Report by the
Comptroller and Auditor General

The Management and Control of Hospital Acquired Infection in Acute NHS Trusts in England

Ordered by the
House of Commons
to be printed 14 February 2000

LONDON: The Stationery Office
£0.00

HC 230 Session 1999–00
Published 17 February 2000

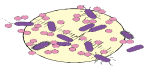
Executive summary and recommendations

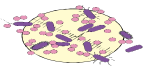
Background

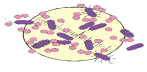
1 Hospital acquired infections are infections that are neither present nor incubating when a patient enters hospital. About nine per cent of inpatients have a hospital acquired infection at any one time, equivalent to at least 100,000 infections a year. Their effects vary from discomfort for the patient to prolonged or permanent disability and a small proportion of patient deaths each year are primarily attributable to hospital acquired infections.

2 The costs of treating hospital acquired infection, including extended length of stay, are difficult to measure with certainty, but may be as much as £1,000 million each year. Not all hospital acquired infection is preventable, since the very old, the very young, those undergoing invasive procedures and those with suppressed immune systems are particularly susceptible. However, in 1995 the Hospital Infection Working Group of the Department of Health (Department) and Public Health Laboratory Service believed that about 30 per cent of hospital acquired infections could be avoided by better application of existing knowledge and realistic infection control practices.

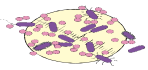
The top five ways hospital acquired infections can attack

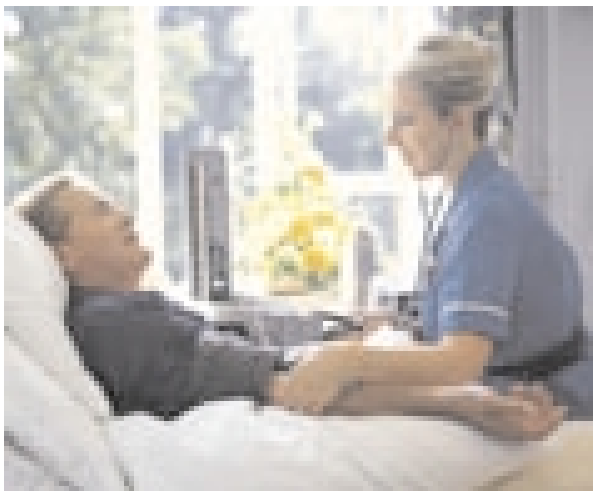

Blood infections


After surgery


Urinary infections


Chest infections


Skin infections



Six main things about hospital acquired infection

- Around one in 11 hospital patients at any one time has an infection caught in hospital.
- There are at least 100,000 hospital infections a year.
- They cost the NHS hundreds of millions £s a year.
- They can mean several extra days in hospital.
- The old and young are most likely to catch one.
- Hospital acquired infections may kill.

3 Against this background we investigated the strategic management of hospital acquired infection; what is known about the extent and cost of hospital acquired infection; and how well hospital acquired infections are controlled through prevention, detection and containment measures in Acute NHS Hospital Trusts in England (NHS Trusts). The main focus of the investigation was the work of the NHS Trust's infection control team, which has primary responsibility for, and reports to the Trust chief executive on, all aspects of surveillance, prevention and control of infection at Trust level. A key part of the methodology was a census of these Trusts.

Overall conclusions

4 During the course of our work we often saw the dedication of infection control nurses and doctors in preventing and minimising the problems of hospital acquired infection. We observed much good practice and real enthusiasm for it to be disseminated. But we are concerned about the remaining avoidable adverse effects of hospital acquired infections for patients' standard of care and health outcomes. And to the extent that some hospital acquired infection can be prevented, with our work suggesting the scope is significant, resources are tied up that could be used to benefit elsewhere in the NHS.

5 Good practice with respect to the prevention, control and management of hospital acquired infection needs to be more widely known and applied. Prioritisation of resources for dealing with hospital acquired infection is restricted by the lack of basic, comparable information about rates of hospital acquired infection. However, we welcome the work being carried out to develop evidence based guidelines, the Nosocomial *(hospital acquired)* Infection National Surveillance Scheme and the Department's new Clinical Governance and Controls Assurance initiative.

