PERINATAL LESSONS FROM THE PAST

Sir George Newman, MD (1870–1948) and the prevention of perinatal disease

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At the start of the 20th century, 15% of all infants in England and Wales died in the first year of life. Newman's classic work *Infant mortality*, published in 1906, identified the causes of these deaths, the significance of the period immediately after birth, the social problems underlying mortality, and possible methods of prevention. Later, as chief medical officer to the Board of Education (1907–1935) and to the Ministry of Health (1919–1935), he achieved many important and wide ranging improvements to the health of infants and children.

pointing out that infant mortality had not fallen over the previous 50 years:

"The young of all animals are more susceptible than the adult to the influence of environment and the approach of death. Hence, it is inevitable that, even under the most favourable circumstances, the deaths of infants will furnish a large contribution to the bills of mortality. As civilisation advances, however, this should become less. That it does not, in fact, become substantially less is surely a matter calling for consideration, for at the present time there is an annual loss to England and Wales of 120,000 lives by the death of infants ... A high death rate of infants is an indication of the existence of evil conditions in the homes of people ... Poverty is not alone responsible, for in many poor communities the infant mortality is low. Housing and external environments alone do not cause it, for under some of the worst conditions in the world the evil is absent. It is difficult to escape the conclusion that this loss

George Newman (fig 1) was born in Leominster, Herefordshire, on 23 October 1870.^{1 2} His father, Henry Stanley Newman, was a minister of the Society of Friends who had made several missionary journeys to India. He was also editor of the Quaker journal *Friend*. His mother was Mary Anne Pumphrey. They had six children, three boys and three girls. George was the fourth child and the second son. He received his education at Sidcut School in Gloucestershire (1881–1885) and then at the Quaker school Bootham in York (1885–1887). He grew up an optimistic and idealistic boy with a love of natural history, a desire to seek out the cause of problems, and with a devout Christian faith. At first he wished to be a missionary in India, but then decided to become a doctor. In 1887 at the age of 17 he began to study medicine first at Edinburgh University and afterwards at King's College, London, graduating in 1892. While in Edinburgh he gained firsthand experience of the city slums and even established a dispensary in the Cowgate. Three years after qualification, Newman gained the MD (Edin) with gold medal, and, having won a Gunning scholarship in public health, then acquired the DPH (Cantab, 1895). In 1896 he became a demonstrator in bacteriology and lecturer in infectious diseases at King's College, a post he held until 1900. During that time he published his first book *Bacteria, especially as they are related to the economy of nature, to industrial processes and to public health*. Next Newman took on the post of Medical Officer to the urban borough of Finsbury together with the mainly rural county of Bedfordshire (1900–1907). The results and conclusions gained from this experience were published in 1906, using infant mortality as an indicator of underlying social problems. *Infant mortality: a social problem*³ (fig 2) remains a classic. Newman began by

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Figure 1 George Newman (1870–1948).

of infant life is in some way intimately related to the social life of the people."

Although not a paediatrician, Newman had absorbed the teachings of Pierre Budin and John Ballantyne, and his contribution to the health of children over the next 30 years has not been surpassed. Having analysed the causes and distribution of infant death (fig 3), he went on to study the prenatal and postnatal factors that influence mortality, focusing particularly on the mother's health and occupation and on the influence of domestic and social conditions in the home. He appreciated the supreme importance of the period immediately after birth, writing: "... the mortality is so high in the first week that were it maintained without diminution every infant ... would die without nearly completing one year of existence." Newman also highlighted the importance of epidemic diarrhoea and its relationship to infant feeding.⁴ His final chapters discuss ways in which infant mortality might be curtailed by measures involving the mother, the child and their environment. The following extracts will give some idea of his extraordinary powers of analysis, insight, and vision.

