

# **A FRAMEWORK FOR NATIONAL SURVEILLANCE OF HOSPITAL ACQUIRED INFECTION IN SCOTLAND**

## **Recommendations of the Advisory Group on Infection's Sub-group on Surveillance of Antimicrobial Resistance and Hospital Acquired Infection (HAI)**

### ***EXECUTIVE SUMMARY***

- 'Our National Health: a plan for action, a plan for change' emphasises the importance of a safe and healthy environment for NHS patients and staff.
- A commitment is given to taking steps to strengthen and monitor infection control in hospitals and to establishing that action is taken by NHS Trusts to ensure that the recommendations of the Scottish Infection Control Manual have been put into place.
- One of the main themes of this guidance is that the implementation of appropriate surveillance of hospital acquired infection (HAI) is a keystone in the reduction and monitoring of infection rates.
- This report contains the recommendations of a sub-group of the Advisory Group on Infection for the development of national surveillance of HAI in Scotland.
- The sub-group recommends a framework for national HAI surveillance based on a central-local collaboration between the Scottish Centre for Infection and Environmental Health (SCIEH) and NHS Trusts. Engendering local

ownership is recognised to be the key to success. The emphasis is therefore placed on locally based surveillance involving a local team of clinicians, infection control teams and managers. Local surveillance data must be of use, and be used, locally to improve performance and within the Clinical Governance agenda of Trusts. National surveillance data become available as a by-product of this activity. The sub-group stresses the need for the collection of national data which are comparable with those collected elsewhere in the UK. SCIEH's role will be to facilitate and coordinate the local surveillance programmes and to collate data at a national level on behalf of the Scottish Executive.

- For comparability in Trusts over time and between Trusts, surveillance of HAI must be carried out according to agreed national protocols, and specified core data collected. However, to match local situations and needs, there should be flexibility in the detailed implementation of surveillance and options available to include additional data, the collection of which is considered important at the local level.
- It is proposed initially that surveillance of in-patient surgical site infection should be implemented in all Trusts. In order to obtain robust national data the sub-group recommends that Trusts be asked to undertake, as a minimum, inpatient surveillance of at least two operative procedures selected from the short list of procedures for surveillance in Table 2, including one of the orthopaedic procedures on the list. Structures should be in place in all Trusts for surveillance of SSI by April 2002 with surveillance data available from all Trusts by 2003.
- Surveillance of HAI following neurosurgical procedures should be in place in all Trusts undertaking neurosurgery by April 2002.

- Surveillance of post-discharge surgical site infection should be added to the national programme as soon as a consensus is reached about appropriate methodology. Plans for post discharge surveillance should be available from the HAI Surveillance Steering Group by the end of 2001.
- National surveillance of methicillin resistant *Staphylococcus aureus* (MRSA) is a priority and should be developed as soon as possible. Mechanisms should be in place in all Trusts to collect MRSA data by Autumn 2001, with data available from April 2002.
- A second report of the sub-group will include recommendations on surveillance of HAI and antibiotic resistance in intensive care units.
- It is recommended that a Hospital Acquired Infection Surveillance Steering Group should be appointed by the Scottish Executive to oversee implementation, to provide strategic direction and to monitor and report on progress in the development of national surveillance of hospital acquired infection.
- The sub-group recommend that SCIEH play a major part in taking forward the implementation of national surveillance of HAI in Scotland. They, therefore, recommend that the Scottish Executive consider carefully the implications for SCIEH and ensure they have sufficient resources to facilitate the rapid implementation of their recommendations.
- The sub-group recognise the significant resource implications at Trust level of their recommendations. They, therefore, recommend that the Scottish Executive recognise that additional resources will need to be made available to Trusts to implement effective surveillance activities.

## **1. BACKGROUND**

The Advisory Group on Infection was asked to set up a sub-group to advise the Scottish Executive on how to proceed with the development of national surveillance of hospital acquired infection (HAI) and antimicrobial resistance in Scotland. The membership of the sub-group can be found at Annex 1.

### **1.1 What is a hospital acquired infection?**

1.1.1 The term hospital acquired infection (HAI) covers infections which occur in patients who have been hospitalised and which were not present or incubating on admission. The commonly applied definition includes those infections arising within 72 hours of admission.

1.1.2 The term nosocomial infection, sometimes loosely used to refer to HAI, covers all infections which result from patient care, wherever such care is given.

1.1.3 The broad term HAI includes infections which may be 'endemic' (ie usually present within the hospital) or 'epidemic' - an 'outbreak' of infection (ie an increase in the numbers of infections above what is 'usual'). Endemic or epidemic HAI may be defined by the site or system affected, eg surgical site infections, bacteraemias, pneumonias and urinary tract infections (these latter three groups are commonly associated with invasive procedures), or by the organisms causing the infection, eg methicillin resistant *Staphylococcus aureus*, *Clostridium difficile*. Outbreaks may also occur due to organisms not usually present in hospitals. Overlap in the ways in which HAI are 'named' can give rise to confusion over exactly what 'HAI surveillance' encompasses. In this paper the specific HAIs under consideration are clearly identified in the sections which follow.

