of tracheotomy.²⁴² Contrary to their expert knowledge and skill, top physicians in the medical community were finding it difficult to reduce their mortality rates. Despite operating more frequently, they were seeing similar results in mortality numbers. Newspaper coverage of tracheotomy thus implied that the operation was fraught with risk that even the most skilled physicians were faced with.

The increased case count and mortality numbers of diphtheria in children changed the narrative of newspaper reporting of tracheotomy from heroic to high-risk. Perception of tracheotomy was shifting with its increased use on children. For newspapers, a story that included the operation and the death of the patient could be highly profitable. As such, cases of tracheotomy where diphtheria was not involved were also emphasized in the newspapers. During the late nineteenth century, one particular case of tracheotomy not associated with diphtheria held continued public attention.

²⁴² Kristen Johnson, "Furnishing the Skill Which Can Save the Child: Diphtheria, Germ Theory, and Theodicy." *Zygon* 52, no. 2 (2017): 308.

George Buchanan, considered one of the top surgeons of his era, recorded success of tracheotomy in only nineteen of the fifty tracheotomies he had performed.

The role of tracheotomy to open up an airway was reiterated in newspaper coverage of the case of the German Emperor. In 1887, Frederick III, son-in-law to Queen Victoria, developed a severe throat affliction requiring intense medical supervision and his experiences were widely broadcast. Notable figures, including British physician Sir Morrell Mackenzie, German pathologist Rudolf Virchow, and German physician Ernst von Bergmann, were placed on the medical council to oversee the Emperor's health and treatment.²⁴³ The involvement of these well-known medical figures increased readership of publications for newspapers. This story was not only reported on in both the *London Evening Standard* and the *Morning Post*, but also ran in virtually all titles that were published in Britain, including other conservative titles such as *The Times* and the *Illustrated London News*, as well as liberal titles such as the *Pall Mall Gazette* and the *Daily News*.²⁴⁴ Coverage of the Emperor's case exposed the lack of consensus in the medical community. It also disclosed the high level of skill necessary for physicians to have in order to properly perform a tracheotomy.

As the Emperor's affliction became increasingly worse, the majority of the medical council felt that tracheotomy was necessary during the earlier stages of his condition.²⁴⁵ However, Mackenzie disagreed with this path of treatment because there were no cancerous cells found in the samples from the throat that were sent to Virchow for laboratory analysis.²⁴⁶

²⁴³ Sir Terence Cawthorne, "Section of the History of Medicine: Two Historical Tracheostomies." *Journal of the Royal Society of Medicine* 61 (1968): 42.

²⁴⁴ "Sir Morell Mackenzie and His Slanderers." *Pall Mall Gazette*, 22 March, 1888. "Sir Morell Mackenzie's Reply to His German Traducers." *Pall Mall Gazette*, 12 October, 1888. "Sir M. Mackenzie's Charges Against the German Doctors." *Pall Mall Gazette*, 13 October, 1888.

Both the *Pall Mall Gazette* and the *Daily News* reported updates of the Emperor's wellbeing throughout 1887 and 1888. Most notably, the *Pall Mall Gazette* emphasized coverage following the death of the Emperor and the responses of Sir Morrell Mackenzie to the various rumours and slanderous comments being made about his involvement.

²⁴⁵ Cawthorne. "Section of the History of Medicine," 42.

²⁴⁶ *Ibid*, 43.

Instead, Mackenzie believed the invasive operation should be avoided until the last possible moment, as outlined in a statement signed by the Emperor himself.²⁴⁷ Mackenzie alternatively prescribed the displacement of the Emperor to warmer climates for periods of two to three months, and though travel to milder regions maintained the Emperor's condition, it did not remedy it.²⁴⁸ His symptoms slowly worsened, and eventually a tracheotomy was required. Bergmann was appointed as the individual to perform the operation on the Emperor, likely because of his reputation as "one of the most skillful surgeons and commanding personalities in Germany of the last century."²⁴⁹ Despite his prominence, Bergmann made multiple mistakes during the operation, including missing the trachea after making an incorrect incision into the Emperor's throat and trying to force the cannula into the wrong spot.²⁵⁰ Once he made the correct incision, he dug his fingers into the opening, causing significant hemorrhaging and discomfort for the Emperor.²⁵¹ The sloppiness of his operation ultimately resulted in an abscess which continued to cause the Emperor a great deal of discomfort during and after his recovery.²⁵² Ultimately, the operation did not reduce symptoms for the Emperor, and he died on June 15, 1888.²⁵³

After the Emperor's death, Mackenzie and Bergmann published personal accounts of their experience caring for the Emperor. Each gave opposing views, blaming one another for the lack of proper care, incorrect diagnoses, and the Emperor's death.²⁵⁴ Each felt they needed to

²⁴⁷ "Sir Morrell Mackenzie's Book." *Morning Post*, 13 October, 1888.

²⁴⁸ Cawthorne. "Section of the History of Medicine," 42.

²⁴⁹ "Ernest von Bergmann." *Nature*, 138 no. 1003 (13 December, 1936).

²⁵⁰ Cawthorne. "Section of the History of Medicine," 44.

²⁵¹ "Sir Morrell Mackenzie's Book." *Morning Post*, 13 October, 1888.

²⁵² Ibid.

²⁵³ Cawthorne. "Section of the History of Medicine," 44.

²⁵⁴ *Case of Emperor Frederick III: Full Official Reports by the German Physicians and by Sir Morell Mackenzie* (Edgar S. Werner: New York, 1888).

defend their actions and ensure that their efforts were not only justified but, ultimately, were the correct steps to take, regardless of the death of the Emperor. There was a great deal of contention, opposing views, and differing treatment preferences amongst the Emperor's medical council. As such, newspaper coverage publicly showcased the dissension occurring within the medical field and challenged the esteemed reputation of tracheotomy as medical practice.

Reading of this case in the newspapers, fear for the health of children may have increased drastically. Middle-class parents were unlikely to have the same resources and access to highly qualified medical professionals as the Emperor. Lower class children were more likely to be admitted to the GOSH than to be visited at home by a physician. Even still, in some instances, children were denied admission to the hospitals and possible medication for at home treatment.²⁵⁵ Because private health care was not afforded by all classes, it was expected that parents would have some knowledge of how to treat their sick children before sending them off to the fever hospital.²⁵⁶ The inability of the Emperor's qualified group of physicians to successfully perform a tracheotomy without complications was widely publicized. It is likely that anxieties surrounding the qualifications of physicians increased. Should a child be granted access to a hospital, as were more than 2000 children admitted to the GOSH, parents had no assurance that the attending physicians possessed the skills necessary to successfully perform tracheotomy. Parents who admitted their children to hospitals resigned their agency to allow the operating

²⁵⁵ "Inquests." *London Evening Standard*. 21 August, 1896.

²⁵⁶ "Essays on Diphtheria." *Morning Post*, 6 January, 1879.

Parents needed to familiarize themselves with knowledge of the disease to provide care to the child prior to the arrival of medical men.

Tamara Silvia Wagner, "The Sensational Victorian Nursery: Mrs. Henry Wood's Parenting Advice." *Victorian Literature and Culture* 45, no. 4 (2017): 806.

There was a boom in the publishing industry surrounding specialised magazines and self-help books written by mothers and medical men, providing guidance on how best to care for their children both in full health or having fallen sick.

physicians to act in what they believed to be the best interests of these children.²⁵⁷ There was a new strategy by London fever hospitals to govern infection through mass isolation that was not particularly attractive.²⁵⁸ In fact, fever hospitals were regarded as the place where a person goes in with one infectious disease and comes out with all the rest.²⁵⁹ However, the severity of diphtheria forced many parents to concede and admit their sick children to these fever hospitals.

The Emperor's treatment and tracheotomy was carried out by a group of physicians likely more qualified than the physicians employed with the hospitals, and even they were unable to successfully perform a tracheotomy without complications. The Emperor's case, resulting in death and circulated by newspapers, informed a fearful opinion of tracheotomy in cases of childhood diphtheria by amplifying the division amongst the medical community regarding tracheotomy.

