Infectious diseases: who cares and how much?

In the UK

Infectious diseases have recently been much in the news. After being considered ‘conquered’ and a burnt out issue in the 1950s and early 1960s, the problem of infection is emerging as a phoenix from the ashes, rapidly becoming more difficult to dismiss. Apart from the ongoing story of hospital-acquired infections caused by methicillin-resistant *Staphylococcus aureus* [1], there are continuing problems with *Clostridium difficile*-associated diarrhoea [2], gastroenteritis due to small round structured viruses [3] and the relentless emergence of penicillin-resistant *Streptococcus pneumoniae* both in hospital and the community. A recent paper has emphasised the connection between hospital admission and the carriage of this last organism by schoolchildren [4].

These types of infection are not only problems for hospital management but are also looming in the community. AIDS, of course, is relatively old news and has consumed enormous amounts of financial and other resources; other problems with important resource implications will almost certainly require skilled recognition and management at the clinical level if they are not to escalate faster than the health services can respond.

Tuberculosis is a major concern; not only multi-resistant disease, but community acquired disease in indigenous people, surprisingly often non-pulmonary and requiring skill in both recognition and management. (Most research on short-course treatment is directly applicable only to pulmonary tuberculosis.) A report from the Interdepartmental Working Group on Tuberculosis is about to be published [5] and is expected to emphasise the importance of case-management by a range of appropriate specialists, including infectious diseases specialists. Tuberculosis is not infrequently a multisystem disease; some cases are infectious, depending on who is exposed and how; and multidrug treatment and associated follow-up should not be carried out by the inexperienced [6].

Varicella has already become a problem; a rapidly increasing incidence of chickenpox in adults has resulted in increased morbidity and mortality, causing particular concern when infection occurs during pregnancy [7]. Acyclovir treatment makes a marginal impact on the progress of the disease, but few non-specialists recognise the importance of anticipating secondary bacterial infection, renal failure and thrombocytopenia. Though nearly everybody has heard of pneumonia in chickenpox, few are aware of its subtle presentations and the relative rarity of a purely viral lung infection.

The importance of penicillin-resistant (or worse, multiply-resistant) *Streptococcus pneumoniae* in the community cannot be overestimated. Recent figures suggest a prevalence of about 5% of all isolates, increasing with a doubling time of about two years. In general practice it will limit the ability to treat such simple problems as exacerbations of bronchitis, or secondary infections in asthma, influenza and other viral infections; in hospital it will increase the complexity and expense of treating recognised infections and greatly increase the risk of failure when unrecognised pneumococcal conditions are treated with 'standard' broad spectrum anti-infectives.

Other new diseases with long time-courses and evolving multisystem involvement include borreliosis, tropical parasitic infections and long-term complications of intestinal infections. Many of these are home-grown, but their diagnosis and treatment are complex. In the case of borreliosis, the situation is further complicated by the inapplicability of American experience to disease acquired in Europe: it evolves differently with different long-term manifestations, and is caused by different species of *Borrelia*.

Old diseases, such as diphtheria in Eastern Europe, plague in India or Ebola fever in Zaire, can still put a severe strain on NHS facilities; only luck has protected them from having to cope with such problems ‘for real’ in the last years. The increasing difficulty in finding effective malaria prophylaxis, and emerging resistance to even the newest antimalarials is daily making travel medicine a more exacting commitment.

So who takes care of these problems? Who supervises the investigation of these disorders and the control of infection (from the day of admission, not after the diagnosis is known which may be days or weeks later)? It is increasingly unrealistic to declare that a physician whose main concern is cardiology or endocrinology, or such a physician’s trainees, can encompass these demands in ‘intellectual spare time’. What little audit has been published [8,9] suggests that patients get a poor service in such circumstances, with at least half suffering delayed diagnosis, over- or underinvestigation, suboptimal treatment and poorly anticipated management setbacks. This situation cannot be improved by the planned shortening and ‘focusing’ of specialist training in medicine.

There is a similar problem in expecting microbiologists to carry the clinical burden. In the first place, clinical facilities are needed; it has long been recognised that a dedicated ward and staff are more effective in managing infectious conditions than a scattering of ‘isolation’ rooms in widely dispersed wards [10], and

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this takes no account of the fact that patients are best managed by doctors who see more than a handful of cases of their disease. Unless there are greater numbers of more clinically-orientated microbiologists, they will never be able to provide effective patient management. While haematologists have made the transition to the ward, microbiologists are hampered by the fact that even the simplest microbiological investigation is labour-intensive, requiring considerable interpretation and quality control. Furthermore, microbiologists have a separate and heavy administrative responsibility for supervising hospital-wide hygiene and infection control.