6 We believe that in many NHS Trusts there may be a growing mismatch between what is expected of infection control teams in controlling hospital infection and the staffing and other resources allocated to them. Hospital acquired infection is very costly and, to the extent that some of it is preventable, it is possible to improve patient care and save money. But it will be important for NHS Trusts to justify existing and additional expenditure on infection control against other uses of health resources.

7 There are many ways to build upon the work already carried out by infection control teams and others. It is encouraging that the Department has recently taken a number of initiatives to raise the profile of hospital acquired infection and improve its prevention and control. We urge that our

recommendations for improving management and control of hospital acquired infection be considered quickly in the interests of better patient outcomes and releasing resources for alternative NHS uses.

Main conclusions and recommendations

Strategic management of hospital acquired infection

8 A number of NHS Trusts have put infection control high on their agenda, but health authorities and NHS Trusts generally could do more to improve its strategic management. A quarter of service agreements between NHS Trusts and their health authorities did not cover the provision of infection control services. Where infection control was covered, it was sometimes without input from the personnel with detailed knowledge about infection control, namely the Trust's infection control team and the health authority's Consultant in Communicable Disease Control.

9 The requirements within service agreements also tended to be in very general terms. For example, while 66 per cent specified the need to undertake surveillance to collect data on infections, only 27 per cent included the need to calculate infection rates. Lack of detailed specification within service agreements and lack of compliance with them means that many health authorities do not have all the data they need to assess NHS Trusts' performance in improving infection control.

10 In 1995, the Department issued guidance that gave NHS Trust chief executives overall responsibility for ensuring the provision of effective infection control arrangements. We found in the majority of NHS Trusts that direct chief executive involvement was very low. Few chief executives were members of their Hospital Infection Control Committee, the key management forum for infection control in NHS Trusts, and in 30 per cent of NHS Trusts neither the chief executive nor a nominated representative was a member. Fifty eight per cent of NHS Trust chief executives never received reports on resources spent on hospital acquired infection and less than half received reports on rates or numbers of hospital acquired infections. This suggests that in a number of NHS Trusts, chief executives may be unaware of the extent and cost of hospital acquired infection and how it is being addressed in their NHS Trust, though these aspects may be delegated to other senior managers.

11 Seventy nine per cent of NHS Trusts had an infection control programme, which generally complied with the Department's guidance on content, although in some NHS Trusts there were notable omissions in relation to the measurement of effectiveness, such as standards setting and audit. In the fifth of NHS Trusts that did not have an infection control programme, infection control was largely reactive in nature. Contrary to Departmental guidance that all chief executives should approve the infection control programme, only 11 per cent formally approved the programme. This may reduce the programme's authority within many NHS Trusts.

12 The Department's guidance states that there are advantages for the planning and implementation of an effective infection control programme if infection control teams have separate budgets. Only some 40 per cent of NHS Trusts had a separate budget for hospital infection control. Often these budgets do not include all the elements suggested in Departmental guidance and the amounts allocated to the budget vary widely. Most infection control teams considered that there had been little real term change in the amount of money spent on infection control in the last three years yet, during this time, expectations particularly in relation to a number of resource intensive activities have increased.

13 There are no Departmental guidelines on infection control staffing. Few NHS Trusts met the guidelines recommended by the Royal College of Pathologists on the amount of time that infection control doctors should spend on infection control.There are also wide variations in the ratio of infection control nurses to beds and, in some NHS Trusts, we consider that the number of beds that a single infection control nurse is expected to cover is unacceptably high. We are concerned that the wide variation in infection control team resources may represent unacceptable differences that could impact on the quality of care that patients can expect regarding hospital acquired infection and infection control generally in hospitals.

14 Over 60 per cent of infection control teams considered that they had inadequate clerical support, with 27 per cent having none. Lack of computer software and hardware was also cited as a major constraint in providing effective infection control. The Department's NHS Information for Health Strategy, which includes installing electronic patient record systems and reporting results of prescribing, should help improve matters, but infection control teams will need appropriate access.

Surveillance and the extent and cost of hospital acquired infection

15 The Hospital Infection Working Group believed in 1995 that it might have been possible to achieve a 30 per cent reduction in hospital acquired infection. Infection control teams in our census believed on average that a reduction of 15 per cent was possible.