3.2 Urban Middle-Class Perception of Diphtheria

From the 1860s onward, the virulence with which diphtheria spread among the child population and its reporting in newspapers contributed to an awareness of infectious diseases in London.²⁶⁰ Newspaper publications included case examples of diphtheria and tracheotomy, as well as new information about disease theory from various medical circles. Information being published surrounding diphtheria and tracheotomy was continuously shifting. Given its increase as a topic in newspaper publications, emphasis of middle-class attention in the second half of the century was generally placed on sourcing the cause of the disease and potential preventative

²⁵⁷ Stanley, *For Fear of Pain*, 250.

²⁵⁸ Kerr, *Contagion, Isolation, and Biopolitics*, 289.

²⁵⁹ Ibid.

²⁶⁰ Hardy, *The Epidemic Streets*, 2.

measures. Members of the urban middle class continued to discuss and act according to their understanding of diphtheria.

At the beginning of the outbreaks, social reformers particularly concerned with urban sanitation and public health identified and framed diphtheria as a class disease. Members of the middle and upper classes, with resources, avoided infection by leaving disease-stricken urban areas for the countryside to enjoy fresh air and ample space.²⁶¹ Considering that miasma theory was a dominant disease theory at the first outbreaks of the disease, diphtheria effectively segregated the different classes that previously co-mingled in the city, as the middle class vacated the central areas to pursue the clean air of the suburbs.²⁶² The urban population understood diphtheria to be highly contagious;²⁶³ one case of diphtheria in a household could put the rest of the members at a much greater risk of contracting the disease.²⁶⁴ Wealthier families could afford to install greater isolation practices by moving away from the city center, effectively avoiding an outbreak within their home. Because the working class were unable to migrate, they were more susceptible to infection stemming from the filth and overcrowding of the city.

Diphtheria was also perceived as a class disease due to its increased virulence within lower-class populations, particularly among poor children. In a contemporary survey of the urban population by Dr. Edward Smith, he found that the diets of infants and children were substandard, as their milk, meat, and vegetable intake was particularly deficient.²⁶⁵ Low-class

²⁶¹ Belchem, *Industrialization and the Working Class*, 36.

²⁶² Ibid.

²⁶³ Kerr, *Contagion, Isolation, and Biopolitics*, 291.

²⁶⁴ "Diphtheria," *Morning Post*, 14 September, 1871.

This exact article was first reported on 7 September, 1871 by the *Daily News*, followed by the exact same report published 8 September, 1871 by the *Shields Daily Gazette*, 12 September, 1871 by the *Bury and Norwich Post*, 13 September, 1871 by the *Orkney Herald*, and *Weekly Advertiser and Gazette for the Orkney & Zetland Islands*, 14 September, 1871 by the *Fife Herald*, 15 September, 1871 by the *Lincolnshire Chronicle*, and 16 September, 1871 by the *Cambridge Chronicle and Journal*.

²⁶⁵ Ibid, 141-144.

children were often underfed and undernourished, and were inappropriately clothed against climatic conditions.²⁶⁶ Given these living conditions, poor children were highly susceptible to infectious disease and more likely to succumb to those diseases than middle- and upper-class children.²⁶⁷ Unhealthy urban environments, insufficient nutrition, and socio-economic status were directly associated with high child mortality.²⁶⁸

Isolation practices extended beyond migration away from the city into medical facilities located within the city. Prior to the establishment of designated fever hospitals, general hospitals experienced constant outbreaks of infectious diseases.²⁶⁹ In response, fever hospitals were erected to specifically treat patients afflicted with infectious diseases, such as diphtheria, scarlatina, and typhus, and isolating infectious diseases to their own dedicated buildings prevented these outbreaks in general hospitals.²⁷⁰ The gathering of multiple infectious diseases within a fever hospital had its own consequences. Eventually, isolation hospitals were established to provide the best possible means of recovery for patients, as well as protection from infection for doctors and nurses. Diphtheria was treated as a dangerous infectious disease and implementing isolation practices proved effective in reducing its spread.²⁷¹

Parents and caregivers were responsible for monitoring their children, recognizing the first signs of illness, and seeking professional treatment when symptoms progressed and became out of their control.²⁷² Because diphtheria symptoms had such a short timeline, it was important

²⁶⁶ John Burnett, *Plenty and Want: A Social History of Diet in England from 1815 to the Present Day* (Great Britain: Thomas Nelson (Printers) Ltd., 1966): 144.

²⁶⁷ Parker, *Tracheotomy in Laryngeal Diphtheria*, 79.

²⁶⁸ Robert Millward and Frances Bell, "Infant Mortality in Victorian Britain: The Mother as Medium." *The Economic History Review* 54, no. 4 (2001): 705.

²⁶⁹ Kerr, *Contagion, Isolation, and Biopolitics*, 291.

²⁷⁰ *Ibid*, 3.

²⁷¹ Worboys, *Spreading Germs*, 255.

²⁷² "The Metropolitan Asylums Board." *London Evening Standard*, 23 April, 1894.

to notice these symptoms early and contact a physician to take over the child's treatment process.²⁷³ Due to diphtheria's evasive nature, identifying the disease was difficult.²⁷⁴ Looking to the medical field for answers, parents and caregivers were often met with varying responses from the deeply divided profession. As such, many cases of childhood diphtheria reached critical condition prior to medical intervention, and the mortality rate continued to increase. As the outbreaks continued to spread throughout London, new details regarding the disease continued to shape the middle-class perception of diphtheria.

In the first half of the century, scarlatina had swept through Britain and infected a large portion of the population, causing concern in the medical community.²⁷⁵ Measles and whooping cough also received much of the medical profession's attention, presenting high mortality rates just under that of scarlatina.²⁷⁶ During the 1850s and 1860s, diphtheria cases were often categorized under these same disease names, causing the recorded mortality rate of diphtheria to be significantly lower than other infectious diseases.²⁷⁷ Newspapers were publishing stories of other infectious diseases rather than diphtheria, but by mid-century, infection rates of scarlatina

Newspaper reports described the inability to properly treat the virus at home. There was a dire need for more beds in hospitals, otherwise children are expected to die at home.

²⁷³ *London Evening Standard*, 21 August, 1896.

In a particular case, after providing the sick child with plenty of soup and liquids, the mother brought the child to hospital. The child died shortly after and she was asked if she knew it was diphtheria. The mother states she had no idea the child was suffering. The exact same report was published 21 August, 1896 by the *Globe*. A short publication briefly describing the death of child, inferring that the mother did know it was diphtheria was published the same day by the *Daily News*. An almost novelistic report was published the same day by the *Pall Mall Gazette* omitting Westminster Hospital for turning away the child but blaming the physicians there for not warning the mother of the dangers of taking the child home in a public vehicle. This story was covered by a great number of newspaper titles beyond those mentioned here.

²⁷⁴ *London Evening Standard*, 30 December, 1858.

²⁷⁵ "Cholera and Scarlatina." *Morning Post*, 9 November, 1848.

Virtually all major newspaper titles circulating in Britain were reporting with the outbreaks of cholera and scarlatina.

²⁷⁶ Hardy, *The Epidemic Streets*, 82.

²⁷⁷ *Ibid.*

Diphtheria 171 per million versus 391 for measles, 467 for whooping cough, and 890 for scarlatina.

were reducing significantly and diphtheria infection rates were increasing.²⁷⁸ This was in part due to the distinction of diphtheria from other infectious diseases and more detailed records of diphtheria cases. Between 1858 and 1865, an outbreak of diphtheria in London recorded a drastic increase in child mortality.²⁷⁹ Given this increase in diphtheria cases and deaths among children, publicity surrounding diphtheria ignited fear and concern among the urban population.²⁸⁰

In addition to reports of diphtheria outbreaks, hospital records were repeatedly published in both the *London Evening Standard* and the *Morning Post* as they distributed updated case numbers of diphtheria in London weekly.²⁸¹ Under the heading “Health of London During the Week”, newspapers published the number of deaths organized by age (“Under 15 years”, “At 15 years & under 60”, and “At 60 years & upwards”), as well as the cause of death.²⁸² The numbers of deaths categorized under “epidemics” were compared with publications from previous weeks, showcasing an increase or decrease in cases over time.²⁸³ Early on, some publications discussed individual cases, wherein age, gender, and the outcome of the case were reported, but as the number of cases rose drastically, there was not enough space in newspapers to report individual cases. As the medical profession was working to understand diphtheria as a disease, these newspapers were making their audience increasingly aware of the growing number of children dying. Based on the rising numbers issued in the weekly updates, it was clear that diphtheria was

²⁷⁸ “Health of London During the Week.” *Morning Post*, 3 December, 1851.