1.1.4 Measures of a hospital acquired infection include 'incidence', ie the number of new infections occurring over a stated time interval, and 'prevalence', ie the total number of infections at a particular point in time ('point prevalence'), or in a given period ('period prevalence').

## ***1.2 What is surveillance?***

Surveillance is the ongoing, systematic collection, analysis and interpretation of health care data and the timely dissemination of results so that appropriate investigative and control measures can be initiated. The essential characteristic is that the information is used. By contrast, in an audit measures of performance are taken over a limited period to ascertain whether pre-determined standards are being met.

## ***1.3 Why undertake local and national surveillance of hospital acquired infection?***

1.3.1 Surveillance of HAI provides standardised data which are used to monitor continuously the quality of care which patients receive. The information can be used by local clinicians and managers to identify in a timely manner those areas where performance could be improved and to monitor the impact of infection control interventions which have been put in place.

1.3.2 Consistent and rigorous methodologies used at all sites provide Trusts with the information with which to assess their own performance within the context of clinical governance, to compare their performance against that of others and to examine the factors which underlie any differences in performance. It will also allow Trusts to assess their performance against national standards which are to be set, and which will be used by the Clinical Standards Board for Scotland in monitoring

Trust performance. Clinical governance requires that such data are available both locally and nationally.

1.3.3 The patient's right to have information on hospital infection rates and to have evidence that these are monitored has been acknowledged publicly by government. English Ministers have announced that monitoring of HAI will become mandatory in all Trusts in England from April 2001<sup>1</sup> with results being available for publication one year later. Scottish Ministers are yet to consider what arrangements should be put in place in Scotland. However, this issue is known to be a high priority for Scottish Ministers and, in the light of what is in place elsewhere in the UK, they are likely to wish to ensure robust arrangements are in place.

## **2. METHOD OF WORKING**

2.1 The sub-group was tasked with making recommendations and developing a business case for national surveillance in two related areas – antimicrobial resistance and HAI. The group has met on six occasions between April and November 2000. In order to make rapid progress in implementing national surveillance the sub-group has prepared this first report which addresses national surveillance of HAI. It is anticipated that the second and final report of the sub-group, which will complement this first report, will be available by Summer 2001.

2.2 The sub-group has restricted its detailed consideration at this stage to surveillance of the incidence of the 'classic' HAI, ie surgical site infections (SSI), bacteraemias, pneumonias and urinary tract infections and to outbreaks of HAI.

2.3 The sub-group took as its starting point the recommendations of 'Hospital Acquired Infection. A Framework for a National System of Surveillance for Scotland'<sup>2</sup>. That report recommended the development of a framework for national surveillance of HAI.

2.4 A background paper was provided to the sub-group by Dr Noone of the Scottish Centre for Infection and Environmental Health (SCIEH) which summarised the present situation with respect to HAI surveillance in the United States of America (USA), the UK, Europe and elsewhere.

2.5 The sub-group also took into account the recently published report of the National Audit Office 'The Management and Control of Hospital Acquired Infection in Acute NHS Trusts in England'<sup>3</sup> which identifies the need for surveillance of HAI using robust and consistent methodological approaches to deliver *credible* local and national data. A summary of a joint Public Health Laboratory and London School of Hygiene and Tropical Medicine Study entitled 'The Socio-economic Burden of Hospital Acquired Infection'<sup>4</sup> pointed to the large cost of HAI to the National Health Service (NHS) as well as to the patients themselves and their carers.

2.6 The sub-group considered the surveillance which is in place in other countries including those systems developed in the USA, England and Northern Ireland in order to learn from the experience already gained in this area elsewhere.

2.7 The sub-group heard presentations on the two established HAI surveillance systems in place in the UK. They were able to enquire in detail into practical aspects of implementation including the modules available, the nature of preparatory work with local Trusts, protocol development, implementation including data collection, maintenance and reporting back. The two systems are:

- that implemented in 1994 in Northern Ireland by the Infection Control Team at the Royal Hospitals, Belfast led by Dr Edward Smyth  
and

- the joint initiative of the Department of Health, London, and the Public Health Laboratory Service's (PHLS) – Nosocomial Infection National Surveillance Scheme (NINSS) – initiated in 1996.

2.8 Both these programmes have benefited from the experience of the US Centers for Disease Control's (CDC) system - National Nosocomial Infection Surveillance (NNIS)<sup>5</sup> - which has been developing and evolving over a period of twenty years and which has now been adopted, and sometimes adapted, for implementation in many countries in the world.

