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# MORTALITY AND MEDICAL CARE IN NINETEENTH-CENTURY GLASGOW

*by*

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FOR SOME time now Professor McKeown and his colleagues have argued that the decline in mortality that occurred in England and Wales in the nineteenth century was largely unrelated to the medical treatment and hospital provision then becoming increasingly available.[1] The purpose of this communication is to describe a study made of the relationship between mortality and hospital medical care in nineteenth-century Glasgow to test McKeown *et al.'s* thesis at a local level.[2] Analysis of data provided by the Registrar General from the time vital registration was introduced in England and Wales in 1837 suggested that the reduction in mortality from infectious diseases accounts for most of the post-registration decline between the 1850s and the 1890s.[3]

Statutory vital registration began in Scotland only in 1855. But analysis of registration data for the decades 1861–70 and 1901–10 for both Scotland and Glasgow reveal that here too infectious diseases account for most of the decline in the death rate. Table I shows the relative parts of the mortality decline attributable to respiratory diseases, the fevers, and the common infectious diseases.

Glasgow differed from Scotland as a whole, as Table I shows, in the much larger proportion of the mortality decline due to respiratory disease of all kinds. While the extent of the decline in mortality from pulmonary tuberculosis was similar in Glasgow as in Scotland as a whole, the decline in death rates from other respiratory diseases (largely bronchitis, pneumonia, and pleurisy) was noticeably greater in the city.[4] Otherwise the pattern of the Glasgow mortality decline followed the national trend though mortality, particularly from respiratory diseases, was always much higher in

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[1] T. McKeown and R. G. Brown, 'Medical evidence related to English population changes in the eighteenth century', *Popul. Stud.*, 1955, **9**: 119–141; and T. McKeown and R. G. Record, 'Reasons for the decline of mortality in England and Wales during the nineteenth century', ibid., 1962, **16**: 94–122.

[2] C. I. Pennington, 'Mortality, public health and medical improvements in Glasgow, 1855–1911', unpublished Ph.D. Thesis, University of Stirling, 1977.

[3] McKeown and Record, op. cit., note 1 above.

[4] It is interesting to note that Preston regards the mortality decline in England and Wales between 1851–60 and 1891–1900 as "quite exceptional" because of the very high proportion attributed to pulmonary tuberculosis and infectious diseases and the relatively small proportion to other forms of respiratory disease, S. H. Preston, *Mortality patterns in national populations*, New York, Academic Press, 1976, p. 20.

Glasgow and other cities than elsewhere in the country, and all the diseases contributing to the overall decline fell from much higher levels in Glasgow than those that prevailed throughout Scotland.

TABLE I
Reduction of death rates in decennia 1861–70 and 1901–10: Scotland and Glasgow[5]

| | Percentage of reduction from all causes attributable to specific diseases | | | |
|---|---|---|---|---|
| | Scotland | | Glasgow | |
| | M | F | M | F |
| tuberculosis (respiratory) | 17.86 | 25.65 | 17.27 | 26.05 |
| tuberculosis (other) | 7.51 | 4.44 | 9.20 | 5.57 |
| other respiratory diseases | 5.50 | 5.83 | 19.70 | 19.13 |
| typhus, enteric, and simple continued fever | 17.19 | 20.00 | 16.75 | 17.00 |
| scarlet fever | 15.02 | 15.35 | 10.76 | 9.71 |
| diarrhoea, dysentery, and enteritis | 7.51 | 8.08 | 6.33 | 6.25 |
| smallpox | 3.00 | 2.82 | 1.82 | 1.63 |
| whooping-cough | 3.67 | 4.44 | 5.81 | 7.21 |
| measles | 1.33 | 1.00 | 1.99 | 1.63 |
| diphtheria and croup | 8.51 | 8.88 | 4.16 | 4.23 |
| other diseases | 12.85 | 3.43 | 6.15 | 1.53 |
| Total | 100 | 100 | 100 | 100 |

TABLE II
Death rates/1,000 living in Glasgow and Scotland 1855–1911[6]

| | Scotland | | Glasgow | |
|---|---|---|---|---|
| | M | F | M | F |
| 1855 | 21.79 | 20.20 | 31.37 | 28.69 |
| 1861 | 21.30 | 19.50 | 29.72 | 26.11 |
| 1864 | 24.70 | 22.56 | 35.08 | 30.25 |
| 1869 | 24.04 | 21.96 | 35.30 | 32.63 |
| 1871 | 22.97 | 21.55 | 34.14 | 32.03 |
| 1881 | 20.05 | 18.71 | 25.95 | 24.59 |
| 1891 | 21.15 | 20.38 | 25.79 | 24.86 |
| 1901 | 18.49 | 17.35 | 22.49 | 20.05 |
| 1911 | 15.51 | 14.64 | 17.40[7] | |