Recorded 5,500 deaths from diphtheria in 1889, rose to 9,500 by 1899. The health of London was often reported on and can be seen in other titles including *The Times*, the *Globe*, the *Reading Mercury*, and a great number of other newspaper titles that continuously updated their readers on the statistical health of London throughout the century.

Glenice Gould, “The Years of Lennox Browne 1874-1902.” *Journal of Laryngology and Otology* no. 22 (1998): 20.

²⁷⁹ Hardy, *The Epidemic Streets*, 3.

²⁸⁰ Charles Creighton, *A History of Epidemics in Britain* (Cambridge: University Press, 1894): 739.

Between 1857 and 1858, there were 4526 deaths recorded in England.

²⁸¹ “Health of London During the Week.” *London Evening Standard*, 28 March, 1849.

²⁸² “Health of London During the Week.” *Morning Post*, 3 December, 1851.

²⁸³ *Ibid.*

evading the medical profession.²⁸⁴ The inability of medical men to suggest any effectual cure became a degradation to the reputation of medical science.²⁸⁵ Alongside statistical numbers of children infected with and dying from diphtheria, these newspapers published reports containing updates of the medical understanding of diphtheria. Their contents differed greatly from one professional to another. One man stressed the confusion surrounding various medical circles' understandings of the disease to the *London Evening Standard*, noting that "opinions in treatment differ on this subject daily...".²⁸⁶ These newspapers provided a platform for communication by the urban middle class with medical professionals, and correspondence through letters were among the most socially useful sections of the newspaper.²⁸⁷ This section allowed inquiries such as, "... how far the disease [is] dependent on insanitary condition, how far on infection, and what precautions should be taken to avoid it?"²⁸⁸ The diphtheria problem in the city was becoming increasingly publicized, and concerns were shifting toward action to reduce the severity of its spread among children.

The Victorian public had ample opportunity to read about the disease experience of Princess Alice, who emerged as one of the most famous and heavily reported cases of death caused by diphtheria. The death of the Princess received considerable attention and was reported on in nearly every newspaper title in Britain, including titles such as *The Times*, the *Daily Telegraph*, the *Leeds Mercury*, and many more. The rapid and repeated reporting of Princess Alice's case by many British newspapers undoubtedly generated greater awareness and influenced middle-class opinions of diphtheria. Princess Alice was considered the favourite

²⁸⁴ Hardy, *The Epidemic Streets*, 8.

²⁸⁵ "Diphtheria: to the editor." *London Evening Standard*, 30 December, 1858.

This exact letter to the editor was also published on by the *Morning Herald* on the same day.

²⁸⁶ "Diphtheria: to the editor." *London Evening Standard*, 11 January, 1859.

²⁸⁷ Jones, *Powers of the Press*, 200.

²⁸⁸ Hardy, *The Epidemic Streets*, 2.

daughter of Queen Victoria because of her generosity and kind-heartedness.²⁸⁹ In 1878, diphtheria spread throughout the Grand Ducal household and infected five of her children as well as her husband. Diphtheria killed her daughter, Marie, within four days of contraction, and following Marie's death, the Princess spent several weeks caring for her children and husband.²⁹⁰ She contracted the disease herself after direct contact with her son Ernest.²⁹¹ Although she was treated with a variety of methods, including the local application of antiseptic solutions, highly nourishing foods, and the use of stimulants, she was unable to recover.²⁹² Princess Alice died within 24 hours of contracting the disease.²⁹³ News of the death of the Princess raised awareness regarding the severity and non-discriminatory nature of diphtheria, as this infectious disease had spread quickly through the royal family. Like scarlatina, diphtheria did not actually confine itself to the poor.²⁹⁴ The outbreak of diphtheria in the Grand Ducal household challenged views that diphtheria was a class disease and provided evidence that this disease could actually affect individuals anywhere regardless of class or environmental surroundings.²⁹⁵

Newspapers of all orientations had begun reporting on the outbreak of diphtheria in the early stages of its spread in Grand Ducal household. Recycling the same telegram, early reports informing readers of the outbreak were essentially the same – the four eldest daughters had fallen

²⁸⁹ “The Illness of Princess Alice.” *London Evening Standard*, 11 December, 1878.

²⁹⁰ A. G. Whitfield, “The kiss of death (Princess Alice).” *Annals of the Royal College of Surgeons of England* 61, no. 5 (1979): 392.

²⁹¹ *Ibid.*

²⁹² “The Illness of the Princess Alice.” *Morning Post*, 20 December, 1878.

²⁹³ *Ibid.*

²⁹⁴ Hardy, *The Epidemic Streets*, 3.

²⁹⁵ Lawrence C. Kleinman, “To End an Epidemic: Lessons from the History of Diphtheria.” *The New England Journal of Medicine* 326, no. 11 (1992): 774.

The middle class and social reformers were convinced, on the basis of miasmatic disease causation, that the poor and working classes were particular aggressors and susceptible to outbreaks of diphtheria as overcrowding and filth formed the basis of disease generation.

ill with diphtheria with the state of Princesses Victoria and Alice slightly improving.²⁹⁶ The day of Princess Alice's death, December 14, 1878, is curious as a weekly newspaper was issuing a report that stated, "The latest news in reference to the condition of Princess Alice is reassuring. Fever has decreased, and the patient is altogether quieter."²⁹⁷ This was being distributed while daily newspapers reported obituaries and dedications honouring her death.²⁹⁸ It is unclear which title was first to report on the death of the Princess. Some titles, such as the *Bradford Daily Telegram* and *Sunderland Daily Echo*, covered the death of Princess Alice through short, concise reports. These reports provided little beyond the time in which the Queen received news of her daughter's death through telegram and the Princess' birthdate. Other titles, such as the *Globe*, the *Dundee Evening Telegraph* and the *Pall Mall Gazette*, dedicated longer reports to the story. These reports reminded readers of the admired characteristics of the Princess, who was considered "... all that was best and most truly womanly in daughter, wife, and mother."²⁹⁹ *The Times* published a particularly lengthy report on the death of the Princess on 16 December, 1878. Within it, fond details of her life, her contributions to family and country, and her warm and

²⁹⁶ Early reports surrounding the outbreak began on 15 November, 1878. Titles which reported this story include the *Aberdeen Press and Journal*, the *Exeter and Plymouth Gazette*, the *Shipping and Mercantile Gazette*, the *Birmingham Daily Post*, the *Morning Post*, the *North British Daily Mail*, *The Scotsman*, the *Bolton Evening News*, the *Pall Mall Gazette*, the *Nottingham Evening Post*, the *Leeds Mercury*, the *Dublin Daily Express*, the *Glasgow Herald*, the *Northern Whig*, the *Edinburgh Evening News*, the *Daily Telegraph & Courier*, and the *Liverpool Mercury*.

²⁹⁷ *Falkirk Herald*, 14 December, 1878.

²⁹⁸ On the day of her death, 14 December, 1878, titles that reported her passing included the *Pall Mall Gazette*, the *Dundee Evening Telegraph*, the *Leamington Spa Courier*, the *Shipping and Mercantile Gazette*, the *Sunderland Daily Echo and Shipping Gazette*, the *Express and Echo*, the *Clare Advertiser and Kilrush Gazette*, the *Edinburgh Evening News*, the *Bradford Daily Telegraph*, the *Portsmouth Evening News* and many more newspaper titles beyond those mentioned.

²⁹⁹ *Globe*, 14 December 1878.

giving demeanor are emphasized.³⁰⁰ Additional coverage of Princess Alice's death was continued by some titles well into 1879.³⁰¹

Coverage of Princess Alice's death consolidated views of diphtheria as a highly infectious and dangerous disease and this case increased concern for the welfare of all children as a vulnerable population for this disease. Members of the urban middle class and social reformers who were engaged in the discourse of diphtheria focused less on its treatment and more so on preventative measures. Where the responsibility of treating sick children was dominantly that of the medical profession, a new responsibility lay on these stakeholders who viewed themselves as responsible for the implementation of preventative measures that would reduce the spread of diphtheria within the London.³⁰² The welfare of the children became the concern of various members of the city, including those in medical profession, the urban middle class, and local administration.

