

- <sup>8</sup> James, W. Warwick, and Hastings, S., *Proc. Roy. Soc. Med.*, 1932, **25**, 1343 (Sect. Odont., 39).
- <sup>9</sup> Bradley WH., *Arch. Dis. Childhood*, 1930, **29**, 359.
- <sup>10</sup> Glover JA, and Wilson J., *Brit. M. J.*, 1932 (ii), 506
- <sup>11</sup> Cunningham Ruby L., *Arch. Int. Med.*, 1931, **47**, 513.
- <sup>12</sup> Ash WM., Reports to the Derbyshire Education Committee 1931-7.
- <sup>13</sup> Hewitt ES, and Geddie KB., *Am. J. Hyg.*, 1932, **15**, 1 Paterson D and Bray GW., *Lancet*, 1928 (ii), 1074.
- <sup>14</sup> Close HG Guy's Hosp. Rep., 1930, 45.
- <sup>15</sup> Paterson D and Bray GW., *Lancet*, 1928 (ii), 1074.
- <sup>16</sup> Dearn EM Report of the School Medical Officer, Newcastle, 1930.
- <sup>17</sup> Griffith I., *Lancet* 1937 (ii), 723.
- <sup>18</sup> Dean LW., *J.A.M.A.*, 1934, **103**, 1044
- <sup>19</sup> Harris HA 'The Primary School' London, 1931, p.225.
- <sup>20</sup> Report of the Chief Medical Officer, Ministry of Health for 1931, p.249
- <sup>21</sup> Digby KH 'Immunity in Health', 1919, Oxford Univ. Press, p.93.
- <sup>22</sup> Neuber E., 'Hygienic Condition of Debrecen School Children'. Budapest 1932.
- <sup>23</sup> Ellis RWB, and Russell AE., *Lancet*, 1937 (i), 1304.
- <sup>24</sup> Epstein IM., *Am. J. Dis. Child.*, 1937, **53**, 1503.
- <sup>25</sup> Collins SD, and Sydenstricker E., *Pub. Health Bull.*, 1928, No. 175.
- <sup>26</sup> Garrow RP., Rep. Sch. Med. Officer, Borough of Hornsey.
- <sup>27</sup> Bullough WA., Report to the Essex Education Committee, 1936, 11.
- <sup>28</sup> Medical Research Council, Report No. 227, 'Epidemics in Schools'. 118

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## Commentary: James Alison Glover (1874–1963), OBE (1919) CBE (1941) MD (1905) DPH (1905) FRCP (1933): health care variations research then and now

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'James Allison Glover served in the Boer War and World War I. In 1917 he was appointed to the Cerebro-spinal Laboratory in London. There, his work on cerebrospinal fever resulted in the "spacing out" of beds in huts and earned him the name of "good friend of the private soldier". In 1919 he proceeded (sic) OBE for his work during the war. In 1920 he was appointed medical officer to the new Ministry of Health. He made significant contributions to rheumatology and the understanding and treatment of tonsillitis, and to public health more widely'. So says<sup>1</sup> one of the eulogies to a master in public health, writing well before his time.

Published in 1938 his 'The incidence of tonsillectomy among children' in the *Proceedings of the Royal Society of Medicine* covered pretty much all there was to

know in principle about variations in surgical rates, amply analysed by Glover. The paper provided a blue print for a core component of health services research using epidemiology for understanding rates of intervention as opposed to disease. What was obviously not known then was that surgical rates still vary and tonsillectomy is by no means exceptional. This is now well studied and common knowledge among health service researchers. The essence is, and was, that there are many reasons for doing surgery (and other interventions such as prescribing drugs) and these may sometimes only have an oblique bearing on the therapeutic needs of the patient, tightly defined. This is clearly a difficult message since in the United States for many years reimbursement is a function of an intervention happening<sup>2</sup> and today in the UK 'payment by results' rewards clinical activity as if the results need no demonstration.<sup>3</sup> Medical and surgical intervention is still widely regarded as necessarily beneficial for the health of the patient—as indeed it may (or may not) be, but not necessarily for the reasons assumed.

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Jerry Morris in his classic text on the uses of epidemiology, first published in 1957, in my edition of 1970,<sup>4</sup> refers us to the work of Glover in the chapter on the working of the health service as a prime example; a 'pioneer study' he calls it, of the extent of the variation in tonsillectomy rates. Morris says 'but Glover still rules' referring to later varying tonsillectomy rates. (Indeed Glover followed up with a reanalysis of his findings in 1948, finding then a tenfold range in rates among schoolchildren between areas of England.<sup>5</sup>) And he still does rule, but not just currently but also for a very wide range of surgical and medical interventions as well as the essence of variations research methods themselves. Morris argues that such stories raise pertinent questions of efficiency and effectiveness of health care. It is surprising therefore to find no reference to Glover's work in Archie Cochrane's seminal book<sup>6</sup> on the topic published in 1971.

