

ENQUIRING MINDS

Hand washing has played a vital role in preventing disease long before COVID-19. Though the path to its discovery wasn't straightforward

Midwives played a central, if uncomfortable, role in the first study that showed that careful washing of hands stopped the transmission of infection. In 1795, Alexander Gordon published his *Treatise on the Epidemic of Puerperal Fever* in Aberdeen. Giving birth at that time carried a reasonable risk of the mother dying. If she developed puerperal, or childbed, fever it was a protracted and agonising death.

Gordon was a Royal Navy surgeon who came back to Aberdeen to practise midwifery. He had witnessed puerperal fever infecting whole wards in a London hospital, but was puzzled how it could spread relatively easily among home births in Aberdeen.

He looked carefully at the records of 77 women infected between 1789 and 1792, of whom 28 had died. Most of these births had been attended by midwives and some by Gordon himself. This was an era before the development of trained midwives and obstetricians as we now know them. No one had a clue what caused the fever. The most common explanation was 'miasma', something in the air, and the cure was based on purging – taking large amounts of blood from the mother who might have had opium to ease the pain.

Gordon's genius was to see a pattern: the infection appeared only after he or the midwives had come from a previous patient infected by the disease. They were the source of the infection.

His advice was clear: "The patient's apparel and bed clothes ought either to

be burnt, or thoroughly purified; and the nurses and physicians, who have attended patients affected with the puerperal fever, ought carefully to wash themselves, and to get their apparel properly fumigated before it be put on again." But this wasn't well received.

Gordon was far ahead of his time in meticulously providing evidence and summing this up in a table. The trouble was that this also showed the names and addresses of patients and the names of birth attendants (Gordon or the midwives). It led to great hostility when his paper was published. Midwives were outraged that they had been identified and the suggestion they were in effect killing their patients.

Gordon was hounded out of Aberdeen. He gave up midwifery, re-joined the Navy and died in 1799



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Semmelweis was appointed assistant physician at Vienna General Hospital in 1846. He was intrigued at the difference in maternal mortality rates at its two maternity clinics. They were more than twice as high in the one that trained medical students and carried out post-mortems than the other, which trained midwives. Semmelweis explored several hypotheses, but his turning point was also the death of a pathologist colleague from sepsis contracted cutting a finger in an autopsy of a puerperal fever victim.

He was convinced that infection was spreading because doctors were taking little bits of cadaverous flesh from post-mortems. Semmelweis told his medical staff to clean their hands and instruments not just with soap but with a chlorine solution; not because he had stumbled on its disinfectant properties, but because it got rid of the smell of the flesh. As a result, maternal mortality dropped to the levels of the midwives' clinic.

Semmelweis tried to persuade colleagues in Austria and across Europe to follow his example, but encountered vicious opposition. Eminent physicians whose reputation and income depended on their sound judgement disliked being corrected. Tact was also not Semmelweis's strong suit – he gave as good as he got. Nor was he helped by his failure to publish his results until 1861, which gave his opponents years to mock him based on their interpretations rather than his evidence.

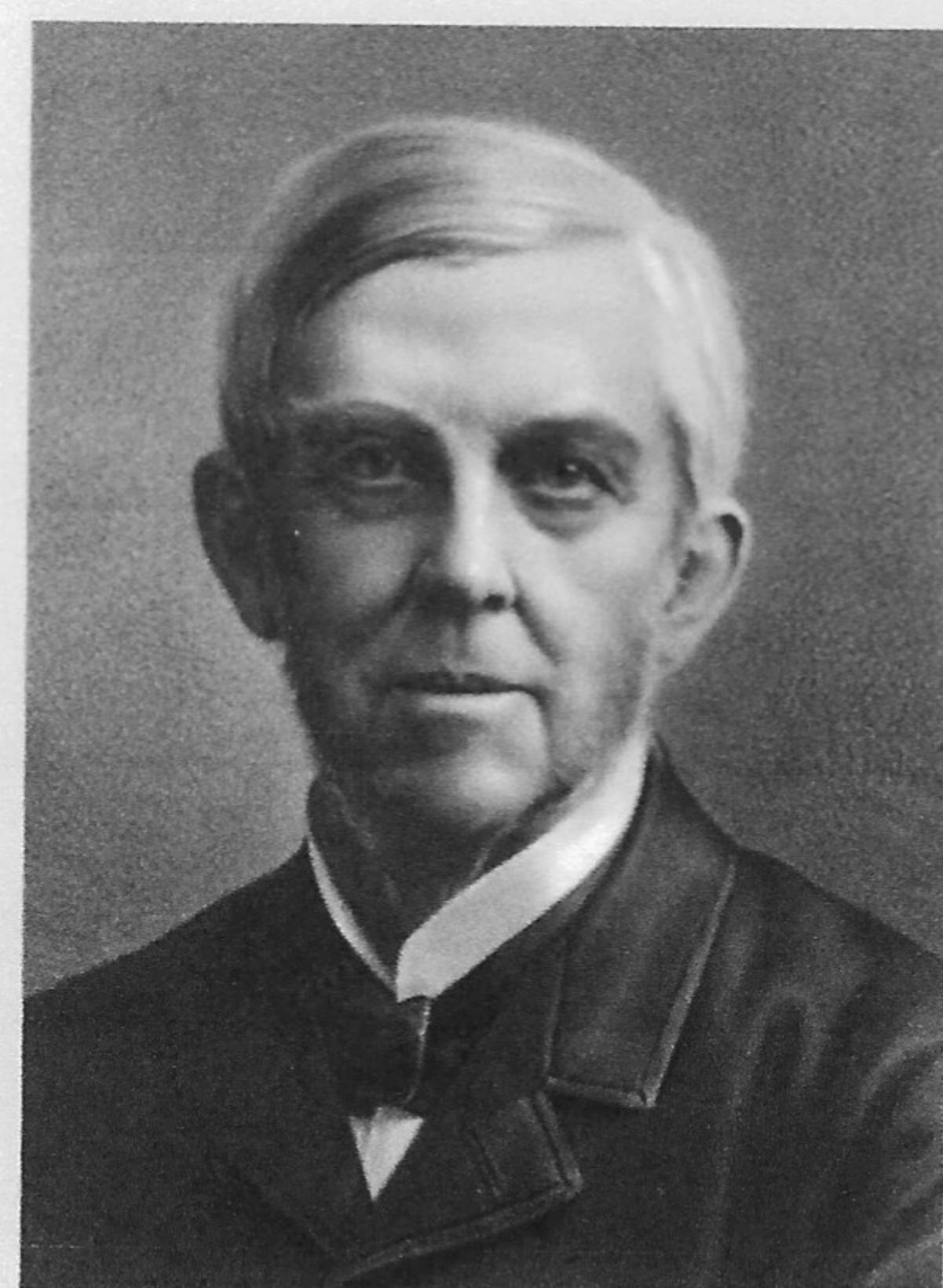
He got angrier, started drinking heavily and became sufficiently unbalanced to be tricked into being committed to a mental asylum in 1865. He was beaten trying to escape, which