3.3 Stretching the Boundaries of Influence

Overlapping disease theories, such as miasma or contagion theory, suggested that overcrowding of people in the city was one of the main causes of the spread of diphtheria within London. Overcrowding had been a standard issue for medical circles and one that became of particular focus in the sanitary sciences.³⁰³ Prominent sanitary reformer, Edwin Chadwick and his contemporaries believed that infectious diseases arose spontaneously in crowded and ill-smelling areas.³⁰⁴ Given the rise of urbanization during the late eighteenth and early nineteenth

³⁰⁰ *The Times*, December 16, 1878.

³⁰¹ Newspapers continued to publish reports in regard to the Princess. On 31 December, 1879, newspaper titles such as the *Oxfordshire Weekly News*, the *Chester Courant*, the *Sussex Advertiser*, the *Eastbourne Gazette* continued to report on news in memory of the Princess.

³⁰² "Diphtheria." *Morning Post*, 14 September, 1871.

³⁰³ Hamlin, *Public Health and Social Justice in the Age of Chadwick*, 169.

³⁰⁴ John Tyndall, *Essays on the Floating Matter in the Air* (London: Arnold, 1883): 18.

century, London experienced significant and rapid population growth, totalling approximately 896,000 inhabitants, in response to the need for labour.³⁰⁵ By 1851, 54% of the population of Britain was classified as urban inhabitants, living in major urban centers.³⁰⁶ The rise urban overcrowding forged environmental challenges as industry by-products polluted the urban area, created an unpleasant stench, and caused unsavoury sanitary conditions for individuals working and living in the city.³⁰⁷ Medical journals, such as *The Lancet*, stressed the relationship between overcrowding and infectious diseases, being cited often by these newspapers to provoke engagement in the standard of living debate by social reformers and the middle class, particularly focusing on the living standards of the working class.³⁰⁸ Unlike the urban middle class, the working class were not able to move away from the city and its filth, and remained in common lodgings within the city. These common lodgings were the first of housing spaces to undergo legislative control; they were known to be grossly overcrowded and fostered the production of filth within the working-class population.³⁰⁹ Social reformers, supported by the urban middle-class population, centered their attention around reforming working-class housing, constructing new streets and maintaining the adequacy of air space in order to clean up the city. By combatting overcrowding in the city, social reformers were effectively reforming another agent they attributed with the rise of diphtheria infection rates – the sanitary conditions of the city.

Because of their inability to leave the city centers, the working class was associated with and arguably blamed for the increase of filth in the city. Despite proof that diphtheria was not a

³⁰⁵ Belchem, *Industrialization and the Working Class*, 37.

³⁰⁶ Ibid.

³⁰⁷ Wohl, *The Eternal Slum*, 45.

Improvements in the metropolitan, railway construction, and rising rents increased overcrowding, particularly among the working class.

³⁰⁸ Belchem, *Industrialization and the Working Class*, 37.

³⁰⁹ Ibid, 40.

class disease, the working class was perceived as the primary hosts for the spread of diphtheria due to the virulence of the disease within that population. By reforming the living conditions of the working class, social reformers were targeting a specific community where infection was more prevalent. However, inadequate sanitary conditions were not confined to low-income housing; other parts of the city struggled with inadequate sanitary conditions. Reforming the living conditions of the working class did not offer explanation of outbreaks that occurred in other areas of the city, most notably schoolhouses.

The sanitary conditions of schoolhouses, which were also often overcrowded, were under critical scrutiny by the urban middle class.³¹⁰ Concern that schools were not only susceptible to outbreak but also capable of spreading diphtheria beyond their buildings was common. Their association with diphtheria outbreaks garnered significant attention, especially during the 1890s, when "...interest in sewer gas as a means of transmitting diphtheria gave way to concern about the role of schools in spreading disease to the community."³¹¹ As diphtheria primarily targeted children, there was an increase in debate by middle-class parents and social reformers surrounding strategies to reduce infection within schoolhouses. From parents, criticism of compulsory school attendance became a pillar in the discourse to reduce the diphtheria outbreaks in London.³¹² Bureaucrats did not support this argument from parents. In fact, the Elementary Education Act was established in 1870 which directly supported compulsory school

³¹⁰ "Infectious diseases and schools." *London evening standard*, 17 January, 1891.

Infectious diseases and their ability to spread easily among children who attended schoolhouses was a considerable topic reported on by newspaper titles. Newspaper titles reported stories regarding school attendance (*Westminster Gazette*, 11 August, 1897), the connection between diphtheria and school slates (*Nantwich Guardian* and *Crewe Guardian*, 29 Saturday, 1894), and closing schools to arrest the spread of diphtheria (*Lowestoft Journal*, 17 August, 1895, *Middlesex & Surrey Express*, 30 December, 1899). Many more reports were published by newspaper titles beyond those mentioned.

³¹¹ Hardy, *The Epidemic Streets*, 10.

³¹² "Infectious diseases and schools." *London evening standard*, 17 January, 1891.

attendance.³¹³ Instead, to combat overcrowding in schoolhouses and elsewhere, urban sanitary districts were established within the 1872 Public Health Act to ensure the proper drainage, sewerage, and environmental cleanliness of high traffic urban spaces.³¹⁴ This Act helped reduce, but did not solve, the spread of diphtheria among the child population.

With growing concern for the welfare of their children, the urban middle class engaged with medical circles to seek answers about where the disease came from, how it was so easily transmitted, and how to protect their children. Examples of diphtheria outbreaks beyond the working class reinforced the notion that diphtheria was not a class disease, especially as the reformation of working-class living conditions did not prevent the spread of the disease in middle-class spaces. Diphtheria spread easily through vulnerable populations, and as such children, regardless of class, were highly susceptible to infection. The by-products of urbanization affected everyone in the city, and thus the by-product of diphtheria outbreaks transcended beyond the working class and could spread within virtually all communities within the urban city center.

The diphtheria outbreak at Wellington College, reported on extensively by the *Morning Post* and briefly reported on by *The Times*, confirms that working-class children were not the only vulnerable population to widespread infection. Wellington College, a boys' private school open only to the middle class, experienced a sizeable outbreak during the diphtheria epidemic in 1891.³¹⁵ Prior to this outbreak, the residing doctor, Dr. Armstrong, was capable of caring for the health of the 427 boys that occupied the campus.³¹⁶ After seeing multiple cases of boys with

³¹³ Gary McCulloch, "Compulsory School Attendance and the Elementary Education Act of 1870: 150 Years On." *British Journal of Educational Studies* 68, no. 5 (2020): 523.

³¹⁴ Belchem, *Industrialization and the Working Class*, 160.

³¹⁵ David Newsome, *A History of Wellington College, 1859-1959* (London: William Clowes and Sons, Limited, 1959): 216.

³¹⁶ *Ibid.*

complaints of a sore throat, Armstrong contacted Sir Andrew Clarke, throat specialist, Dr. Woodforde, local sanitary officer, and Dr. Bristowe, senior physician at St. Thomas' Hospital, to seek guidance assessing and treating the situation.³¹⁷ Armstrong did not initially suspect the outbreak to be diphtheria. Only after outside help had been requested did the administrative panel agree to send the children home during the Christmas break.³¹⁸ Once home, the outbreak was identified as diphtheria, resulting in two deaths and twenty-three confirmed cases – these cases are assumed to have recovered.³¹⁹

During this holiday break, the school's administration discovered that the sanitary system throughout the school, which had been replaced 8 years prior in 1883, was insufficient in its operation.³²⁰ In order to ensure the safe reopening of the school, three measures were necessary: the school's sanitary system had to be entirely replaced, the campus had to be disinfected thoroughly, and alternative accommodations had to be established because the former steps were to be quite time-consuming and the entire school had to be evacuated in just a few weeks.³²¹ These measures were costly but required to reassure parents that the college was safe for their children. Despite the administration's reopening plan, the outrage of parents stemmed from the administration's inability to identify the illness in time to prevent it from spreading. The school required the boys to stay on campus, suggesting to parents that the welfare of their children would be cared for during their time at school. Parents subsequently lost trust in the school's safety measures to protect their children from infection. In order to regain this trust, parents needed accountability on part of the school's administration. A considerable retaliation

³¹⁷ Ibid.