[5] Unstandardized data, as there was little change in the age structure of the population. Calculated from Registrar General's Detailed Annual Reports, other respiratory disease does not include influenza. For discussion of the reliability of death certification in England and Wales, see McKeown and Record, op. cit., note 1 above, p. 102; and in Scotland and Glasgow, see Pennington, op. cit., note 2 above.

[6] Sources, Registrar General's Detailed Annual Reports and censuses.

[7] Both sexes.



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How much responsibility for the decline in respiratory and infectious disease mortality can be accorded to the development of hospital facilities?

Glasgow hospitals were of three kinds: voluntary infirmaries, Poor Law hospitals, and municipal infectious disease hospitals. Voluntary infirmaries were supported by donations and annual subscriptions and (with the exception of accident victims), admitted patients only on the recommendation of a subscriber to the hospital. Poor Law hospitals were financed from the poor rates and treated only the destitute.

There were three voluntary infirmaries in Glasgow during the period under study. The Royal Infirmary founded in 1794, the Western Infirmary which opened in 1874 close by the new buildings of Glasgow University at Gilmorehill, and the Victoria Infirmary which was built on the south side of the city in 1890. The bulk of the surgical operations done in Glasgow were carried out in these three institutions. Hospital diseases (erysipelas, pyaemia, hospital gangrene, and tetanus) had been a major problem in the Royal Infirmary in the first half of the nineteenth century, as they were elsewhere.[8] Lister found conditions to be atrocious on his appointment as surgeon to the Infirmary in 1861, and so he turned his attention to the problem of reducing cross-infection within his wards and developed his antiseptic system of surgical treatment. The latter part of the nineteenth century witnessed great advances in surgery made possible by the introduction of this antiseptic system, by aseptic surgery (pioneered in Britain by Sir William Macewen at the Royal Infirmary), and by improvements in anaesthetics. Hitherto the kind of surgery that could be performed was limited to treating accident victims—a compound fracture frequently resulted in the amputation of a limb, and to such procedures as lithotomy and the reduction of dislocations. It now became possible to perform far more abdominal surgery (previously largely confined to ovariotomies) and in 1890 the first appendicectomy in Glasgow was carried out at the Victoria Infirmary.[9] Operations such as herniotomies became a commonplace. Yet not all the new developments in surgery can have contributed directly to the improving mortality pattern. The new osteotomy operations (pioneered by Sir William Macewen at the Royal and Western Infirmaries), for example, which figure prominently in the operating statistics of the Glasgow infirmaries, were not performed for life-threatening conditions and nor were many other operations. The diseases that contributed to the overall mortality decline were not in general amenable to surgical treatment.

There were no advances similar to the revolution in surgery in the treatment of the major common, and often fatal medical conditions, namely the respiratory diseases and the various forms of tuberculosis. The infirmaries concentrated their resources on treating surgical rather than medical cases in their wards, and by the early twentieth century a growing proportion of in-patients were surgical rather than medical as Table III shows. The number of operations performed showed a corresponding increase (Table IV). Furthermore from the 1870s cases of infectious disease were largely excluded from these hospitals and sent to the new municipal infectious disease hospitals.

[8] Greater Glasgow Health Board 1 1 4, p. 122.

[9] A. E. Maylard, *The Glasgow Infirmaries*, Glasgow, Glasgow Southern Medical Society, 1933, p. 15.

TABLE III[10]
Number of in-patients treated annually in the Glasgow infirmaries

| year | number of patients | medical | surgical | fever |
|---|---|---|---|---|
| 1855 | 3416 | | | |
| 1860 | 3742 | | | |
| 1865 | 6229 | 1697 | 2068 | 2464 |
| 1870 | 6247 | 1971 | 2334 | 1942 |
| 1874 | 6499 | 2923 | 3432 | 144 |
| 1879 | 7267 | 3386 | 3881 | — |
| 1885 | 8158 | 3675 | 4483 | — |
| 1891 | 9600 | 4120 | 5480 | — |
| 1895 | 11335 | 4772 | 6563 | — |
| 1900 | 12416 | 4409 | 8007 | — |
| 1905 | 15612 | 4797 | 10815 | — |
| 1910 | 20092 | 5860 | 14232 | — |