2.9 In Wales, HAI surveillance has been developing slightly differently in that systems for enhanced MRSA surveillance and outbreak surveillance are now firmly in place while development of surveillance of the 'classic' HAI along similar lines to that implemented in Northern Ireland is being implemented.

2.10 The approach adopted in Northern Ireland closely follows NNIS, including in the definitions used. Dr Smyth, the key figure in developing surveillance, is the Royal Hospitals' infection control doctor. The clinical areas/procedures for which HAI surveillance have been developed include: general surgery, cardiac surgery, vascular surgery, neurosurgery, intensive care units, paediatric surgery and caesarean section. SSI surveillance includes all operative procedures but surveillance is limited to the in-patient period. Surveillance is an ongoing and not an intermittent process. All modules are in place in The Royal Hospitals. Dr Smyth has been asked to develop a business case for implementation of surveillance of HAI throughout Northern Ireland. Dr Smyth emphasised the importance of the 'holistic' approach - fully involving local teams especially clinicians from the outset, of simple data entry methods, of a short (essential) core data set with the option for additional local data collection, and of effective and interactive feedback. He has found that involving clinicians results in their 'ownership' of the data and reinforces its credibility and value. Electronic scanning of data collection forms using 'FORMIC'



software has been found to be a very efficient method of data entry. Development of the Northern Ireland SSI data collection form, and ultimately other data collection forms, is planned to allow direct comparability with data from NINSS. Two of the four Trusts undertaking neurosurgery in Scotland already have experience of participating in Dr Smyth's module for surveillance of HAI following neurosurgical operations.

2.11 NINSS has been developed by the PHLS at Colindale, London in collaboration with NHS clinicians. Trusts participate voluntarily. The central multidisciplinary team develops the protocols, trains the voluntary participants, undertakes data handling, analysis and interpretation and feeds back to participants the national as well as their own results. One or both of the modules developed, viz surgical site infection (SSI) and bacteraemia, have been implemented on an intermittent basis in nearly 150 hospitals (about 70% of Trusts). The SSI module involves surveillance of any of a specified group of 12 operative procedures for a minimum duration of participation of three months. Only in-patient wound infections are identified. Although there are some differences in the definitions used for SSI surveillance by NINSS and NNIS (and in Northern Ireland), efforts are being made by both Dr Smyth and PHLS to adapt their systems to ensure that data from the two systems can be compared. NINSS has been reviewed on behalf of the Department of Health, London and is evolving and expanding in order to meet local priorities and requirements in several respects such as flexibility in methods of data collection and entry, surgical categories included, and development of additional modules including surveillance of HAI and antimicrobial resistance in intensive care units and surveillance of intravascular device associated bacteraemias. Emphasis is being placed on the more timely provision of local data to improve clinical practice.

2.12 Strategic re-development of NINNS to adapt it into a service for the NHS, which will also deliver the requirements of English Ministers, is being overseen by the 'Healthcare Associated Infection Surveillance Steering Group' (HAISS) of the

Department of Health, London. There is Scottish, Welsh and Northern Irish representation on this group. It will be a valuable forum in which the participant countries can try to coordinate developments in the individual countries of the UK. One development already agreed is a pilot of surveillance of SSI following orthopaedic surgical procedures in England, Wales and Northern Ireland drawing on the work of Prof Sean Hughes of Charing Cross Hospital, London, which will be adapted in collaboration with Dr Smyth to provide a surveillance methodology modelled on that in operation in Belfast.

2.13 The sub-group also noted that HAI surveillance in England, Northern Ireland and Wales was continuing to develop. UK wide data compatibility is being addressed through the HAIS group and through the informal liaison between the countries that was already in place.

2.14 Post-discharge surveillance of SSI is not currently included in the Northern Ireland or NINNS projects. In-patient surveillance of SSI alone may greatly underestimate the overall numbers and the rates of SSI where patient stays are short or day-surgery procedures common. This is particularly important as in-patient post-operative stays have decreased and day surgery is increasing. Despite a large literature on the subject, there is as yet no consensus on the best methods of accurately identifying infections which occur when the patient has returned to the community. There are a number of problem areas including how and by whom (eg patient, surgeon, GP, community nurse, laboratory) post-discharge infections are *accurately* identified and the practical and resource issues involved in implementing an efficient and effective method. A number of local studies, which will provide information on the most suitable methodology for national post-discharge surveillance, have been or are being undertaken in Scotland and elsewhere in the UK. A national pilot study of post-discharge patient-based audit of wound infection following groin hernia surgery using telephone questionnaire interviews is being undertaken in Scotland by Mr Eric Taylor and colleagues and

results will be available within the next two years. The approach of patient-based reporting using postal questionnaires has been studied recently by the PHLS in England. The results of this study have been presented to the Department of Health, London and will become widely available in the near future. The sub-group is also aware of other possible mechanisms for post discharge surveillance which need to be examined eg the participation of general practitioners involved in continuous morbidity recording, and the involvement in the surveillance of SSI following lower section caesarian section of midwives who routinely visit women within 10 days of delivery.

