"250 years ago, the first hospital in Leicester was opened. Reflect on what inspired and challenged people then, and now"

The Leicester Infirmary was the first hospital to open in Leicester, but this is not to say that care provision to those most in need had never been provided previously. Descriptions of hospitals and almshouses which opened during the 16th century throughout Leicestershire are well-documented and these institutions continued to provide care into the 20th century (1). The word 'hospital' was defined as 'shelter for the needy' from the mid-13th century Old French 'hospital', and from Latin 'hospitale' as a 'guest-house' (2). The clear requirement of those most vulnerable in the community in Leicester from the 16th century to present day for care has not changed and this need precipitated the founding of the Leicester Royal Infirmary in 1771 (then the Leicester Infirmary), by Dr William Watts. Dr Watts raised the £2,200 needed to build the hospital through fundraising and donations from the rich of the city (3). This philanthropism holds similarities to the charities working within University of Hospitals of Leicester (UHL) today.

The idea of poverty and the need to provide support for those most in need continues into present day. In 2020 in Leicester, 35% of the population lived in the top 20% of deprived areas nationally (4). The health and social implications of this statistic include the impact of poor-quality housing, leading to respiratory and cardiovascular disease (5). Those living in more deprived areas also have lower life expectancy, are more likely to smoke and have higher rates of mental health problems (5). Despite many facing the challenges of poverty in our city today, as the need for almshouses suggests, poverty in Leicester is not a recent phenomenon. There are descriptions from the 17th century noting 53% of households were poor, and there were proposals of bills in the early 18th century for establishing workhouses for the poor (6). In the 1770s households are likely to have been overcrowded, just as 20% of adults live in overcrowded households in Leicester today (an increase of 59% from 2001-2011) (5). Today higher rates of transmission of tuberculosis (40.5 per 100,000) than the national average (8.3 per 100,000) continues to be a problem in Leicester (7), just as other communicable diseases such as smallpox would have caused similar problems in the 1770s. Therefore, tackling inequalities in health in Leicester is an ongoing challenge and the need to support those in poverty has continued over the last 250 years.

One particular challenge in public health during the time the Leicester Infirmary was opened also inspired many individuals to find ways to improve healthcare. Smallpox was accountable for 6-10% of all burials in London in the 18th century (8) and was epidemic in Britain. Lady Mary Wortley Montagu brought the method of Variolation (immunisation through infecting patients with the pus from those with mild disease) to Britain in the 1720s (9), triggering interest into research of smallpox vaccination. 25 years after the Leicester Infirmary was opened, Edward Jenner successfully demonstrated the use of cowpox inoculation as a vaccination for smallpox (10) and was the first to use scientific investigation of vaccination to prevent disease (11). His work triggered the start of further research into vaccination which has altered public health today. One notable comparison includes the rapid recent development of a COVID-19 vaccination, which was possible due to the hard work of scientists inspired to work in the interest of public health today and has parallels with the search for a smallpox vaccine.

The use of vaccination in public health has altered the diseases which our population; causes of mortality in 1771 when the Leicester Infirmary opened were very different to the causes of mortality today. Even until the early 20th century infections such as tuberculosis constituted the largest cause of death (12). According to the World Health organisation, in 2020 noncommunicable diseases accounted for 80% of the top 10 causes of death worldwide, with ischaemic heart disease, stroke and chronic obstructive pulmonary disease accounting for the top three (13). Challenges faced by healthcare professionals today in promoting healthy eating, physical activity and other lifestyle changes are therefore very different to the healthcare needs of the Leicester population in 1771, where communicable diseases were the biggest problem and there was not even running water in the Leicester Infirmary or the city itself (3).

Of course, one communicable disease in particular has had our attention over the last few years. The COVID-19 pandemic began on the 11th March 2020 (14) and the challenges associated with a novel communicable disease surfaced within our society today. These challenges included the need to understand the route of transmission, reducing transmission and vaccination, and hold similarities to the processes used at the time the Leicester Infirmary was opened in understanding the smallpox epidemic. There have recently been members of the public and healthcare professionals sharing their anti-vaccination viewpoints and misinformation regarding COVID-19, provoking a challenge for those promoting vaccination to the public. In Leicester this challenge was also seen during the 19th century. Just 100 years after the Leicester Infirmary was built, Leicester became known for the strong anti-smallpox vaccination opinions of many people living in the city (15). The 'Leicester Method' is well described and was created by those against vaccination as an alternative to vaccination (15). The 'Leicester Method' involved sending people to one hospital in order to isolate away from the community, to reduce transmission of the disease (15). This holds similarities to the requirement for 'lockdown' and self-isolation over the last few years to reduce the transmission of COVID-19. Inspired ideas formed by forward-thinking individuals about methods to reduce the transmission of disease are still in use today and have formed part of the public health approach to the management of COVID-19.

When the Leicester Infirmary opened its 40 beds to the public in 1771 (16), the practice of Medicine was very different to how it is practiced today. Women would not be allowed to become doctors until 130 years after it first opened (10). Anaesthesia and antiseptics were not used in surgery until the mid-19th century and blood groups were only discovered in 1902 (10). Although much progress had been made in Medicine before the 1770s, there were clearly many challenges which prevented the standard of care for patients which we expect today. Even the art of Medicine itself at the Leicester Infirmary would have been different to the theory we use today. Only in the early 19th century did Pierre-Charles Alexandre Louis, a French clinician, formulate the modern approach we use in patient assessment (17). His novel approach, which highlighted the importance of systematically determining the patient's presenting complaint, their medical history, performing an examination and (if they later died) autopsy (17), inspired change in the practice of Medicine in Europe. The impact of his work would have changed the perceptions of

clinicians working in the Leicester Infirmary and altered the way patients in Leicester were assessed.

Today, Leicester is a centre for ground-breaking research, and attracts funding for a huge variety of clinical trials and laboratory studies (18). Standard research methods, which usually include controlled trials using a treatment arm and a control arm are normal practice today. However, this methodology was not routinely used until more than 20 years after the Leicester Infirmary opened. Pierre-Charles Alexandre Louis was also one of the first clinicians to introduce the concept of statistics into medical research (17). He coined 'la methode numerique', which involved taking groups of patients and stratifying them based on their treatment (in this case, bloodletting) (19) and demonstrated that bloodletting was unlikely to be of use in treating pneumonia (19). Individuals who contributed to developments in Medicine inspired future clinicians to make the progress we have made in research today. One relevant example is that of ECHMO in Glenfield Hospital. 200 years after the Leicester Infirmary opened its doors, Frimin and Sosnowski were the first to bring the pioneering ECHMO therapy to the UK, and did so to Glenfield Hospital (20). Glenfield is the only hospital in UK which provides ECHMO for adults and children, and does so thanks to forward thinking clinicians working today. Even more recently, clinicians and researchers in UHL have pioneered world-leading research into ethnicity and COVID-19, inspiring and prompting research across the world, and demonstrated how the demographics of the people of Leicester have altered the impact of the disease in our city (21).

Over the last 250 years there have been major advances in science, healthcare and the formation of epidemiology. Several of the challenges faced by the people of Leicester remain the same: notably, poverty. Forward-thinking, innovative individuals throughout history have inspired change and advocated for improvements in healthcare, including in Leicester. As a medical student in Leicester today it is certainly inspiring to have learnt about the history of the hospital which I tread the corridors of each day. Although much change has occurred since the Leicester Infirmary first opened, at its heart UHL is continuing to provide the same service it aimed for 250 years ago, of which is also our basis for practicing Medicine: giving care to those in need.

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