TABLE IV[11]
Total operations performed in the three Glasgow infirmaries

| year | operations | year | operations |
|---|---|---|---|
| 1855 | 198 | 1891 | 2362 |
| 1865 | 310 | 1895 | 3370 |
| 1870 | 470 | 1900 | 4531 |
| 1875 | 657 | 1905 | 7166 |
| 1879 | 1187 | 1910 | 12058 |
| 1885 | 1642 | | |

At this time mortality was especially high among young children and the period was marked by steep falls in child death rates. The infirmaries, though admitting some children, treated surgical rather than medical cases although it was medical, particularly respiratory conditions, that were the major cause of child deaths. In the early years of the existence of the Glasgow Sick Children's Hospital an effort was made to concentrate on treating medical cases but here too the policy changed and approximately equal numbers of medical and surgical cases were admitted for treatment each year. Moreover the children's hospital was extremely small and served not only Glasgow but all of the West of Scotland. It was therefore able to treat only a small proportion of the sick children of the city.

Although consumption (pulmonary tuberculosis) continued to be a major cause of death, accounting for some 1,200 deaths each year in Glasgow in the decade 1901–10, the number of cases treated in the infirmaries actually fell. The number of cases of

[10] Sources, Annual Reports of the Royal, Western, and Victoria Infirmaries.
[11] Ibid.

those with respiratory diseases of other kinds that were treated did increase, although these can have been only a small proportion of the total cases of conditions that killed between two and three thousand people annually in Glasgow in the first decade of the new century, and many more when winters were severe.

TABLE V[12]

Cases of pulmonary tuberculosis and other respiratory diseases treated as in-patients in the three Glasgow infirmaries

| year | pulmonary tuberculosis | other respiratory diseases | year | pulmonary tuberculosis | other respiratory diseases |
|---|---|---|---|---|---|
| 1855 | 161 | 236 | 1890 | 282 | 418 |
| 1860 | 258 | 271 | 1896[13] | 336 | 643 |
| 1865 | 299 | 243 | 1900 | 230 | 695 |
| 1874 | 274 | 511 | 1905 | 162 | 808 |
| 1880 | 366 | 506 | 1910 | 135 | 1112 |
| 1885 | 330 | 502 | | | |

Thus the infirmaries treated only a small proportion of those with the respiratory conditions that account for much of the decline in mortality that took place in Glasgow between the 1860s and the early 1900s. They concentrated on treating acute, curable cases. The managers of the Royal Infirmary frequently reminded subscribers "the Infirmary is not an Hospital for chronic or incurable disease",[14] and that accident and operation cases were admitted in preference to those "of a lingering or chronic character".[15] One reason why such a relatively small number of those with common respiratory conditions were admitted to the Glasgow infirmaries was the admission policy used. Many surgical patients, particularly accident cases, were admitted directly from the out-patient dispensaries without producing a subscriber's "line" of recommendation. Dispensary physicians could recommend the admission of medical patients directly into a ward, but this privilege was reserved for very urgent cases. The majority of patients had to get a recommendation (or "line") from a subscriber, and this was not easy. For someone with a common illness that was not of interest for medical teaching purposes or[16] with a chronic or advanced disease there was little hope of a bed in an infirmary ward, and at this time pulmonary tuberculosis and other respiratory diseases fell into this category.

The Poor Law hospitals admitted only the destitute, for, as the parochial board of City parish noted, it was desirable that parochial aid should be avoided "for all who although poor, are above the rank of paupers, being self-supporting except in the

[12] Ibid.

[13] Only from 1896 is a detailed breakdown of the medical cases in the Western Infirmary given. For clinical details of pulmonary tuberculosis treated at the Western in the 1880s, see W. T. Gairdner and J. Coats, *Lectures to practitioners*, London, Longmans, 1888, pp. 125–136.

[14] 68th Annual Report of the Royal Infirmary (1862).

[15] 54th Annual Report of the Royal Infirmary (1848).

[16] J. F. Sutherland, 'Breakdown of the present hospital system', *Glasg. med. J.*, 1888, **30**: 345–365.

case of personal or domestic sickness".[17] For much of the nineteenth century there were no Poor Law hospitals as such in the city, only sick wards in the poorhouses of the three Glasgow parishes of City, Barony (at Barnhill, now Foresthall Hospital), and Govan (at Merryflatts, now the Southern General Hospital). These were staffed by pauper inmate nurses. Only in the early 1900s were they largely superseded by three purpose-built hospitals (Stobhill and the Eastern and Western District hospitals) though the sick poor of Govan continued to be treated in sick wards of the poorhouse.