2.15 There is clear evidence from the survey of HAI surveillance activities that was undertaken by SCIEH on behalf of a Scottish office Working Group in late 1998 that priority areas for HAI surveillance in Trusts are SSI and bacteraemia<sup>6</sup>.

### **3. THE PRINCIPLES, STRUCTURE AND METHODOLOGICAL REQUIREMENTS FOR NATIONAL SURVEILLANCE OF HAI**

3.1 As a result of its deliberations, the sub-group agreed that the following general principles should apply in the development of a framework for national surveillance of HAI in Scotland:

- Surveillance of HAI should be based primarily *within* the local Trusts. There must be local ownership and use of surveillance data if it is to be used effectively to improve patient care.
- Collection of national HAI surveillance data is important but will be achieved as a by-product of local surveillance data collection.
- The surveillance data produced should be able to meet the objectives of surveillance included in section 1.3.

- HAI surveillance data must be reliable, credible and useful, both locally and nationally, thus the methodology employed for its collection must be robust.
- The methodology adopted should be such as to provide data comparable with those from elsewhere in the UK.
- In developing national HAI surveillance in Scotland the experience gained in Northern Ireland, Wales and England should be drawn upon as much as possible. All groups are very willing to share their expertise and to collaborate in developments.
- A national surveillance scheme should take the form of a *collaboration* between local Trust teams (including clinicians, infection control teams and managers) and a central coordinating organisation – SCIEH. This is in essence the ‘framework’ for surveillance.
- SCIEH should be commissioned by the Scottish Executive to prepare the national surveillance protocol(s), taking into account the experience gained elsewhere, to assist and support Trusts in effectively implementing the national surveillance protocol(s) and to collate, analyse and feedback the data in a timely manner.
- In order to provide data which are comparable nationally between Trusts and within Trusts over time, the surveillance methods adopted in all Trusts should use the definitions for procedures, infections and risk factors which are contained in the national protocol.
- Participating Trusts should be required to undertake HAI surveillance using agreed national protocols and to undertake to collect certain ‘core’ data

items on selected procedures. Data collection forms should be designed to allow Trusts the option to collect additional data items if they wish to do so for local use.

- The core national dataset required should be as small as possible, but within the requirements of a robust methodology.
- The methods adopted for data collection within each Trust should be for local decision but should aim to be as simple, efficient and streamlined as possible within the local resources available.
- Surveillance data for inclusion in the national data set should be provided to SCIEH by Trusts.
- Timely feedback of national and local data to infection control teams and to clinicians and the use of the data to improve practice where necessary, is an essential part of the surveillance cycle and its importance was stressed by the sub-group.
- A National HAI Surveillance Steering Group should be created by the Scottish Executive to provide strategic direction and to oversee and monitor the implementation of a national HAI surveillance system. The importance of ensuring appropriate representation of key user groups on the steering group to ensure 'ownership' was highlighted by the sub-group.

#### **4. AREAS FOR NATIONAL HAI SURVEILLANCE**

4.1 The sub-group considered the desirability of national surveillance of the 'classic' HAI, viz SSIs, bacteraemias, urinary tract infections and lower respiratory tract infections, against the following criteria: the burden and cost of infection, preventability, evidence from the SCIEH survey on Scottish Trusts' priorities, and the ready availability of well-piloted methodologies.

4.2 Against the above criteria, **the sub-group recommends that first, priority for national surveillance development should be given to in-patient surveillance of SSI, an area where UK methodology is already well developed, where there are opportunities for prevention, which Trusts record as of high priority and where the infections are costly to the NHS<sup>4</sup>.** HAI surveillance of SSI using standardized methods and the NNIS approach will thereby become a routine part of Trusts' infection control and quality assurance cultures and structures, and the basis on which further HAI surveillance initiatives can be built.