16 Attributing costs to hospital acquired infection is complex and uncertain. However, a comprehensive study commissioned by the Department and undertaken by the London School of Hygiene and Tropical Medicine and the Central Public Health Laboratory suggests that hospital acquired infection may be costing the NHS as much as £1 billion a year. This estimate is based on an extrapolation of the results from one hospital to the rest of the NHS, which make it very difficult to derive an exact estimate. Nevertheless, this is the only estimate currently available. On the basis that infection control teams believe a reduction of 15 per cent is achievable, this suggests that potential avoidable costs are around £150 million a year (this excludes the cost of measures that might be needed to achieve this and assumes achievable reductions are across the full range of infections).

17 A large proportion of infection control teams said they would like to spend less time being reactive and spend more time on planned surveillance activities. Research shows that surveillance, involving data collection, analysis and feedback of results to clinicians is central to detecting infections, dealing with them, and ultimately reducing infection rates.

18 In general, surveillance needs to be done more effectively. While over 90 per cent of infection control teams had carried out some limited surveillance, there was a lack of comparable data on rates and trends. This limits the ability of NHS Trusts to have a good understanding of infection problems, both within the Trust and in comparison with other Trusts, and the effectiveness of any intervention measures employed. There were wide variations in the extent of dissemination of surveillance results.

19 The Nosocomial Infection National Surveillance Scheme, developed in 1996, is starting to show the benefits of surveillance. By December 1999, 139 hospitals had participated in one or more modules of the scheme. The scheme's first full year results show there is considerable scope for NHS Trusts to reduce infection rates through better practice. NHS Trusts surveyed reported a number of

benefits of participating, but also problems that need to be overcome if the scheme is to be fully effective, in particular the need for an improvement in the feedback of results to NHS Trusts and, within NHS Trusts, to clinicians and senior managers.

20 Several studies have indicated that between 50 and 70 per cent of surgical wound infections occur post-discharge and the preliminary results from a comprehensive study in three NHS Trusts would appear to support these findings. However, only a quarter of infection control teams are carrying out any post-discharge surveillance.

21 While there is clearly scope to reduce hospital acquired infection, there will inevitably be an irreducible minimum. However, attempts to achieve this may be offset by NHS Trusts' bed management policies and developments whereby staff and patients move freely between wards. While there may be good reasons for this, it is important that the implications for hospital acquired infection are carefully considered as part of NHS Trusts' other policies.

Effectiveness of prevention, detection and control measures

22 There are wide variations in infection control teams' input into the main prevention, detection and control activities. The key activities include the provision of education and training; development and dissemination of infection control policies; monitoring and audit of hospital hygiene; and clinical audit.

23 It appears that there are important gaps in the extent to which education and training in infection control is provided to key health care staff. For example, currently some 10 per cent of infection control teams do not provide nurses and health care assistants with induction training about infection control and less than two thirds provide annual updates. Most teams do not provide any infection control training to senior doctors. The development of interactive computer assisted training packages could be a cost-effective way of helping to address the weaknesses in training and education.

24 Written infection control policies and procedures need to be more widely available and accessible. All NHS Trusts had policies in place for dealing with MRSA (methicillin resistant *Staphylococcus aureus* - an antibiotic resistant organism that is causing problems in most hospitals), patient isolation, handling of sharps such as disposable needles, and clinical waste management. But over a quarter of NHS Trusts did not have written policies for the use of catheters and other devices implicated in hospital acquired infections. Many infection control teams consider that producing and updating policies and guidelines, often as part

of an infection control manual, is very time consuming. There is evidence of re-inventing the wheel and scope to streamline the production of infection control manuals.

25 Some eight per cent of NHS Trusts do not have a policy on handwashing. Handwashing is regarded by many as one of the most effective preventative measures against hospital acquired infection, and is one example of good practice that needs to be more widely implemented. There is ample evidence that compliance with handwashing protocols is poor. It is welcome that in March 1999, an NHS action plan was issued by the Department which included advice reinforcing the importance of handwashing.

26 Monitoring hospitals' routine procedures such as ward cleaning is important to ensure that proper hygiene practices are being followed and that they are working as intended. We found that most NHS Trusts had carried out such audits within the last three years. The results showed that NHS Trusts had made changes in response to audit reports, but in some there was scope for considerable improvement.