from tuberculosis. However, his paper was published widely and his theory was later taken up by other doctors – Oliver Wendell Holmes in America and Ignaz Semmelweis in Vienna.

Challenging established thinking

Holmes drew on Gordon's treatise with further research in Boston in his paper published in 1843 and was ridiculed for it. He was prompted in part by the death of a doctor one week after performing a post-mortem on a woman who had died from puerperal fever.

He wrote: "It would seem incredible that any should be found too prejudiced or indolent to accept the solemn truth knelled into their ears by the funeral bells from both sides of the ocean – the conclusion that the physician and the disease entered hand in hand into the chamber of the unsuspecting patient."



American Oliver Wendell Holmes was ridiculed for the paper he published in 1843, which drew on Alexander Gordon's theory



likely left him with a wound to his hand. This became gangrenous and he died two weeks later, aged 47.

Everything changed soon after the death of Semmelweis, with research by Louis Pasteur identifying bacteria as the agents of infection. The value of rigorous hand washing was the cornerstone of Florence Nightingale's teachings and nursing and midwifery training by the 1890s.

Clinical research

What lessons are there for midwifery research now? Another Austrian escapee has some good tips.

Lisbeth Hockey, a refugee from the Nazis, later became a trailblazer for nursing research in the UK. Her advice was not to fear asking questions about current practice – in her case this started in London as a probationer in 1940. She suggested the type of bed linen might be causing bed sores among patients only to receive a stern rebuke from her ward sister.

It seems that good research needs not only a curious mind but also proper planning, tactful engagement, timely publication and allowing the results to speak for themselves.

Lisbeth said successful researchers needed five attributes: curiosity, competence, integrity, common sense and a sense of humour. "Despite all its hazards and problems, to be involved

REPORTING OF MATERNAL DEATHS

In 1917, Matthew Hay, the Aberdeen's medical officer of health, launched the world's first confidential inquiry into maternal deaths.

That study revealed a great deal: underreporting of non-fatal sepsis, which had a much higher incidence in maternity homes and hospitals, and the mortality rate in cases attended by midwives was less than half of those attended by doctors. It triggered further inquiries in Scotland and was copied across the UK and internationally.

Mary Breckinridge, who based her Frontier Nursing Service in Kentucky on the model she witnessed in the Highlands and Islands, calculated in 1924 that more women in the USA had died in childbirth than men had been killed in all wars (including the American Civil War).

The sharpest fall in UK maternal death rates was achieved in the 1940s – mainly due to the first antibiotic, prontosil, discovered in Germany in 1933, and blood transfusion services.

MORE INFO

Watch RCM's introduction to research at bit.ly/Researchstrat
Read the strategy at bit.ly/RCMRStrat

Clinical research helps elevate the authority of the profession

in research is a wonderful experience. Don't be put off but enjoy it," she added.

Thankfully the focus later shifted from apportioning blame to investigating patterns and learning lessons to prevent future deaths.

Today, those involved in clinical research regularly note that they can't imagine doing anything else and that the research speaks for itself by bringing huge benefits both to colleagues and the women in their care. In addition, it helps elevate the authority of the profession in the medical world. The RCM believes so strongly in the power of clinical research that, in October 2020, it launched its own research and development strategy to encourage more midwives to consider incorporating research into their day-to-day practice.

Meanwhile, it's worth remembering that more than 400,000 women still die every year across the world in childbirth for want of any care of a midwife or doctor. Hand washing remains essential but impossible in so many places where there is no access to clean water. 