On perinatal pathology³

"... embryonic pathology ... may serve to remind us of the long period through which embryonic influences are exerting a direct effect on the individual. While that is so the actual formative period occupies, of course, the early weeks of intra-uterine life, during which the morphology and organogenesis of the infant is developing. And so the foetal period is reached, and this fills by far the larger portion of intra-uterine existence, throughout which time the condition of the mother is exerting influences, direct and indirect, upon the foetus ... The neonatal period, which has been placed at four weeks, is occupied in the attempt of the new-born infant to correspond with, or adapt itself to, its new external environment, a period witnessing in particular to the adjustment of function. The commencement of the exercise of the vital functions, coupled as it is with some modification in structure, must of necessity be a crucial testing time as to physical fitness, or otherwise, for survival. As we have seen, thousands of new-born infants every year fail to survive. It is that non-survival which creates so large a part of the infant mortality. For the infant may be born already diseased or malformed; or it may be predisposed to disease by conditions acting upon it during its foetal existence; or it may be so frail, owing to similar conditions, as to find itself unable to cope with its new environment of a new diet, a new temperature, and a new medium of respiration; or it may be born before it is fully equipped either for life or for growth and development. Like pregnancy, neonatal life is an epoch which has a physiology in many respects peculiar to itself, and which borders very closely on the pathological, tending very easily to pass over into it. Further, just as every woman brings with her into pregnancy the results of her past pathological history, so the new-born infant brings with him out of his antenatal life into his neonatal existence, the effects of any morbid processes which may have attacked him in utero. In this way the pathology of pregnancy and the maladies of the new-born infant are both invested with peculiarities; in the former there is, among other things, the pathology of pre-reproductive maternal life; and in the latter there is, among other factors, the pathology of antenatal, foetal, and embryonic life."

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Figure 2 Chapter headings from *Infant mortality*.³

On the influence of urbanisation³

"... 59.1 per cent of the population live in large towns now, as against 16.7 in 1801, or an increase of 71.1 per cent in 1904 ... town life brings with it many conditions and circumstances which counteract in respect of infancy its advantages. Nor am I thinking now of overcrowding, polluted atmosphere, conditions of employment, and so forth. It is not these things which mainly affect infancy, though even these exert an indirect effect. It is rather the habits and customs of town life which militate against healthy infancy, especially in the artisan classes, to whom infant mortality is almost confined. Life in a large city means for the artisan limited accommodation (not necessarily overcrowding), late hours, short nights, manufactured foods, stress and strain, alcoholism, small excesses, and an almost total absence of restfulness, leisure, and home life ... the general conditions of domestic life in a city tenement are such as to make the rearing of infants a difficult and doubtful undertaking."

Antenatal influences on perinatal mortality³

"And to (other causes) must be added profound emotion, fright, anxiety, and sudden shock, and such conditions as living in over-heated and ill-ventilated rooms, the activities and pleasures of society, and physical causes such as a blow, a fall, or accidents and strains. Physical fatigue, particularly if accompanied by strain and stress, are likely

	No. of Infant Deaths.	Percentage of Total Infant Deaths.
Prematurity and Congenital Conditions...	23,886	19.1
Diarrhoea and Enteritis	17,387	13.9
Atrophy and Debility	16,588	13.2
Convulsions	13,283	10.7
Pneumonia	10,841	8.7
Bronchitis	10,792	8.7
All Tuberculous Diseases	5,701	4.6
Whooping-cough	4,773	3.8
Measles	2,141	1.7
All other causes	19,326	15.6
Total	124,718	100.00

Figure 3 Causes of infant mortality in England and Wales in 1903. Note that the mortality, 1894–1903, was 150 per 1000 births.

to exert a decided effect in the production of premature birth, particularly if these conditions are accompanied by long hours of work and poor or insufficient nourishment. It cannot be too clearly understood that a pregnant woman requires not only additional nourishment but all the physical advantage of a hygienic life. If these conditions are not obtained and a pregnant woman works at industrial occupations throughout her pregnancy and in point of time close up to the date of labour, the result to herself and her offspring must inevitably be injurious. During the last two months of pregnancy no woman should undergo laborious physical toil, for it is a most important time in the development of the foetus, which gains weight in that period from 3½ to 7½lbs.

On the organisation of the Finsbury infant milk depot³

- “(a) Direct control of the milk at the farm;
- (b) Treatment of the milk, whatever it may be, immediately after its yield, and before the contained micro-organisms have had time to multiply or secrete their products;
- (c) Medical supervision of the depot and of the infants using the milk;
- (d) A discriminating and careful distribution of the milk only to children who cannot be breast-fed, and the use of a suitable modification for each child;
- (e) The systematic study of the effect of the milk on each child, accompanied by medical examination and periodical weighing;
- (f) The adoption of a policy of attempting to increase rather than decrease the sense of responsibility of the mother.