³¹⁸ Ibid.

³¹⁹ Ibid.

³²⁰ Ibid.

³²¹ Ibid.

among parents and surrounding community members was prompted by this outbreak, one which produced action by the school.

Clark Kennedy, a parent to one of the boys attending Wellington College, wrote to the *Morning Post* expressing his discontent. He requested that parents who shared in his opinion rally in order to force the administration to reform their safety standards.³²² Over the course of two weeks, Kennedy continued to write to the *Morning Post* and was successful in rallying a group of parents and other concerned community members to hold a conference which would grant parents more autonomy in the care of their children. This call for supporters was not without opposition: many readers of the *Morning Post* wrote their own responses to the polarizing movement Kennedy was attempting to start. For example, alumni of Wellington College spoke highly of the school's administration and their ability to run a respectable school that produced equally respectable young men.³²³ In particular, one alumnus provided a full defense for the current headmaster, E. C. Wickham, and his ability to manage the school and its students.³²⁴

The inability of the school's administration to ensure the safety of their students eclipsed any argument of their defense, and ultimately Kennedy was able to gather plenty of supporters and hold the conference on January 8th, 1892.³²⁵ Initially, Kennedy suggested two members of the conference be added to the Executive Committee, a sect of the school's administration.³²⁶ The hope was that they would oversee the sufficient replacement and upkeep of the school's sanitary conditions. This motion did not pass as the conference members agreed that the expertise already

³²² "Wellington College and Diphtheria." *Morning Post*, 18 December, 1891.

³²³ "Wellington College and Diphtheria." *Morning Post*, 28 December, 1891.

³²⁴ "Wellington College and Diphtheria." *Morning Post*, 19 December, 1891.

³²⁵ "Wellington College and Diphtheria." *Morning Post*, 9 January, 1892.

³²⁶ *Morning Post*, 9 January, 1892.

found among the Executive Committee was more than sufficient in recording the school's safety.³²⁷ Instead, four men were appointed as outside agents of parental representation and were to confer with the Executive Committee to be updated with the school's conditions, holding the administration accountable and keeping information more transparent.³²⁸

Early coverage of the case of Wellington College was covered by a variety of newspaper titles. On December 1, 1891, the *Pall Mall Gazette* was the first title to publish the letter sent by the headmaster to the parents of children attending the college, warning them of the new cases of sore throat.³²⁹ That same day, other titles too covered the event with the omission of the letter. The *Nottingham Evening Post* and the *Coventry Evening Telegraph* published the exact same report which summarizes the letter to parents, stating that a serious illness had broken out at the college and emphasizing the order of Scottish physician Sir Andrew Clark to send the boys home.³³⁰ Additionally, the *Gloucester Citizen* made the statement, “what is described as ‘an illness of a nature not specified,’ but which from the description looks uncommonly like acute diphtheria...,” which was the first and only publication on that day to suggest that the outbreak at Wellington College was most likely diphtheria.³³¹ *The Times* provided an update of the situation on December 4, 1891, referencing the *British Medical Journal*’s publication that states that the causation and development of the epidemic at Wellington College was placed in the hands of Dr. Bristowe and Dr. Woodforde.³³²

Sustained coverage of the case of Wellington College was primarily covered by the *Morning Post*, however, many titles joined in the coverage following the conference that was

³²⁷ Ibid.

³²⁸ Ibid.

³²⁹ “Serious Illness at Wellington College.” *Pall Mall Gazette*, 1 December, 1891.

³³⁰ *Nottingham Evening Post*, 1 December, 1891, *Coventry Evening Telegraph*, 1 December, 1891.

³³¹ *Gloucester Citizen*, 1 December, 1891.

³³² “Wellington College.” *The Times*, December 11, 1891.

held on January 8, 1892. Surprisingly, the *Pall Mall Gazette* did not cover the outcome of the conference, but rather published a report which briefly describes the sanitary conditions of the college prior to the outbreak and alerts readers that the conference was to be held at noon that day.³³³ *The Times* was the first title to publish the entire letter written by the conference committee that was given to the administration of the college, as well as Dr. Bristowe and Dr. Wooforde's personal reports of the condition of the school and the possible causes for the diphtheritic outbreak. *The Times* dedicated nearly an entire page to the cover these reports.³³⁴ Other titles, such as *The Scotsman*, the *Daily Telegraph & Courier*, and the *Western Morning News*, published summaries of the letter, outlining the events of the conference and the resolutions which were achieved.³³⁵ Furthermore, the *Leeds Mercury* published a candid report that opens, "It seems now to be placed beyond question that the sanitary condition of Wellington College is deplorable."³³⁶ This report continues to outline the condition of the school, emphasizing how the school was saturated with sewage refuse.³³⁷

The outbreak at Wellington College showcased how parental concern for the spread of infectious disease influenced public administration to intervene in ensuring improved conditions at the school in response to diphtheria anxieties. Outside of parents, members of the community not directly associated with Wellington College took outrage at the outbreak. This case consolidated different community groups to address the issue of infectious disease as it directly challenged the wellbeing and health of children. Diphtheria did not solely affect children –

³³³ "The Outbreak at Wellington College." *Pall Mall Gazette*, 8 January, 1891.

³³⁴ "Wellington College." *The Times*, 8 January, 1892.

³³⁵ "Diphtheria at Wellington College." *The Scotsman*, 9 January, 1892., "Wellington College." *Daily Telegraph & Courier*, 9 January, 1892., "Sanitary Condition of Wellington College." *Western Morning News*, 9 January, 1892.

³³⁶ "Politics and Society." *Leeds Mercury*, 9 January, 1892.

³³⁷ *Ibid.*

parents and neighbours too felt the effects of diphtheria on the community. Parents and community members focused on preventative measures and established a general standard for administrative bodies to navigate further outbreaks. This proved effective in reducing diphtheria cases at the school and reinforced the concept of preventative measures as a successful means of ensuring the wellbeing of children in overcrowded urban spaces.

Through to the end of the nineteenth century, attention remained on the overcrowding and unsanitary conditions that facilitated disease spread, notably diphtheria, in London. Most of the urban middle class adopted and encouraged the sanitarian position of environment causation of the disease, which championed the ‘anti-contagionist’ view, claiming that sickness sprang from the harmful ‘miasmas’, or contaminated atmospheres.³³⁸ As such, members of the urban middle class frequently wrote to these newspapers to voice their complaints about the filth consuming the streets and airspace. In one report, an anonymous English woman wrote to the *Morning Post* to express her disgust with the city's sanitary conditions.³³⁹ She stated she was unsurprised at the prevalence of diphtheria in London, as there was considerable overcrowding of children in schools and poor drainage as well.³⁴⁰ Criticisms of the city’s cleanliness were common in these newspapers as demand for administrative reformation increased. As Victorian London became a more bureaucratic, “expert-driven” state, it facilitated the role of sanitary officers as integral to reducing the spread of infectious diseases.³⁴¹ The inclusion of the Medical Officer of Health in the 1872 Public Health Act made sanitary inspection compulsory.³⁴² Thus,

³³⁸ Roy Porter, *Disease, Medicine, and Society in England, 1550-1860* (London: Macmillan Education Ltd., 1987): 60.

³³⁹ “The Outbreak of Diphtheria.” *Morning Post*, 16 August, 1897.

³⁴⁰ *Ibid.*

³⁴¹ Tom Crook, "Sanitary Inspection and the Public Sphere in Late Victorian and Edwardian Britain: A Case Study in Liberal Governance." *Social History* 32, no. 4 (2007): 369.