4.3 Post-discharge surveillance will be required for operative procedures which are carried out predominantly as day cases or which have very short inpatient stays, eg hernia repair, caesarian section, excision of breast lump. In view of developments in the area of post-discharge surveillance, and to allow time for consensus to emerge on the appropriate methodology to use, it was felt appropriate to concentrate initially on in-patient SSI surveillance. UK-wide, there is an agreed urgency to achieve agreement as to the best way to proceed with post-discharge surveillance. A meeting on post-discharge surveillance was arranged in Scotland on 16<sup>th</sup> January 2001 by the informal inter-country liaison group, to which members of HAISSG and representatives of all the UK countries were invited. The issues were discussed in order to try to achieve a consensus

on the way forward for Scotland and other parts of the UK. **The sub-group recommends that the HAI Surveillance Steering Group should ensure that local and national surveillance of SSI post discharge is implemented as soon as there is a consensus on the appropriate areas and methodology/methodologies for Scotland and the UK.**

4.4 For national surveillance of SSI it is important that robust local and national data on infection rates are available. There are two main approaches to national surveillance. Trusts can be facilitated in intermittent or continuous surveillance of *all* operative procedures within a speciality, such as general surgery, orthopaedic surgery, vascular surgery, or alternatively, of only those operative procedures specifically required for national surveillance. The former approach, which is the one used in CDC-NNIS and in Northern Ireland, has three important advantages: first, it is 'inclusive', ie surgical teams are not excluded from participation because they do not undertake surveillance of a listed procedure; second, Trusts' perceived priorities can be included; and third, data collection can be incorporated into routine record keeping without decisions having to be made about whether a particular procedure is 'on the list'. The Northern Ireland experience is that when all procedures are included, the collection of surveillance data by the surgical team rapidly becomes normal practice. The second approach, national surveillance of selected specified operative procedures, has been adopted by NINNS. The operations included in NINSS (Table 1) have been selected because these are recognised to be 'high risk', because it is felt that the current in-patient stay is long enough for infections to occur in hospital, and because a sufficient number of procedures is performed in one hospital to allow a robust estimate of infection rates.

Table 1 Categories of surgical procedures included in NINSS

Abdominal hysterectomy
Bile duct, liver, pancreatic surgery
Cholecystectomy
Gastric surgery
Small bowel surgery
Large bowel surgery
Coronary artery bypass graft
Vascular surgery
Limb amputation
Open reduction of long bone fracture
Hip prosthesis
Knee prosthesis

**4.5 The sub-group recommends that in Scotland some flexibility for Trusts' should be allowed in terms of which operative procedures they choose to be included for surveillance. However, there should also be some 'required' procedures for in-patient surveillance by participating Trusts so that national HAI surveillance data will become available. The sub-group proposes that this should include two of the procedures listed in Table 2 (page 16), one of which should be an orthopaedic procedure. The development of surveillance of SSI following orthopaedic procedures will be part of the pilot surveillance to be undertaken in collaboration with colleagues in England, Wales and Northern Ireland.**

4.6 The sub-group also recognised the importance for a number of reasons of implementing surveillance for infection following Lower Segment Caesarian Section (LSCS) and propose that the HAI Surveillance Steering Group be asked to consider this as an early candidate for post-discharge surveillance.



4.7 Two of the four neurosurgical units in Scotland have already participated in SSI surveillance (for varying periods of time) in collaboration with colleagues in Northern Ireland. This is therefore a specialty of particular importance in which experience already exists and for which national data could be collected relatively easily, if the four Trusts involved agreed to participate.

Table 2. **Required surgical procedures for national surveillance in Scotland:** numbers of procedures\* per annum in Scotland and median stay.

<b>Procedure**</b>	<b>Total pa</b>	<b>Median stay (days)</b>
Hysterectomy	6063	6
Cardiac surgery	830	8
Total hip replacement	5214	10
Fracture neck of femur	6364	11
Knee replacement	3181	10
CABG with chest and peripheral incision	2322	8.0
CABG with chest incision only	275	7
Lower segment caesarian section	10704	5
Vascular Surgery*	2897	7
Breast Surgery	6363	4

\*annual operations carried out in adults (persons >16yrs)

\*\*The OPCS Codes for procedures included in these groups are available on request

Data source: Information and Statistics Division

4.8 National surveillance of Methicillin Resistant *Staphylococcus aureus* (MRSA), an important and common nosocomial pathogen, will also have to be urgently addressed. Some data on MRSA bacteraemias occurring in Trusts in Scotland is already routinely collected by SCIEH but these data are incompletely reported and some important data items are missing. DH Ministers have recently announced that surveillance of MRSA will be mandatory in all English Trusts from April 2001 with a

view to having data which can be published from April 2002. To meet this objective the PHLS has been commissioned by Department of Health, London on behalf of HAISS to develop rapidly a simplified scheme to collect basic, outline data on MRSA infection rates in Trusts which can be used whilst more comprehensive surveillance methodology is developed and agreed. The Scottish HAI Surveillance Steering Group will be able to draw on this work to facilitate the collection of Scottish data (local and national) on MRSA associated bacteraemia at the earliest opportunity. It is anticipated that ECOSS will have been rolled out to the majority of Trusts by March 2001, and could be used for this purpose.