What did Glover do in this important analysis of tonsillectomy rates at that time? The first clue was that tonsillectomy was rising in popularity as were other surgical interventions in the inter war period. Clearly many surgeons and possibly parents were regarding tonsillectomy in particular as a cure for many ills of their children. First, he analysed the need based on attempts at matching, on the evidence from the epidemiology, of a predisposing condition and known effective treatment. (This is, or should be, currently part of the process of commissioning services, but remains poorly informed by studies of variations, local, regional or international.) Then he looked at the number of interventions historically and geographically (in this case between 1895 and 1937 in four centres in the UK) to understand the recent trends. Then he examined age and sex specific trends. He went on to notice no obvious variation in tonsillitis by class or wealth, but apparently a marked increase in tonsillectomy among the well to do, roughly a three-fold difference in rates.

This paper is surely the foundation of both health care variations research and research into the appropriateness of tonsillectomy. Several common catch phrases stem from this work, the Inverse Care Law<sup>7</sup> being an obvious example. In fact it is an object lesson in the value of variations research in raising as it does the issue of uncertainty, and hence the need for research, without the need for any explicit expression of that uncertainty by involved professionals. Without any uncertainty expressed, and indeed often acknowledged, it has become known as implied uncertainty.<sup>8</sup> As such it represents a core element in the evidence based agenda for health care. Where variations in utilization rates are unexplained or inexplicable by concomitant variations in morbidity then *primie facie* evidence about appropriateness of the procedure in question needs to be sought.

Clearly tonsillectomy has a very particular role in understanding medical care. First, tonsillectomy is common and an apparently rational response to a

very common morbidity (both perceived and real). It has an iconic status in the examination of surgical appropriateness and here is not the place to review all that literature.<sup>9</sup> But in a sense it is strictly atypical—as is every individual procedure—since tonsillectomy is and was relatively benign and cheap. But since it attempted to influence the subsequent quality of people's lives it is completely typical of procedures which exhibit considerable, often unexplained, variation.

Clearly, however, such studies are threatening to a particular view of the role of medicine. In the battle to remove the scourge of illness medical care has asserted a dominance that prevails in the minds of most, while those in public health are seen as interfering busy bodies in asking questions about the effects of clinical behaviour on populations. Hence I would argue, because of research on variations in part, medicine is increasingly becoming more evidence based—not so much on the appropriate indications but certainly on the attributable consequences. But studies on variations threaten the clinical freedoms of the medical and surgical professions—because the existence of variation in rates, unexplained by measurable differences in disease incidence, suggests that these freedoms may not be entirely beneficial for some communities. Several studies which compare rates between neighbouring regions in countries have been seen to have dramatic effects on prevailing rates in those areas where the rates were high.<sup>10,11</sup> Of course this is not necessarily a rational response since it may not be known that high rates are inappropriate—but the effect is nonetheless clear.

The first of these represents an operation that has been a staple example of variation studies; hysterectomy. Their effect on prevailing rates has ultimately lead to fairly dramatic reductions in the use of hysterectomy for benign conditions, partly because less invasive techniques have begun to supersede the use of hysterectomy for heavy bleeding or fibroids.<sup>12</sup> I have no real idea what goes on in the heads of the therapeutic enthusiasts when it is suggested that their favourite technique may not be entirely appropriate in all cases since the populations they serve has a lifetime risk of say 70% compared with 30% elsewhere. But it is clear that such information might not be welcomed. Complicating this is the vexed question of the role of fee-for-'service' which of course is not often amenable to rigorous epidemiological analyses—if only because the data among private patients cannot usually be referred to a coherent population base. Or if they can, as is often the case in comparisons between countries, then so much else is different too. Hence variations research, unlike aetiological epidemiology, which constitutes its roots, has a slightly threatening air to it among its mainstream practitioners.