³⁴² *Ibid.*, 372.

sanitary officers were never without work and were constantly inspecting the quality of sanitary conditions throughout the city, including streets, factories, and schools.³⁴³ Sanitary officers were heavily involved and visible in urban centers, performing thousands of inspections in Britain's major cities each year.³⁴⁴ They employed the surveillance of urban spaces as a tool to maintain a standard of cleanliness within a newly urbanized society, and to promote retrospective inspection within communities.³⁴⁵ The role of an "inspector" extended beyond the locally appointed administration; urban populations began to take on the responsibility of self-inspection.³⁴⁶ In addition to the cleaning of the city rooted in miasma theory, the employment of practices sanctioned by germ theory were applied when infectious persons were identified.³⁴⁷ Proper isolation and disinfection measures were exercised by all members of the community rather than only the preventive authorities.³⁴⁸ By reducing overcrowding and improving the sanitary conditions of the city, urban populations participated in preventative measures to reduce the spread of diphtheria. Though the classes were relatively segregated, the fight against the diphtheria outbreaks became a cooperative effort.

The diphtheria outbreaks were not a problem that simply affected the medical profession. Infectious diseases in London were increasing due to the rise of urbanization and overcrowding at the beginning of the nineteenth century and children were particularly susceptible to the dangers of infection. Medical attempts to treat infection from diphtheria mainly employed tracheotomy, though this did not address the spread of infection. As such, during the first years of the diphtheria outbreaks, tracheotomy was still being reported on in newspapers as a rare and

³⁴³ Ibid, 369.

³⁴⁴ Ibid, 370.

³⁴⁵ Ibid, 372.

³⁴⁶ Ibid.

³⁴⁷ Ibid, 379.

³⁴⁸ Hardy, *The Epidemic Streets*, 9.

formidable operation. However, as diphtheria rapidly spread through the child population, tracheotomy no longer sustained its eminent reputation. Instead, attention turned to preventative measures to reduce the spread of infection. Discourse surrounding the filth of the city, the overcrowding in major urban centers, and the sanitary conditions of gathering spaces, such as schools, became the core pillars of reformation to fight the outbreak and satisfy the need for a cleaner city. Perceptions of diphtheria as a class disease only infecting the working class were dissolved as significant public and high-class figures were affected by the disease. Those who could afford to install isolation practices in their homes were likely to prevent the spread within their families. Unfortunately, many were forced to live in common housing that promoted infection among its inhabitants. However, the value of isolation practices was disseminated and applied in hospitals through the construction of new buildings dedicated to treating fevers. The influence of the urban middle class and social reformers in reducing the spread of diphtheria helped establish pivotal health practices in the medical field, and in doing so urban middle-class populations gained more voice in matters of medical and public health affairs.

CONCLUSION

“‘And we’, said another throng of shades, ‘were that little child who lived to walk and talk and to be the favourite, and to influence the whole of this great house and make it very pleasant, **until the infection that could not be stopped** [author’s emphasis], was brought here from those poorer houses not far off, and struck us one day while we were at play, and quenched the light of our bright eyes, and changed out prattle into moaning, **and killed us in our promise!**’ [author’s emphasis]”³⁴⁹

Charles Dickens and Henry Morley, co-writers of the article *Drooping Buds*, illuminate the remorse of the loss of children in the above quote, emphasizing how the preciousness of childhood was taken and lost from children who were infected with disease. Diphtheria was non-discriminatory. The disease attacked children of all classes, and its high infection rate among the general child population of London was frightening for everyone. Not only was the loss of child life concerning, but the way in which diphtheria struck down these children was harrowing. Suffocation produced a painful death, one which most parents could not bear to see their child suffer. Given that almost all children who suffered from diphtheritic infection too suffered from asphyxia, tracheotomy was often employed in order to alleviate suffocation from the pseudo-membrane produced by the disease. Tracheotomy itself was a visceral operation. As such,

³⁴⁹ Henry Morley and Charles Dickens, “Drooping buds,” *Household Words*, 03 April, 1852. <https://www.thecircumlocutionoffice.com/drooping-buds/>

diphtheria put much at stake. The lives of infected children were at risk, with a visceral symptom being halted only by a visceral surgical operation. Determining whether the risk was worth an uncertain outcome was highly contested throughout the nineteenth century.

In this thesis, I revealed how the messiness of nineteenth-century disease understanding directly influenced the medical and middle-class response to disease epidemics. The outbreaks of diphtheria in London challenged everyone and created a venue for surgical intervention to take an important role in the treatment children. More specifically, tracheotomy became the primary operation to relieve diphtheritic children of suffocation and, despite its ability to do so, received considerable resistance as it was understood to be fraught with risk. By examining why this operation was met with such resistance, alternative methods of treatment and approaches to infectious diseases established in the nineteenth century can be better understood.

The adoption of a surgical operation is rarely a linear process as there are many factors that can determine its acceptance and diffusion. The characteristics of the operation in question, as well as the contextual factors that accompany it, influence its adoption by physicians. In the case of tracheotomy and its use on diphtheritic children, this includes the level of skill required to perform the operation, and the risk this operation poses in its use on children. Generally, physicians may be attracted to an operation if it can be easily and quickly learned and add to their existing practice with minimal disruption.³⁵⁰ In addition, if the operation offers a positive contribution to their practice, physicians may be more likely to invest time and effort into mastering the operation.³⁵¹ In the Victorian period, physicians were already equipped with the basic teachings of tracheotomy. Before the diphtheria outbreaks of the nineteenth century,

³⁵⁰ Charles B. Wilson, "Adoption of New Surgical Technology." *British Medical Journal (Clinical research ed.)* 332, no. 7533 (2006): 112.

³⁵¹ *Ibid.*

physicians were performing tracheotomies far less frequently, and so the increased demand for its use required more effort in perfecting the operation. As with any surgical procedure, some physicians were more willing than others to put forth the effort that would allow them to master the operation. This inadvertently strengthened the division among medical men as their clinical experience influenced how they argued the benefits and risks of tracheotomy in its use on diphtheritic children.

In most cases, when a surgical procedure becomes more frequently used and is quickly adopted by some physicians without proof of its clinical indications, it often falls under the lens of scrutiny. Physicians who are resistant to adopt these procedures will question the efficacy it has when used by less experienced physicians, as well as the effect the skill level of the physician may have on the patient.³⁵² By outlining the risk involved in adopting and performing the procedure, physicians who are resistant to the operation amplify anxieties towards the operation not only among themselves, but among parents and other stakeholders. If the question of whether or not the operation is required, these parties must then weigh its risks and benefits to decide whether or not to allow the surgical procedure to proceed. When a surgical procedure has not undergone sufficient clinical trial or has not produced the outcomes that were intended for, this decision becomes even more difficult.

Scrutiny by resistant physicians focuses on the drawbacks of the operation, and when accompanied by the widespread attention in the media, this may influence public and medical opinion. This may also initiate and hasten an unwarranted abandonment of the operation. As discussed in Chapter Two, the unfavourable outcomes produced by physicians exercising tracheotomy in cases of diphtheritic children were widely publicised, influencing the early

³⁵² Ibid, 113.

phases of its adoption and contributed to the lack of consensus among medical circles. When considering a controversial surgical operation, physicians have to weigh the benefits and risks associated with the operation and assess how these could affect their ability to continue their practice. Adopting a surgical operation has complex effects on physicians' professional careers. Physicians must consider how,

“use of a new [or revived] surgical technology has the potential to provide patients with the best possible care while reinforcing the professional vitality of the surgeon and the institution, boosting their image, and providing a competitive advantage. Conversely, that decision also has the potential to sully reputations, waste resources, and cause inadvertent harm to patients.”³⁵³

When considering exercising tracheotomy in cases of diphtheritic children, physicians made their decision based on their own experiences with the operation, as well as the experiences of medical colleagues, and the mortality rates of diphtheria cases in children. Physicians also had to consider the evasiveness of diphtheria, their ability to identify the disease and knowing when to employ tracheotomy at the appropriate time. Some questioned the value of the operation to reduce a disease the medical field did not fully understand. Detractors argued that a physician's skill and ability to perform a procedure is unimportant if the operation should not be done in the first place.³⁵⁴

In Chapter 1, I discussed the ways in which tracheotomy was supported and contested by opposing medical circles. Before the outbreaks of diphtheria in nineteenth-century Europe, tracheotomy had a long history of proven success in removing obstructions from the larynx and opening the airway for the reinspiring of breathing. The operation was generally accepted as a beneficial surgery that had the ability to be successful. However, despite the operation being considered minimally invasive, surgery of any kind was feared as infection or sickness so often

³⁵³ Ibid, 114.