27 Infection control teams have a responsibility for standard setting and audit. Only 50 per cent of infection control teams included clinical audit in their annual infection control programme, though most acknowledged that it is an important part of the audit cycle to improve infection control. Eighty one per cent of infection control teams had not audited their own activities. In the last year, the main focus of audit attention was on arrangements for controlling MRSA, surgical wound audit, and antibiotic prescribing. A number of infection control teams identified interventions that had reduced particular infections and achieved cost savings, and which could be applied more widely.

28 Infection control has implications for the whole hospital and the advice of the infection control team is important in ensuring that the risk of infection is minimised. While around 50 per cent of infection control teams said they were usually consulted, a quarter were never consulted on the letting of cleaning, or catering or laundry contracts. While about half of infection control teams are usually consulted when an NHS Trust is contemplating alterations or additions to buildings, they are less likely to be consulted by staff purchasing equipment.

29 Well documented procedures for dealing with outbreaks of infection are essential, and all infection control teams had them. But about a quarter of infection control teams did not comply with the requirements for disseminating written reports to appropriate personnel within the Trust.

30 Screening patients for infections, which involves taking swabs from the patient and submitting them to microbiology testing, is one way of detecting some infections and controlling their spread. It is expensive to do, however, and there is little evidence on its cost effectiveness. The benefits of screening staff are even less certain, and also need to be further researched.

31 Evidence to the House of Lords Select Committee on Science and Technology inquiry on 'Resistance to Antibiotics and other Antimicrobial Agents' states that "Isolation of patients is an expensive, but effective form of infection control." There is, however, a lack of evidence based research on how best and when to use isolation facilities cost effectively. The number of isolation facilities within individual NHS Trusts have been greatly reduced over the last five years and over 40 per cent of infection control teams were dissatisfied with the facilities available in their Trust. Some 150 NHS Trusts have yet to assess the need for and provision of isolation facilities, regarded by the Department as part of risk assessments needed to meet Health and Safety legislation.

Recommendations for improving strategic management

32 We found that some NHS Trusts have put infection control high on their agenda and there was also evidence of good practice where infection control teams had made great efforts to overcome staffing and other resource constraints. The Department's positive response to the House of Lords Select Committee inquiry should go some way towards improving the strategic management of hospital acquired infection, as should the new infection control standards for acute NHS hospitals, recently issued as part of their new guidelines for implementing Controls Assurance in the NHS. However, we have identified areas where Acute NHS Trusts can improve the strategic management of infection control still further.

The Department should:

(i) consider the need for a revision of their 1995 guidance on infection control and ensure that the implementation of the controls assurance standard on infection control is monitored through the NHS performance management process and through the Commission for Health Improvement and the Audit Commission;

(ii) consider commissioning research on appropriate staffing levels for the infection control team, to help NHS Trusts determine an appropriate level of resources; and

(iii) ensure necessary access to any relevant systems developed as part of its NHS Information Management and Technology Strategy.

Health authorities and NHS Trusts need to work together (and in the future with Primary Care Groups and Trusts) to:

(iv) review their service agreements, with input from the Consultant in Communicable Disease Control and infection control team to ensure that each NHS Trust's arrangements meet recently issued controls assurance standards on hospital acquired infection; and

(v) ensure that service agreements require the collection of data on the rates and trends of hospital acquired infection, based on surveillance.

Chief executives of NHS Trusts need to ensure that:

(vi) the infection control team has an adequate annual programme for infection control that is approved by them and that they and the Trust Board receive regular feedback on performance in relation to the programme; and

(vii) as part of the requirement to put infection control and basic hygiene at the heart of good management and clinical practice:

a) their senior management and clinicians are encouraged to accept greater ownership for the control of hospital acquired infection;

b) the Hospital Infection Control Committee is operating as the Department intended and that they or their nominated deputy attend meetings;

c) the infection control function is resourced in line with Departmental guidance; and

d) in developing their IT systems as part of the Information Strategy for the Modern NHS 1998-2005, their action plan takes into account the requirements of the infection control team, particularly in relation to surveillance.

Recommendations to improve surveillance and reduce the extent and cost of hospital acquired infection

33 Hospital acquired infection cannot be prevented completely and it is important therefore that it is readily detected and dealt with. The consequences for patients, particularly after major surgery, can otherwise be very serious.