4.9 In view of its public and political profile and the impact it has on the NHS and community, **the sub-group recognises that surveillance of MRSA must be given priority in line with activity elsewhere in the UK and recommend that an approach similar to that to be implemented in England be established as soon as practical.**

4.10 Outbreaks of *HAI* occur from time to time in hospital settings, resulting in a variety of infections in patients. Current patterns of care have led to shorter hospital stays and a need for closer integration of infection control activity across the interface between the hospital and community setting. It is important, therefore, that when outbreaks of infection occur within Trusts, these are reported as a matter of 'good practice' to the Public Health Medicine Department of the Health Board concerned so that Trust and community activity can be coordinated. In addition Trusts are required to report any significant outbreak of infection to the Director of Public Health of the Health Board area so that he/she can execute their statutory responsibility to report such outbreaks to the CMO. As no national information is available on these incidents the frequency, extent and aetiology of these local outbreaks is not known. It is also not possible for Trusts to benefit from each others' experience in managing similar outbreaks or to find sources of advice and

expertise. The availability of a national database of outbreaks and their management would provide a resource for Trusts and assist in their outbreak management. **The sub-group therefore recommends that a national surveillance scheme for outbreaks of HAI in healthcare settings should be implemented.**

4.11 National surveillance of bacteraemias was considered by the sub-group. Whilst these are, indeed, a costly group of infections, and an area judged to be of great importance by Trusts within their own local surveillance activity, it was felt that existing methodologies were not yet robust enough to produce information for effective intervention. Even if the burden of bacteraemias is demonstrable, the proportion that is preventable cannot easily be derived. There is a consensus internationally that intravascular device-associated bacteraemias are an important area in terms of the control of HAI. Such surveillance requires that data are available on the times/dates of placing and removal of the intravascular devices, events which are not routinely recorded at present. **The sub-group recommends that the HAI Steering Group be asked to look in more detail at surveillance of bacteraemias and to ensure appropriate developments on a suitable time scale.** PHLS have been asked to produce a simplified bacteraemia module for English Trusts and the group can draw on this work.

4.12 HAIs in intensive care units (ITUs) are frequent, have serious sequelae and are costly to health services. In the USA the approach adopted has been to target HAI surveillance (including bacteraemias, urinary tract infections, respiratory tract infections and wound infections) on intensive care units. Since levels of antibiotic resistance are highest in ITUs, surveillance has included that of antibiotic prescribing practice and resistance patterns. The House of Lords Select Committee on Science and Technology Report 'Resistance to antibiotics and other antimicrobial agents'<sup>7</sup> strongly urged the development of surveillance of hospital

acquired infection and antimicrobial resistance in intensive care units along the lines of the 'ICARE' project developed in the US by CDC and Emory University. In the UK, surveillance is in place in the Royal Hospitals, Belfast and protocol development is being undertaken by NINNS (PHLS). The second report of the sub-group will address surveillance in ITUs.

4.13 At this stage national surveillance of urinary tract infections and lower respiratory tract infections was assessed by the sub-group against all the criteria of cost, preventability, high Trust priority and well developed methodology, and was judged to be currently of lower priority than SSIs and bacteraemias.

4.14 Prevalence surveys can be undertaken intermittently to provide data on the total HAI in hospitalised patients at any one time and trends in prevalence. Several such surveys have been performed in the UK in recent years. The sub-group is aware that, whilst prevalence surveys provide useful information about the total impact of HAI and trends in HAI, such surveys are difficult to organise nationally and are also time-consuming. For this reason, national prevalence surveys are not considered a priority at this time.

## ***5. ACTION, PROGRAMME AND TIMESCALE FOR THE DEVELOPMENT OF NATIONAL HAI SURVEILLANCE***

5.1 In order to take this initiative forward **the sub-group recommends that a National HAI Surveillance Steering Group should be appointed by the Scottish Executive (SE)**. This will provide strategic guidance and will monitor and report on the implementation of a national HAI surveillance system. In view of the tight timescale required to allow Scotland to match activity elsewhere in the UK, this needs to be undertaken as soon as possible.

5.2 In order to provide a central coordinating function for this exercise, the SE should commission SCIEH to:

- develop national protocols compatible with those in other parts of the UK in collaboration with the HAI Surveillance Steering Group.
- work with the HAI Surveillance Steering Group to roll out a programme of surveillance of HAI across Trusts in Scotland.
- work actively with the Trusts to assist them in the development of HAI surveillance according to the national protocols(s).
- facilitate and coordinate the development of local surveillance programmes.
- undertake quality assurance of national surveillance data.
- collate data at a national level on behalf of SE.