³⁵⁴ Ibid.

led to death.³⁵⁵ It is during the outbreaks of diphtheria in the nineteenth century that tracheotomy came under intense scrutiny as to its ability to be successful. Many cases of childhood diphtheria required surgical intervention to allow for a chance at the prolonging of life for the patient. The increased application of tracheotomy resulting from the increase in diphtheritic children created dissension within the medical profession that made the operation highly controversial.

The discourse and application of treatments and surgeries on children to remedy infectious diseases reflected the changing value of the lives of children in the nineteenth century. It is in the Victorian period that a new construction of childhood was established that distinguished childhood as ‘priceless’ and ‘precious’.³⁵⁶ Physicians became directly involved in the protection of children as pediatric medicine as a specialism came to be developed in the second half of the century.³⁵⁷ However, despite the growing specialism, the surgery of children remained a complicated and high-risk field throughout the Victorian period. Parents were forced to make the decision of whether to consent to treatment, ultimately inflicting pain upon their child. Many hesitated or refused.³⁵⁸ Surgery had such a visceral reaction that many parents were inclined to watch their child suffer from their affliction rather than consent to the infliction of pain by the physician.³⁵⁹ Parents played an important role in the decision-making process in surgery, as physicians were partially dependent on their consent in order to operate.³⁶⁰ For parent and physician, it was difficult to participate in an operation which did not guarantee the saving of the patient’s life. Some physicians were reluctant to operate on children, and some refused

³⁵⁵ Stanley, *For Fear of Pain*, 242.

³⁵⁶ Viviana A. Zelizer, *Pricing the Priceless Child: The Changing Social Value of Children* (New York: Basic Books, 1985): 96.

³⁵⁷ Stanley, *For Fear of Pain*, 245.

³⁵⁸ *Ibid*, 248.

³⁵⁹ *Ibid*, 248-9.

³⁶⁰ Thomas Schlich, “Patient Choice and the History of Minimally Invasive Surgery.” *The Lancet* 388, no. 10052 (2016): 1369.

entirely.³⁶¹ This was in part because children were less-than-ideal patients. Many were unable to explain their pain or symptoms, and once under the knife, were extremely difficult to keep still or quiet. In addition, physicians had to consider their reputation as well as their technique, making one's own confidence another factor in the decision to operate.³⁶² Performance of this surgical operation was only granted when all the necessary elements came together to justify the procedure. These elements included the willingness of the physician to perform, the assessment of the patient as a good candidate for the procedure, and the willingness of the parents to consent.

In order to understand why different stakeholders, such as parents, the urban middle class, and social reformers, contested tracheotomy as a treatment procedure for diphtheria-stricken children, several factors must be considered. Many of these stakeholders contested and debated the use of the procedure and its potential success within the context of surgical risk during the nineteenth century. For tracheotomy, the measure of success should be the ability to open up an airway and reinspire breathing in the patient. That is the true role of the operation. Before the outbreaks of diphtheria in London, success in tracheotomies were understood in this way. I previously mentioned two accounts of acute suffocation that were published in newspapers that described the condition of each patient and their need for the operation. In the first case, a young girl had committed suicide. The doctor had opened the trachea and pressed upon the chest to reinspire breathing, however, this proved useless as she was already dead. Tracheotomy was not considered a failure in this case as the coroner had stated the girl was dead before the operation had begun.³⁶³ The operation was only performed at the request of her

³⁶¹ Stanley, *For Fear of Pain*, 250.

³⁶² Schlich, "Patient Choice", 1369.

³⁶³ *London Evening Standard*, 17 December, 1828.

parents, as was recorded in the case account, to satisfy their need to know of the “impossibility of restoration”.³⁶⁴ In the second case, the patient experienced sudden swelling of the throat resulting from numerous bee stings. Tracheotomy was performed, though the patient had died at the start of the operation. Because the patient had died before the operation was completed, it was not considered a failure. The only published critique received in this case was that the pulse had been so shallow that it was almost imperceptible, and as such a stimulant should have been provided prior to the operation to give a greater chance at better results.³⁶⁵ The published accounts of multiple cases where tracheotomy was not considered a failure suggests that, prior to the diphtheria outbreaks, the operation was accepted by medical circles and the general public as one that could be successful in the job it is meant to do.

An inappropriate and inaccurate understanding of the measures of success in tracheotomy caused the operation to become directly linked with the death or recovery of the patient it was performed on. Tracheotomy does not have the ability to cure the body of infectious disease. It in no way offers treatment of the bacterium within the body. Instead, tracheotomy is an operation that treats a symptom caused by diphtheria. The true measure of success should be whether tracheotomy is able to halt suffocation in diphtheritic children when it becomes the most dominant mode of attack by diphtheria. The new valued life of the child, combined with the appearance of suffocation in the later, more severe stages of diphtheria, established tracheotomy as a last resort effort to try and save the life of the child. This reputation as a last resort operation misconstrued the role of tracheotomy and the outcome it was intended to produce. It was not a hail-Mary that could determine life or death for the patient beyond suffocation. Because of this interpretation of the procedure, tracheotomy essentially adopted diphtheria’s high mortality rate.

³⁶⁴ Ibid.

³⁶⁵ "A Man Stung to Death by Bees." *London Evening Standard*, 19 December, 1827.

Physicians were often associating the outcome of tracheotomies, successful or unsuccessful, with the results of whether diphtheritic children lived or died. By not separating the two outcomes – the outcome of the operation and the outcome of the patient – this made tracheotomy appear to have a far greater risk of death than it actually possessed.

In the majority of cases, the true killer of children infected with diphtheria was blood poisoning.³⁶⁶ Blood poisoning occurred undetected to physicians and parents during this period. In contrast, suffocation from the pseudo-membrane was easily identified and could be swiftly intercepted by tracheotomy. However, if the patient's body accumulated high blood poisoning levels, it was unlikely that the child would recover. Most often, blood poisoning occurred after the obstruction of the trachea, as it was most often the symptom which followed that of the pseudo-membrane. As such, tracheotomy did not serve to treat blood poisoning. The operation was never intended to cure the disease. Instead, it was a surgical procedure that addressed a symptom of diphtheria which could stall the effects of the disease in patients to provide the body more time to fight off the causative agent of diphtheria. Unfortunately, due to the undetected nature of diphtheritic blood poisoning during this period, cause of death for children who succumbed to blood poisoning was often incorrectly determined as a result of the use of tracheotomy.

In Chapter 2, I showcased how two London newspapers influenced and reflected urban middle class opinion surrounding diphtheria and the role of tracheotomy. The Victorian period saw an explosion of newspaper publications resulting from three determining factors: the rise of literacy, new printing technologies, and an improved transportation and distribution system

³⁶⁶ Mackenzie, *Diphtheria; its Nature and Treatment*, 69.

allowing these papers to reach the outermost parts of the country and beyond.³⁶⁷ This increase in overall newspaper readership consolidated periodical literature as a vital component of Victorian culture.³⁶⁸ Titles of all orientation and audience were reporting on major stories of the period. Notably, infectious diseases and public health initiatives were topics widely covered by a variety of newspaper titles circulating throughout the nineteenth century as both affected members of any and all classes.³⁶⁹ The effects of infectious diseases on the child population of London were widely publicized in the newspaper press, especially the statistical mortality of children infected with diphtheria. Additionally, the efforts of medical professionals to combat diphtheria, including their triumphs as well as their shortfalls, were broadcast throughout the city. The reading public became increasingly aware of the medical field's inability to treat the disease and saw this reflected in the statistical mortality rates of children in the city which were published each week. Within the context of a shifting view of children and an increased commitment to their health, the urban middle class began to utilize their own knowledge to combat the spread of infectious disease in the city. This aligned the interests of the medical profession and the urban population to respond to children as a vulnerable community during this period. Thus, the newspaper press offered the potential to stimulate discussion surrounding the health of city and the severity of public health problems.³⁷⁰

The inability of physicians to contain and treat diphtheria was highly publicized by the newspapers. This may have given the urban population little confidence in the medical field to

³⁶⁷ Rosemary T. VanArsdel, "Retrospectives: Early Victorian Periodicals Research." *Victorian Periodicals Review* 50, no. 2 (2017): 419

³⁶⁸ *Ibid*, 420.