Surveillance is the foundation for good infection control practice and we found examples of good practice in the way individual NHS Trusts have developed their own surveillance systems. We also welcome the introduction of the Nosocomial Infection National Surveillance Scheme as a key step in improving patient care, and the prospect of improving patient care and saving money through reducing the extent of avoidable infection. Some progress has been made by NHS Trusts but we believe that more needs to be done. We recommend that:

The Department should:

(viii) emphasise the importance of surveillance and build on the success to date of the Nosocomial Infection National Surveillance Scheme, making improvements to it where possible while maintaining the emphasis on the achievement of its objectives to reduce infection rates by disseminating information on best practice;

(ix) encourage participation in the Nosocomial Infection National Surveillance Scheme so that it becomes a comprehensive NHS scheme, facilitating the production of comparable data on infection rates;

(x) consider the need for post discharge surveillance to be carried out, either as part of a NHS Trust's own surveillance, or as a future module of the Nosocomial Infection National Surveillance Scheme;

(xi) work with the Public Health Laboratory Service to evaluate and develop the Nosocomial Infection National Surveillance Scheme and consider other similar schemes, for example the USA National Nosocomial Infections Surveillance System, to identify any lessons that might be applicable; and

(xii) develop evidence-based guidance on the cost effectiveness of intervention measures to reduce hospital acquired infection, and if necessary commission further research. The Department then needs to disseminate the results to NHS Trusts to ensure that they have the evidence-based information needed to determine the best approach to reduce the extent of hospital acquired infections.

NHS Trusts should:

(xiii) consider the level of resources required to undertake surveillance effectively and evaluate the benefits of providing such resources;

(xiv) ensure that there are appropriate mechanisms for feedback of surveillance data to clinicians, the Hospital Infection Control Committee etc and require evidence that these results are being acted on;

(xv) when participating in the Nosocomial Infection National Surveillance Scheme, ensure that reasons for markedly worse than average performance are identified and acted upon;

(xvi) consider some form of post-discharge surveillance, either as part of the Nosocomial Infection National Surveillance Scheme or as part of the Trust's own surveillance;

(xvii) ensure that infection control considerations are an integral part of bed management policies; and

(xviii) assess their local situation to evaluate infection risks and implement those intervention measures which they believe would have the largest impact in reducing hospital acquired infection.

Recommendations to improve the effectiveness of other prevention detection and control activities

34 We found infection control teams to be a professional and dedicated group of NHS staff whose role and responsibilities have increased significantly over the last five years or so. We also found many examples of good practice in preventing and controlling hospital acquired infection. However there is scope for further improvement particularly in relation to education and training and in the audit of compliance with infection control guidelines. We consider that:

The Department should:

(xix) consider the benefits of producing an Infection Control Manual as is the case in Scotland, with the possibility for local "add ons";

(xx) consider the need for a revision of the 1995 guidance on Infection Control ; and

(xxi) consider the available evidence on the cost effectiveness of screening patients and staff and on isolation of patients and develop standards and guidelines where appropriate.

NHS Trusts should:

(xxii) review their policies on the provision of education and training on infection control procedures to ensure that all staff are targeted by induction training and that key staff who have day to day contact with patients (for example nurses, healthcare assistants and doctors) are kept up to date on good infection control practice. Computer Assisted Learning, which may have less resource implications for the infection control team, could be a way forward;

(xxiii) in implementing the Department's guidance on infection control, ensure that they consider the relative costs and benefits of measures to address hospital acquired infection;

(xxiv) review their arrangements for monitoring hospital hygiene and work with their infection control teams to determine whether there is a need for some revision of hospitals' practices;

(xxv) ensure that the advice on handwashing, published as part of the NHS action plan in March 1999, is fully implemented throughout the Trust;

(xxvi) ensure that they comply with the newly published infection control standards by consulting infection control teams when purchasing equipment, planning alterations or new hospital building and the letting of service contracts etc;

(xxvii) review their clinical audit arrangements to ensure that infection control issues are covered adequately and that infection control teams carry out regular audits of their own activities;

(xxviii) review their isolation facilities in line with Health and Safety legislation; and

(xxix) review their guidance on management of hospital acquired infection outbreaks ensuring endorsement by the Hospital Infection Control Committee.