5.3 In line with the recommendations of the sub-group, the HAI Surveillance Steering Group should:

- ensure initially that national surveillance development will concentrate on surveillance of in-patient SSI;
- see that post-discharge surveillance is added to the national programme as soon as a consensus has been reached on methodology;
- recognise that surveillance of MRSA-associated bacteraemia is regarded as a priority and development needs to be taken forward urgently,

5.4 The sub-group was asked to give some guidance on the likely timescale involved. The sub-group considers that it is feasible to expect that:

- the structures should be in place in all Trusts in Scotland for local and national surveillance of inpatient SSI following at least two operative procedures, one of which should be an orthopaedic operation, by April 2002. These surveillance data should be available from all Scottish Trusts by April 2003.
- surveillance of HAI following neurosurgical procedures should be in place in all Trusts undertaking neurosurgery by April 2002.
- a plan for post-discharge surveillance of SSI should be available from the HAI Surveillance Steering Group by the end of 2001.
- surveillance data on MRSA bacteraemias should be available from all Trusts by April 2002.

5.5 In addition to the above, SCIEH should develop and implement a system for collecting data on incidents/outbreaks of hospital infection. The database should be an information resource for the Trusts.

5.6 The HAI Surveillance Steering Group should take account of the second report of the sub-group in addressing the further development of national surveillance to include surveillance of intravascular device-associated bacteraemias and the need to undertake HAI surveillance in ITUs. Relevant proposals on surveillance of antimicrobial resistance patterns will be included in this further report and will also need to be addressed by the HAI Surveillance Steering Group.

## **6. OTHER ISSUES RELEVANT TO IMPLEMENTATION OF NATIONAL HAI SURVEILLANCE**

6.1 In the course of its deliberations the sub-group identified the following procedural/practical aspects of implementation of local and national HAI surveillance which need to be addressed during implementation.

6.2 Successful HAI surveillance in the UK and in the USA is based on local involvement and ownership of the HAI surveillance data. This is seen to ensure local credibility and use of the data to improve practice. Initial consultation and discussion with local teams was reported to be a lengthy but essential part of successful implementation of HAI surveillance. Flexibility in local implementation is key to successful central/local partnership in achieving a national HAI surveillance dataset. This is recognised in the recommendations from the sub-group.

6.3 Whilst a group of 'core procedures' is proposed for national surveillance purposes, there is no reason why Trusts should not collect data on a range of procedures, or even all procedures, within a particular speciality in which they are interested. However, since infection rates are most usefully expressed for groups of similar procedures, there may be limitations on the robustness of estimates due to small numbers in some procedure groups.

6.4 The sub-group was impressed by the simplicity and flexibility of the two-sided, single A4 sheet data collection form developed in Northern Ireland. This includes the collection of essential 'core data' but also provides space for individual Trusts to record optional extra data. It is proposed that SCIEH should, with agreement from Dr Smyth, utilise the experience gained in Northern Ireland and develop a similar data collection form for use in Scotland.

6.5 Trusts must make their own decision about who collects the surveillance data. Data need to be collected on the denominator, ie patients at risk (including their clinical and other characteristics), and on the numerator, ie wound infections. Numerator and denominator data collection by involved clinical staff was the preferred option in Northern Ireland as it was felt to reflect local ownership and involvement. The collection of information on the numerator, ie the presence of an infection which meets the agreed case definition, should be undertaken by staff trained in recognizing such infections. Clinical or infection control staff may be involved in this process. The sub-group was conscious of the severe pressure under which many infection control teams already work and so did not want to be too prescriptive in respect to data collection arrangements within Trusts. Decisions as to the most efficient and effective way of collecting accurate numerator and denominator data consistently, using the nationally agreed definitions, must be made at local level in the light of local resource availability.

6.6 Surveillance involves continuous data collection and has the advantage of providing data which will alert local teams to problems as soon as they occur. In Northern Ireland continuous surveillance which becomes integrated into the process of patient care was seen as desirable. It may be that in some circumstances only intermittent data collection is achievable. Where continuous surveillance is not possible, intermittent surveillance will be undertaken provided that the duration of data collection is such that a sufficient number of procedures is observed to provide robust estimates of infection rates.

6.7 Data can be collected manually or downloaded from existing electronic systems. Manual data collection has the advantage of speed, simplicity and flexibility and is likely to be the method suitable for the majority of Trusts. There may however be instances where Trusts have well developed IT systems which are able to provide some of the data required and direct downloading of appropriate data items may be possible. Direct entry of data onto an electronic form has been utilised in some



surveillance systems. Such methods could prove to be suitable, efficient and reliable in particular local situations. However, the need for good IT support locally to back up local electronic systems and the requirement for high quality data rapidly and efficiently collected must be borne in mind in developing data collection and management within the Trusts. SCIEH's role will be to help Trusts develop the systems most appropriate to their own situation.

6.8 Efficient data entry of paper-based data using scanning systems has been described to the sub-group. It is anticipated that initially this will be the usual method of data entry and that paper forms will be sent to SCIEH for entry. It may be that some Trusts have the resources and expertise to enter data efficiently, accurately and reliably onto an electronic database in a timely manner. Such alternatives would need to be explored with individual Trusts.