There are currently 64 infectious diseases specialists in England, Wales and Northern Ireland; 20 are academic, some with broad-based clinical departments and others with more focused and limited activities; 16 retirements are expected in the next ten years, among which eight are single-handed specialists whose posts may therefore be discontinued. There are 24 senior registrars whose posts are accepted for training in infectious and tropical diseases, but their skills will be wasted if appropriate consultant-level posts are not available for them to fill. Using principles developed by JPAC and applied in the early 1990s, approximately ten consultant posts would be required in the next five years to achieve this balance.

In other developed countries

How do we compare with other developed countries in our provision of infectious diseases services? In Australia there is one infectious diseases specialist for about 220,000 adult population [11]. In Sweden, for a population of 8.3 million there are 30 infectious diseases units and 400 specialists or trainee specialists; this in the presence of a similar number of specialists in microbiology, with close collaboration between the two specialties. Apart from pulmonary tuberculosis and sexually transmitted diseases (which are separate specialties) all cases with infection can be cared for by infection specialists. Norway, with a population of 4.3 million, has 18 infectious diseases units, and one more is needed to provide one for each county. There are 56 specialists, and it is anticipated that a further 25-30 will be required (including for the management of HIV and AIDS). In Finland, although absolute figures are not available it seems that patients can usually have access to specialist services in infection.

Thus, in Australia and Scandinavia, there is approximately one infectious diseases specialist for every 200-250,000 adult population, and about one bed per 10-15,000.

In future?

On that basis and allowing for the excellent primary care and public health services in the United Kingdom, and the availability of skilled microbiology services, it would seem reasonable to expect no less than one bed per 15-25,000 population in England and Wales, and a minimum of 100 specialists. Physicians 'with an interest', which includes training in infectious and tropical diseases, would offer an economical means of avoiding single-handed specialists in small districts, and have been endorsed by the Royal College of Physicians. Currently, one of the health regions has no infectious diseases provision, one has virtually lost its large unit during reorganisation of a metropolitan hospital service, and another two are about to lose units.

In the UK, two large surveys of infectious diseases provision have been published; one in Scotland as part of the Scottish Needs Assessment Programme (SNAP) [12], and one by the Public Health Service in Yorkshire in response to the likely loss of specialist services in the health region [13]. Both studies encountered great difficulties in obtaining accurate data because of enormous variation in the quality and accuracy of coding final diagnoses in infectious cases. Many are miscoded as non-infectious conditions and many are coded as other infectious diagnoses. When infections accompany other medical conditions they are rarely coded at all, and hospital infections are usually untraceable in discharge data. It is therefore not possible to compare outcome of treatment between specialists and non-specialists using length of hospital stay as a measure; nor is death a suitable measure because, fortunately, few patients with infectious fevers die, whether treated by experts or relative amateurs. Nor is it possible to compare outcome between specialist and non-specialist treatment in Scandinavia or Australia. In Scandinavia it is considered unethical not to refer patients with infectious diseases to an appropriate infectious diseases specialist; and in Australia the only available outcome data come from cases treated at a hospital specialising in infectious and tropical diseases.

Both UK studies concluded that poor use was made of existing facilities, that expertise was regularly ignored and that facilities were in danger of being lost by default. Both felt that high-quality facilities should be provided for infectious diseases patients, that expertise should be preserved, and that specialists should have access to appropriate and safe intensive care beds. The Yorkshire study strongly advocated the provision of sufficient beds with specialist input on a district or regional basis. Both studies recognised the value of 'general' physicians with interest and training in infectious diseases. Both strongly advocated the use of audit to set standards for the provision of care and expertise in infectious and tropical diseases, and for the use of such expertise and facilities in situations such as the Stanley Royds Hospital salmonella outbreak and in major outbreaks of legionnaires disease. In Canada, these issues have led to a view that physician specialists in infectious diseases will be required for the foreseeable future [14].

There are many reasons for taking a close look at service provision in infectious and tropical diseases in
England and Wales. Are patients receiving the best and most timely care? Almost certainly not in many cases. Are we getting good value for resources expended? It is very unlikely that we are. If more consultants are trained, will their skills be usefully applied? Will we compare well with our colleagues in other countries? And, if the true situation is as unsatisfactory as it may seem, where will be the clinical base for excellence in research and development? Only thorough research and appraisal will provide the information and direction necessary for a knowledge-based service which can both do justice to its users and hold its own in the world of science and medicine.

Acknowledgements

Thanks and acknowledgements are due to Dr N J Beeching, University of Liverpool; Professor C O Solberg, University of Bergen; and Professor S Iwarson, University of Göteborg for providing me with data based on their researches and expertise in their respective countries.

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