TABLE VI[18]
Patients in the Glasgow Poorhouse and voluntary hospitals

| year | total poorhouse sick patients | total voluntary hospital patients |
|---|---|---|
| 1861 | 6310 | 4103 |
| 1865 | 9399 | 6229 |
| 1870 | 12959 | 6247 |
| 1875 | 8809 | 6473 |
| 1880 | 11723 | 7141 |
| 1885 | 11058 | 8158 |
| 1890 | 11403 | 9131 |
| 1895 | 10771 | 11335 |
| 1900 | 12437 | 12416 |
| 1905 | 15237 | 15612 |
| 1910 | 16663 | 20092 |

As Table VI shows, until the 1890s the poorhouses treated more patients than were treated in the three infirmaries, although the position was reversed thereafter. Unlike the voluntary hospitals, poorhouse sick wards treated many more medical than surgical cases.[19] Of these many were "cases of chronic and incurable disease" often passed on by the infirmaries.[20] But how significant was the treatment they offered? Was it the main agency in the decline in respiratory disease mortality? Here too the answer is probably no.

First, as the Poor Law hospitals admitted the destitute many patients would only consider entry when their condition was very advanced. Dr. Core, the medical superintendent of Stobhill, commented that he seldom saw cases of pulmonary tuberculosis "until the disease had advanced beyond the expectation of a cure".[21]

[17] Glasgow City Archives, D. HEW 1 5 3, pp. 34–35.

[18] Sources, Annual Reports of the Board of Supervision for the Relief of the Poor and the Local Government Board, and of the Glasgow voluntary hospitals. No data are available on the diagnoses of those treated in poorhouse sick wards nor on the number of operations performed.

[19] In the City poorhouse the ratio of medical:surgical cases was 12:5. Dr. Johnston (Medical Officer, City Poorhouse) evidence to Departmental Committee on Poor Law Medical Relief (Scotland) (Parliamentary Papers, 1904, XXXIII), p. 224.

[20] Evidence of Dr. W. J. Richardson (Medical Officer, Govan Poorhouse), Report of Royal Commission on the Poor Laws and Relief of Distress, Appendix VI (Parliamentary Papers, 1910, XLVI), p. 793.

[21] Glasgow City Archives, D. HEW 1 2 16, 19 April 1907.

Second, only a small proportion of the cases occurring in the city were treated in the Poor Law sick wards and hospitals. For if, in the absence of other data the number of deaths from respiratory diseases occurring in hospital is used as an indication of the number of cases treated, it is found that in 1895, for example, of the 1584 deaths from pulmonary tuberculosis in Glasgow only 149 occurred in the City poorhouse (the only poorhouse in the Glasgow registration district) and thirty-eight in the Royal Infirmary.[22] Of over 4,200 deaths from respiratory diseases of other kinds only 156 occurred in the City poorhouse and fifty-six at the Royal Infirmary. Clearly most deaths from these conditions did not take place in hospital at all. The vast majority of cases probably never received any kind of hospital in-patient treatment. Third, respiratory disease mortality has been falling since the 1870s yet improvements in conditions in poorhouse sick wards that might have contributed to this decline came much later in the century. The nursing care was abysmal for much of the period, as the only nurses were totally untrained pauper women. There were no effective drugs available to doctors until the 1930s and such measures as segregation of those with pulmonary tuberculosis, which would have reduced the spread of the disease, came only when a small number of special wards for consumptives were opened in the new Stobhill hospital. Adequate institutional provision came only after the National Insurance Act of 1911 obliged local authorities to provide sanatoria.[23]

From the 1860s, infectious diseases (eg. smallpox and fevers), the other main factor in the mortality decline, were treated in specially provided municipal infectious disease hospitals. Such hospitals were built at Parliamentary Road in 1865, at Belvidere in 1870, and at Ruchill in 1901. Their establishment coincided with outbreaks of continued fevers (typhus, typhoid, and relapsing fever) and smallpox, with which they were primarily intended to deal, but when these became less common the infectious diseases of childhood, particularly cases of scarlet fever, but also measles and whooping-cough, were treated. Demand for infectious disease beds grew, particularly after Glasgow adopted the Infectious Disease (Notification) Act in 1890.