6.9 Transfer to SCIEH of paper-based forms which will be scanned into the central database and analysed to provide a series of routine tables is proposed. However, the possibility exists of electronic transmission of data, particularly from Trusts which can undertake their own scanning, or those which enter data directly onto electronic databases. If Trusts prefer to undertake their own analyses and have the resources to do, so this option too will be possible. Suitable software programmes will be available from existing UK schemes or could be developed for the preparation of routine tables.

6.10 There will be an agreed timetable for feedback of routine data analyses by SCIEH to the Trusts' HAI surveillance teams. Trusts will receive the national analyses as well as the analyses of their own data for their own use in monitoring and controlling HAI infection.

6.11 An individual Trust's data will not be released by SCIEH to any other party except with the agreement of that Trust's HAI surveillance team. There is no plan for

national surveillance data to include surgeon-specific infection rates. This information will be purely for individual Trusts.

## **7. RESOURCE AND FUNDING IMPLICATIONS**

7.1 The sub-group recognised that the key to successful implementation of a national system of surveillance for HAIs is the availability of appropriate resources. This will be particularly important given the tight timescale needed for Scotland to catch up with the significant developments which have already taken place in other parts of the UK.

**7.2 The sub-group recommends that SCIEH plays a major role in taking forward this exercise in Scotland.** It is anticipated that they will play a major role in the national HAI Surveillance Steering Group and in acting as the central point for coordination and data collection for the surveillance system. In addition, if Trusts are to be expected to implement surveillance systems over a short period of time, SCIEH will have to play a very active role and work closely with Trusts to facilitate this, in the initial phases of the exercise. In order for SCIEH to be able to fulfil this role, the sub-group recognised that SCIEH will require significant additional resources. **The sub-group recommends that the Scottish Executive consider carefully the implications for SCIEH and ensure they have sufficient resources to facilitate the rapid implementation of their recommendations.**

7.3 In addition, the sub-group recognises the significant resource implications at Trust level of their recommendations. Given the severe pressures and constraints that the infection control staff of most Trusts already work under, it is considered unrealistic to expect them to be able to take on these additional surveillance functions within their current resources. Even if infection control nurses and doctors

do not collect the data themselves, they will have to play an important part in coordinating the surveillance activity within a Trust, in the interpretation of surveillance data at Trust level and in planning and overseeing any control measures required in response to the information. **The sub-group, therefore, recommends that Scottish Executive recognise that additional resources will need to be made available to Trusts to implement effective surveillance activities.**

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## ANNEX 1

The members are:

Dr David Old (Chairman),	Chairman, Advisory Group on Infection (recently retired Reader in Medical Microbiology and Consultant Microbiologist, Ninewells Hospital and Medical School)
Professor Sebastien Amyes,	Head of Department, Medical Microbiology, University of Edinburgh Medical School
Dr Jim Chalmers,	Consultant in Public Health Medicine, Information and Statistics Division, Common Services Agency for NHS Scotland
Mr Richard Clark,	Information and Statistics Division, Common Services Agency for NHS Scotland
Professor Peter Davey,	Clinical Pharmacology, Ninewells Hospital and Medical School
Dr Ian Gould,	Consultant Microbiologist, Aberdeen Royal Infirmary
Dr Norman Lannigan,	Trust Chief Pharmacist, Western General Hospital
Dr Chris Low,	Scottish Agricultural College
Mr John McCormick,	Consultant Surgeon, Medical Director, Dumfries Royal Infirmary
Dr Ahilya Noone,	Consultant Epidemiologist, Scottish Centre for Infection and Environmental Health
Dr Gabby Phillips,	Consultant Microbiologist, Ninewells Hospital and Medical School
Professor Bill Reilly,	Consultant in Veterinary Public Health, Scottish Centre for Infection and Environmental Health

Professor Lewis Ritchie,	Professor of General Practice and Primary Care, University of Aberdeen
Ms Sarah Stevenson,	Infection Control Nurse, Stirling Royal Infirmary
Dr Charles Swainson,	Medical Director, Royal Infirmary of Edinburgh
Mr Eric Taylor,	Consultant Surgeon, Surgical Department, Vale of Leven Hospital
Dr Andrew Todd,	Consultant Physician, Infectious Diseases, Monklands Hospital
Dr Tom Turner,	Consultant Paediatrician, Royal Hospital for Sick Children, Yorkhill
Dr Pauline Upton,	Consultant in Public Health Medicine, Lothian Health

Representatives from the Scottish Executive

Dr Rosalind Skinner	Principal Medical Officer
Mr Charles Knox	Director, Computing and IT Strategy
Mr Alan Oliver	Public Health Division 1