The milk used in the depot under consideration is prepared under exceptionally good conditions, but not such as cannot be adopted by other dairy farms ... As far as can be judged, the depot saved the lives of some children and strengthened the physical condition and constitution of others. There is evidence to show that the depot has served as an important training school of infant management. Its value in this respect, as well as in respect of nourishing and saving life, would appear to depend in large measure upon the personal assistance and advice of a skilled nurse in the homes of the children.

The history of the first year of this experimental depot, particularly the clinical record, confirms the view that infants, even when properly and well fed on artificial lines, may still suffer from one of the most preventable and fatal of children's diseases—epidemic diarrhoea. It would therefore appear that, however much this disease may be spread by milk—and undoubtedly such is the case—it may also be communicated to infants in other ways. Uncleanliness in the home, and particularly the common use of articles known as “comforters” and other similar appliances which readily collect dust and dirt, may contribute largely to this result, especially in the summer months ... the results show an exceptional measure of success, and such as justify the establishment of similar depots elsewhere ... this depot serves as a practical experiment in milk reform ...”

In 1907 Newman was recruited by Sir Robert Morant, Permanent Secretary to the Board of Education to become Chief Medical Officer. Together they brought about the foundation and growth of the school medical service, as well as many improvements in the education of doctors. Newman was particularly effective in making the public conscious of

the need for the better care of children. As he kept repeating: “The foundation of national health is the health of the child”. In 1919 Newman received the additional appointment of Chief Medical Officer to the Ministry of Health (the first such appointment), holding both appointments until his retirement in 1935. His period in office saw a sustained attack on preventable disease and the initiation of many outstanding developments in public health.

Much of Newman's time was spent in writing. Besides his 26 Chief Medical Officer Annual Reports from the Board of Education (1908–1935) and a further 15 from the Ministry of Health (1920–1935) all of which were enormously influential, he wrote several more books including “*Hygiene and public health*” (1917), “*Outline of the practice of preventative medicine*” (1919), “*Recent advances in medical education*” (1923), “*Interpretive of nature*” (1927), “*The rise of preventative medicine*” (1932), and “*The building of the nation's health*” (1939). In addition, he anonymously edited the *Friends Quarterly Examiner* for 40 years.

The honours Newman received reflect the respect in which he was held, as the following extract from his obituary notice shows:¹ “For many years Sir George Newman was a member, as Crown nominee, of the General Medical Council, and he served as its treasurer. He was knighted in 1911, and was appointed KCB in 1918 and GBE in 1935. His honorary degrees included the DSc of Oxford, the DCL of Durham and the LL.D of London, Edinburgh, McGill, Toronto, Glasgow, and Leeds. The Society of Apothecaries of London made him an honorary freeman, and the Royal College of Surgeons an honorary fellow in 1928. He was also a fellow of King's College, London, and an honorary fellow of the New York Academy of Medicine. He received the Bisset Hawkins medal of the Royal College of Physicians in 1935, and the Fothergill gold medal of the Medical Society of London. He was emeritus lecturer on public health at St Bartholomew's Hospital, and at various times delivered the Yale, Linacre, Gresham, Halley Stewart, and Heath Clark lectures.”

Newman was short in stature with abundant white hair. He had an enormous zest for life and was unfailingly cheerful. A delightful companion and vivacious conversationalist, he also had great charm. His vitality, intelligence, organising ability, and efficiency made him an outstanding administrator. At the same time he was a master of the English language as well as being a scholar in the history of medicine. These talents, combined with exceptional eloquence, made him a most persuasive speaker, diplomat, and publicist and also an inspiring chief. He regarded himself primarily as a doctor rather than as a civil servant and fully appreciated the importance of the family practitioner.

Newman retained his deep Christian faith and idealism. He had married Adelaide Constance, the daughter of Samuel Thorp of Alderley Edge in 1898. She was a woman of singular quality and an artist. There were no children. After his retirement in 1935, they lived at Harrow Weald surrounded by five acres of woodland. Always a private man, he became rather a solitary figure towards the end of his life though still intent on planning and improving the nation's health. His wife passed away in 1946, and two years later he died at the age of 77 on 26 May 1948, the year of the launch of the National Health Service in the United Kingdom.

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