Maybe that explains the slight lull in activity after Glover's seminal work, not to speak of higher

priorities such as a Second World War and in the UK the creation of a National Health Service. Clearly the need to provide health care, often in dire circumstances, for unambiguous need, was dominant. It really was not until the late 1980s that Glover's analytical backdrop was comprehensively addressed in health service research circles. I refer interested readers to a review of the literature published by the King's Fund in 1989,<sup>13</sup> funded by the DoH which cites some 400 research papers on variation work between Glover and the middle 1980s. Of these only some 20% were before the 1980s and many of these were questioning the need for variations research as some kind of gratuitous and redundant scientific effort.<sup>14</sup>

Key to the development of the methodology in the UK were figures like Bob Logan,<sup>15</sup> Hugh Sanderson<sup>16</sup> and Mick Bloor,<sup>17</sup> the latter from a micro-sociological perspective. Much of this work continued to pursue the 'Glover still rules' hypothesis in tonsillectomy but also widened the scope to other reasons for hospitalisation. Increasingly, occasional Lancet editorials<sup>18</sup> for example, asked questions such as those posed and addressed by Glover throughout this period. Lewis<sup>19</sup> and Vayda<sup>20</sup> then began the systematic investigation of variations in health care use, concentrating inevitably on surgery, because of ease of measurement and its cost. Just as Glover had raised questions about mortality following, possibly unnecessary, surgery so Lichner and Planz<sup>21</sup> had come to identify the uniquely high rates of appendectomy in Germany with a simultaneous high mortality from appendicitis, which they argued was not driven by a particularly high incidence. The mortality was largely iatrogenic.

In the early 1970s serendipitous and timely multi-disciplinary research interest combined at Harvard University to turn itself inevitably to surgery following from the work of John Bunker at Stanford and Jack Wennberg in Vermont on surgical variations. Both of them were working in the Medical School at this time, coming from opposite sides of the country. Bunker had quantified the differences in discretionary surgical rates between the United States and UK<sup>22</sup> and Wennberg and Gittelsohn<sup>23</sup> the variations between neighbouring hospital service areas in New England. Each raised unavoidable and fundamental questions about what health care was for and for whose benefit it was operating. The inexorable emphasis on outputs, pioneered for example by Codman<sup>24</sup> 60 years before by advocating and exploring end result analyses for health provision was again being seriously considered.

It was simply not possible any longer to entertain the contemporary notion that all health care was beneficial when clearly different amounts were being consistently delivered to unsuspecting populations with no evidence for any differential indication. And at this time many procedures were clearly established to exhibit quite as much variation as did tonsillectomy. The variations, it seemed, were determined by

influences of various kinds—but not primarily by illness rates. Although the basic costs were also relatively clear, the benefits and the consequent risks of these variations were much less so. It seemed irrational to remain so ignorant, as it was not at all clear that the greater expenditure resulted in greater aggregate benefit. Surgery was after all expensive. At the Harvard School of Public Health such ignorance was widely seen as irresponsible. The outcome of this work was a book; *Cost, Risk and Benefits of Surgery* edited by John Bunker, Fred Mosteller and Bunny Barnes published in 1977,<sup>25</sup> the evolution of which has recently been discussed in the RSM.<sup>26</sup>

The work since then has concentrated firstly on raising legitimate uncertainty about appropriateness, which has had some considerable effect in some instances. Often this comes first from international comparisons which are stark and remain to this day just as stark. Clearly, however, the plausible causes of such variation are much richer than for variations within a country. Hence although stark they do not necessarily suggest uncertainty—merely possibly different social, economic and/or medical priorities. To address the question of uncertainty specifically Wennberg developed the methodology of small area analyses in which hospital service areas are related to catchment populations and the variations in intervention rates between them studied intensively. This way many of the social and economic determinants are assumed to have been held constant, leaving a more plausible medical spectrum for determining observed variations.

This raised a vital hypothesis which some of us tried to address in the early 1980s. The argument was that, notwithstanding enormous variations for some procedures between countries, the intrinsic variations within countries would be a function of the procedure and not the country. In other words some procedures subject to enormous discretion, derived possibly from uncertainty, could (and maybe should) exhibit characteristic variation around very different mean levels. We tested this looking at New England in the United States, the West Midlands in the UK and in Norway.<sup>27</sup> These three countries had quite dissimilar prevailing rates for the seven or so procedures examined. Hysterectomy was then performed for example at an annual rate of 540 per 100 000 women in the US and 118 in Norway. To test the hypothesis required a new method for measuring variation which properly accommodated the random component in estimated annual rates from very different populations sizes. We called this the systematic component of variation (SCV).

It turned out to be essentially correct; the variations around widely different prevailing rates were characteristic of the procedure and gave insight into the causes of variation. Cholecystectomy for example varied a great deal between counties but hardly at all within countries and that variation may well have



been attributable to systematic regional differences in morbidity.<sup>28</sup>

Recently, the work on variations has existed in few centres largely in the United States, and largely due to the vision and stamina of people like Jack Wennberg and his colleagues. In the United States where the problems are different from constrained systems like the NHS the influence is palpable—but the results do remain enigmatic and too easily ascribed to mercenary doctors or greedy insurers. The larger questions such as which rate is right remain sadly largely unanswered. Such is the place of public health in public discourse on health. For all the opportunity and all the subsequent effort maybe now is the time for a renaissance.