³⁶⁹ Clare Horrocks, "The Personification of 'Father Thames': Reconsidering the Role of the Victorian Periodical Press in the 'Verbal and Visual Campaign' for Public Health Reform." *Victorian Periodicals Review* 36, no. 1 (2003): 2.

³⁷⁰ *Ibid*, 6.

reduce the infection rates of children effectively. Members of the urban middle class were not particularly interested in the discourse surrounding the efficacy of a surgical operation to save the lives of children. Instead, they were focused on ultimately reducing the number of children who were infected with the disease. By reducing the number of children infected with diphtheria, they would effectively reduce the number of children who would require a tracheotomy. If there were altogether less cases of diphtheria in the child population of London, there would be less of a need to employ tracheotomy as there would be fewer children infected and reaching the point of suffocation. Furthermore, reducing the number of infected children would grant members of the medical field more time and opportunity to understand the disease without it completely ravaging through the child population unabated. Emerging nineteenth-century disease understanding supported preventative measures as an effective strategy to reduce the spread of infectious diseases, including diphtheria.

Health in the nineteenth century was of increasing importance and urban populations began to support a larger role for government and public officials to enact public health measures that would ensure better urban health.³⁷¹ This included the implementation of more efficient sewage systems, the regulation of urban housing, and the monitoring of water supplies. The general health of the urban public had come to be considered a civil right in its own regard, and the state became obligated to protect its citizens.³⁷² This initiated a widespread movement by social reformers, supported by the middle-class, toward adequate and modernized sanitary conditions and standards. Knowledge and methods of sanitation were available long before the nineteenth century, including improved space, ventilation, proper drainage and water supply, and

³⁷¹ John M. Eyler, "Mortality Statistics and Victorian Health Policy: Program and Criticism." *Bulletin of the History of Medicine* 50, no. 3 (1976): 337.

³⁷² *Ibid.*

overall cleanliness. However, it was in the Victorian period that the implementation of these methods of sanitation were fully and forcefully instituted. Sanitary reformation became a cooperative effort by public health administrations and the urban population. Isolation and cleanliness practices were utilized in public and private spheres in an attempt to reduce the spread of infection at home, at work, or at school. Additionally, a drastic reformation of working-class housing became the focus of public and legislative attention, as overcrowding of this population in the city was understood to be a major contributing source of filth and disease, encouraging the transmission of infectious diseases, including diphtheria. Given that there was a general dislike for surgical intervention by those outside of the medical profession, the virulence of diphtheria and its attack on children sparked immediate action to reform the city and ensure the health of the child population.

Despite the widespread implementation of preventative sanitary measures during the nineteenth century, outbreaks of diphtheria continued to occur endemically throughout London, as preventative efforts did not eradicate infectious disease but rather reduced case numbers. The evasive nature of diphtheria required far more than preventative measures to ensure a significantly reduced infection and mortality rate among children. Innovations and discoveries in medical science was the true approach that solved the problem of diphtheria outbreaks in London. However, the cooperative effort between the medical profession, public administration and social reformers, and the urban middle class to imbue preventative measures into the sanitary conditions of the city arguably began the modernizing process of improved urban living conditions within London, which aided in the reduction of infection rates within the city.

Diphtheria in children remained a serious problem throughout the second half of the nineteenth century and into the beginning of the twentieth century in London. During the 1880s

and 1890s, the rise of bacteriology contributed to disease-controlling measures to mark the beginning of the end of diphtheria outbreaks in London. In particular, a number of infectious disease bacilli discoveries, including the causative agents of tuberculosis and cholera bacilli, reduced outbreaks of these respective diseases. In 1884, microbiologist Edwin Klebs and bacteriologist Fredrick Loeffler discovered the bacillus, identified as *Corynebacterium diphtheriae*, that causes diphtheria.³⁷³ This was extremely important in understanding the disease and encouraged increased medical interest in finding the cure for diphtheria. In 1889, physiologist Emil von Behring joined bacteriologist Shibasaburo Kitasato at Robert Koch's Institute for Hygiene to develop a cure for diphtheria.³⁷⁴ They produced a diphtheria 'antitoxin' which, in their trials, neutralized the toxins produced by the diphtheria bacillus and arrested disease progression, thus protecting the injected test-animals.³⁷⁵ In 1891, Behring used his newly created antitoxin on a severely ill, 8-year-old boy with diphtheria.³⁷⁶ This boy made a full recovery and was a pivotal clinical case in promoting the success of the antitoxin against the dangerous causative agent of diphtheria.³⁷⁷ The creation of the antitoxin was paramount in the treatment of diphtheria, and not surprisingly, Behring received a Nobel Prize in Physiology or Medicine in 1901 for this achievement.³⁷⁸

Nevertheless, as with any new medical innovation, the antitoxin had its skeptics due to the uncertainty of any potential side effects or dangers it may produce.³⁷⁹ Similar to the

³⁷³ Raju Tonse, "Emil Adolf von Behring and Serum Therapy for Diphtheria." *Acta Paediatrica* 95, no. 3 (2006): 258.

³⁷⁴ Ibid.

³⁷⁵ Ibid.

³⁷⁶ Ibid.

³⁷⁷ Ibid.

³⁷⁸ Ibid.

³⁷⁹ Victoria Lynn Anderson, "Promoting Childhood Immunizations." *The Journal for Nurse Practitioners* 11, no 1. (2015): 2.

uncertainty and eventual adoption of intubation by British physicians, the antitoxin was initially subject to much criticism. Clinical statistics in the use of the antitoxin were integral in shaping its widespread acceptance. With the application of the antitoxin, mortality rates dropped from 50% to 13% in diphtheritic children during the beginning of the twentieth century. However, diphtheria's mortality rate fell drastically even earlier, dropping significantly in the mid-1890s, resulting from the application of laboratory science and the antitoxin as a cure.³⁸⁰ Ultimately promoted by virtually all medical circles, the antitoxin became the dominant preventative measure against diphtheria and its widespread use effectively marked the end of the diphtheria endemic in London in this period. Its global distribution thereafter stemmed diphtheria outbreaks in many countries during the twentieth century.

The rise of diphtheria between 1851 and 1900 in London created an arena for the medical profession to showcase the possibilities of surgical intervention in treating sick children. However, case experiences shaped physicians' skills, patient success rates, and the larger adoption and acceptance of a procedure by physicians and urban population. This was problematic for tracheotomy as cases where the operation was required were in their most severe state, and the bodies of infected children were unable to fight off the causative agent following the reopening of the airway. As the medical field was grounding itself as a scientific discipline through increased interest and discoveries in bacteriology, the value of surgical intervention became misunderstood as physicians contested new theories of medical innovation. Clearly, surgical intervention was simultaneously accepted as a means to treat a symptom of the disease and contested for its uncertainty within the context of surgical risk, especially on children.

³⁸⁰ Worboys, *Spreading germs*, 254.

Eventually, medical innovations in the understanding of diphtheria, as well as treatments to reduce its ferocity, eclipsed the controversy over tracheotomy. By drastically reducing the number of cases of diphtheria, the antitoxin effectively ended the use of tracheotomy in cases of diphtheria. The arrival of the antitoxin as a preventative measure quieted any controversy over the use of tracheotomy on diphtheritic children, as the operation was no longer required. The symptoms of children who received the antitoxin did not progress to the most severe stages, making tracheotomy completely unwarranted in any new cases of diphtheria following the discovery of the antitoxin. With the urgency for surgical treatment no longer present, discourse surrounding the value of tracheotomy simply diminished. Advocates and detractors of tracheotomy never resolved their debate as it was no longer relevant. As such, the nineteenth century, specifically 1851 until the end of the century, has become a unique period of time where tracheotomy ascended to center stage and illuminated the dissension within and between the medical field and the urban middle class. Measures of risk and success are highly influential in the decision-making process and directly impact medical and public reception of medical treatments and procedures. However, even an operation that is the topic of controversy will continue to be performed when there are droves of children dying from a disease that has yet to be resolved by medical professionals.

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