By the early years of the new century many cases of infectious disease were receiving hospital treatment. The increasing proportion of deaths from these conditions that occurred in the city fever hospitals probably indicates the growing proportion of cases that were admitted.

Thus a large proportion of cases of smallpox, typhus, and enteric fever were probably admitted to hospital, a lesser proportion of those with scarlet fever and diphtheria, but only a relatively small proportion of those with measles and whooping-cough.

Whether hospital treatment contributed to the fall in mortality from these conditions is another matter. The isolation in hospital of typhus and smallpox cases probably did reduce their overall incidence. Smallpox is spread by clinically obvious cases, and isolation would have an important effect in removing the sources of the virus. Similarly with louse-borne typhus (though diagnosis is not so clear-cut), hospital

[22] Plus an unspecified number in the Western and Victoria Infirmaries.

[23] C. Singer and E. A. Underwood, *A short history of medicine*, Oxford University Press, 1962, p. 229.

TABLE VII[24]

Proportion of deaths from certain common infectious diseases in Glasgow that occurred in the City of Glasgow Fever hospitals

| year | smallpox | typhus | typhoid (enteric) fever | scarlet fever | measles | whooping-cough | diphtheria |
|---|---|---|---|---|---|---|---|
| 1870–4 | 64% | 16% | 7% | 4% | –% | –% | –% |
| 1875–9 | 72 | 62 | 24 | 8 | 1 | 1 | – |
| 1880–4 | 81 | 73 | 33 | 27 | 8 | 3 | 2 |
| 1885–9 | 100 | 78 | 44 | 40 | 14 | 7 | 7 |
| 1890–4 | 91 | 84 | 62 | 68 | 10 | 8 | 28 |
| 1895–9 | 99 | 100 | 82 | 79 | 15 | 10 | 37 |
| 1900–4 | 99 | 81 | 58 | 50 | 14 | 10 | 44 |
| 1905–9 | 99 | 100 | 96 | 74 | 24 | 24 | 66 |

isolation would probably have reduced the incidence of the disease in the community. The overall incidence of scarlet fever, measles, whooping-cough and diphtheria is unlikely to have been reduced by isolating cases in hospital, for the causative organisms are ubiquitous in the community, only causing severe disease in a proportion of those infected. Isolation is unlikely to have reduced their incidence. Enteric fever, which is spread by contaminated water, milk, and food; from cases; and also from healthy carriers, is difficult to diagnose in mild cases. Hospitalization is unlikely to have reduced the overall incidence of infection, as many of the cases would not have been detected. It was admitted by those experienced in the management of the continued fevers that there was no specific treatment.[25] The same held true for smallpox and, until the 1890s, for diphtheria.[26] There may have been some beneficial results from hospital treatment of measles and whooping-cough cases, but probably not to any marked degree.

## CONCLUSIONS

This study demonstrates that there was little relationship between the fall in mortality from respiratory diseases, the largest single factor in the overall mortality decline in Glasgow at this time, and the limited hospital treatment available. The infirmaries concentrated their efforts on developing the new improved surgical techniques, while the Poor Law sick wards were the place of last resort for those unable to gain admission to an infirmary ward or to pay for medical care at home. Though the municipal hospitals admitted a growing proportion of cases of the

[24] Sources, smallpox data, J. B. Russell, *Public health administration in Glasgow*, Glasgow, James Maclehose, 1905, p. 332. Other data, Detailed Annual Reports of the Registrar General and Annual Reports of the Glasgow Fever Hospitals.

[25] C. Murchison, *A treatise on the continued fevers of Great Britain*, 2nd ed., London, Longmans, Green, 1873, p. 643.

[26] Until the serum treatment for diphtheria, which is effective, was introduced in 1894.

common infectious diseases (the other major factor in the mortality decline in Glasgow) isolation in hospital was probably of little consequence for several of the most prevalent diseases, and the value of the treatment provided was limited. Thus this study of mortality in nineteenth-century Glasgow tends to support the view of McKeown and his colleagues that the reasons for the contemporary mortality decline do not lie in the medical field.

SUMMARY

This paper discusses the relationship between mortality and hospital care in Glasgow between the introduction of vital registration in 1855 and 1911. The pattern of the mortality decline is examined and the major diseases contributing to it are identified. The local hospital provision for the care of those suffering from these conditions is discussed and the paper concludes with an assessment of whether hospitals can have been responsible for the decline in mortality at this time; the evidence available indicates that they were not.