## Conclusions

Glover, a very long time ago, set a stage for subsequent research, which many have played on. However variations research has the air of carping and its results are massively counter intuitive to the majority of the population. They are maybe all too obvious to the clinical specialties who clearly have no interest in drawing peoples attention to them. The net results are that Governments continue to regard individual health care as a good thing and worthy of reimbursement in high rate areas just as much as in low rate areas. The fact that each area has a signature class of preferred and neglected procedures plays no major part in the commissioning or funding process, when it is now clear that such characteristics are an arbitrary manifestation of the facilities and clinical preferences rendered available by artefacts of history. The total variation on the margin is large and PCTs need to know whether they are funding what the population requires. Money for more intervention based on apparent clinical need is available in general so long as some other specialty is not apparently doing its job. Such matters require better analysis than this.

Clearly NICE is one palpable response to evidence from variations research generally to button down on outcomes. Evidence from small area variations analyses routinely derived from existing NHS data like the Dartmouth Atlas of Health Care<sup>29</sup> are another necessary component of commissioning as well as one determinant of clinical research priorities, to understand about appropriate indications. But for reasons alluded to such arguments remain essentially unanswered. This is an irrational response to the considerable legacy of James Alison Glover.

## References

<sup>1</sup> Storey GO. James Alison Glover. *J Med Biogr* 2004;**12**:77–81.

- <sup>2</sup> Wennberg JE, McPherson K, Caper P. Will payment based on diagnostic related groups control hospital costs. *N Engl J Med* 1984;**311**:295–300.
- <sup>3</sup> Klein R. The new model NHS: performance, perceptions and expectations. *Br Med Bull* 2007;**81–82**:39–50.
- <sup>4</sup> Morris JN. *The Uses of Epidemiology*. 3rd edn. Edinburgh: E&S Livingstone, 1975.
- <sup>5</sup> Glover JA. Tonsillectomy in the school medical service: increased incidence in 1948. *Monthly Bull Minist Health* 1948;**9**:62–68.
- <sup>6</sup> Cochrane AL. *Effectiveness and Efficiency: Random Reflections on Health Services*. London: Nuffield Provincial Hospital Trust, 1973.
- <sup>7</sup> Hart JT. The Inverse Care Law. *Lancet* 1971;**i**:405–12.
- <sup>8</sup> McPherson K, Downing A, Buirski D. Systematic variation in surgical procedures and hospital admission rates. London School of Hygiene and Tropical Medicine 1996. PHP Publication No 23.
- <sup>9</sup> Black N. *Surgery for Glue Ear – A Study of the Determinants of a Surgical Epidemic*. MD Thesis. Birmingham University, 1978.
- <sup>10</sup> Dick FJ, Murphy FA, Murphy JK *et al*. Effect of surveillance on the number of hysterectomies in the Province of Saskatchewan. *N Engl J Med* 1977;**296**:1326–29.
- <sup>11</sup> Wennberg JE, Blowers L, Parker R, Gittelsohn AM. Changes in tonsillectomy rates associated with feedback and review. *Pediatrics* 1977;**59**:821–26.
- <sup>12</sup> NICE, Heavy Menstrual Bleeding: Guideline Development Group <http://guidance.nice.org.uk/CG44/niceguidance/pdf/English>.
- <sup>13</sup> Sanders D, Coulter A, McPherson K. Variations in hospital admission rates: a review of the literature. Kings Fund Project Paper, 1989.
- <sup>14</sup> Moore FD. Small area studies: illuminating or misleading. *Health Affairs* 1985;**4**:96–101.
- <sup>15</sup> Pearson RJC, Smedby B, Berfenstam R *et al*. Hospital case loads in Liverpool, New England and Uppsala: an international comparison. *The Lancet* 1968;**2**:559–66.
- <sup>16</sup> Sanderson HF. Regional variations in cataract extraction rates and their relationship with resource supply and need. *J Roy Soc Med* 1980;**73**:482–96.
- <sup>17</sup> Bloor M. Bishop Berkely and the adenotonsillectomy enigma: an exploration of the variation in the social construction of medical disposals. *Sociology* 1976;**10**:44–61.
- <sup>18</sup> To tie; to stab; to stretch; perchance to freeze (editorial). *The Lancet* 1975;**ii**:645–46.
- <sup>19</sup> Lewis PA. Variation in the incidence of surgery. *N Engl J Med* 1969;**281**:880–84.
- <sup>20</sup> Vayda E. A comparison of surgical rates in Canada and in England and Wales. *N Engl J Med* 1973;**289**:1224–29.
- <sup>21</sup> Lichner EA, Pflanz M. Appendicectomy in the Federal Republic of Germany: epidemiology and medical care patterns. *Medical Care* 1971;**9**:311–18.
- <sup>22</sup> Bunker JP. Surgical manpower: a comparison of operations and surgeons in the United States and in England and Wales. *N Engl J Med* 1970;**282**:135–44.
- <sup>23</sup> Wennberg JE, Gittelsohn A. Small area variations in health care delivery; a population-based health information system can guide planning and regulatory decision making. *Science* 1973;**182**:1102–9.

- <sup>24</sup> Codman EA. The product of a hospital. *Surgery, Gynaecology and Obstetrics* 1914;**18**:491–96.
- <sup>25</sup> Bunker JP, Barnes BA, Mosteller F. *Costs, Risks and Benefits of Surgery*. Oxford: Oxford University Press, 1977.
- <sup>26</sup> McPherson K, Bunker JP. Costs, risks and benefits of surgery: a milestone in the development of health services research. *J Roy Soc Med* 2007;**100**:387–90.
- <sup>27</sup> McPherson K, Wennberg JE, Hovind O, Clifford P. Small area variation in the use of common surgical procedures: an international comparison of new England, England and Norway. *N Engl J Med* 1982;**307**:1310–14.
- <sup>28</sup> McPherson K, Strong P, Jones L, Britton BJ. Do cholecystectomy rates correlate with geographic variations in the prevalence of gallstones? *The Lancet* 1984; 1092–93.
- <sup>29</sup> *The Dartmouth Atlas of Health Care 2006*, Centre for the Evaluation of Clinical Sciences. Dartmouth Medical School.

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## Commentary: Tonsillectomy—then and now

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Dr Alison Glover's article reminds us—if we need reminding—that tonsillectomy has long been a controversial operation.<sup>1</sup> It remains so today and recently, when calls were made in the UK to 'stop doing unnecessary operations', tonsillectomy was quickly cited as one of these. In 1936, Alison Glover clearly thought that many tonsillectomies being undertaken were unnecessary. Both then and now, this lack of necessity presumably refers to the belief that patients are no better off after tonsillectomy than they would have been had they not had the surgery. The wide variation in rates of tonsillectomy between and within countries seen 70 years ago, continues to the present day.<sup>2</sup>

It is difficult to work out from Dr Alison Glover's article what the contemporary indications for tonsillectomy were. Mention is made several times of 'enlargement' and of sore throats and colds. When I rescued the 1937 edition of St Clair Thomson's classic ENT text book 'Diseases of the Throat and Nose' from a library's discard pile I felt sure it would be useful one day; it has proved so now.<sup>3</sup> Contemporary indications included:

1. 'Any interference with respiration, night or day.'
2. Threatened alteration of voice or articulation.
3. Eustachian catarrh, or the presence of inflammatory middle-ear disease.
4. Chronic enlargement of the cervical glands

5. Chronic lacunar tonsillitis with recurrent exacerbations.
6. If adenoids [are going to be removed] the opportunity should be utilized for removing tonsils if also the cause of symptoms.
7. Attacks due to septic absorption through the tonsils, or a chronic condition of ill-health which can be attributed to infection through the tonsillar area.
8. Frequent attacks of tonsillar inflammation, or of peri-tonsillar abscess.'

The authors also comment (perhaps hinting at the increased frequency of tonsillectomy noted by Dr Alison Glover):

'Recently "*sepsis of the tonsils*" has been claimed as the cause of a large variety of disorders, and tonsil enucleation, at all ages, has become more frequent.'

It is axiomatic that removing the tonsils (more specifically the palatine tonsils—those ovoid lumps of lymphoid tissue located between the faucial pillars in the oropharynx) will prevent an individual developing palatine tonsillitis. This is as true as the inevitability of a patient who has undergone appendectomy being unable thereafter to develop appendicitis. But just as appendectomy is not a panacea for all gastrointestinal disease, removing the tonsils is not a measure that will permanently rid the patient of sore throats or pharyngitis. And herein lies the key issue relating to tonsillectomy today.

By its nature, tonsillectomy is a prophylactic procedure, undertaken to prevent future episodes of infection. In which case, how certain can one be that

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