A Strategy for the Control of
Antimicrobial Resistance in Ireland

SARI

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Annual Report 2005

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1. Executive Summary

The Strategy for the control of Antimicrobial Resistance in Ireland (SARI) was launched by the Minister for Health and Children in April 2001, in response to the findings of the 1999 North-South survey on meticillin-resistant *Staphylococcus aureus* (MRSA) and the European Antimicrobial Resistance Surveillance System (EARSS). The SARI report includes, recommendations on the need for developments in surveillance, improvements in antibiotic stewardship, education and research, and enhanced infection control practice such as hand hygiene.

At national level, there has been some progress during 2005 such as the launch of national recommendations on hand hygiene and the control of MRSA, and the development of guidelines on antibiotic stewardship for hospitals. There has also been significant activity in many regions and at local/hospital level such as general practitioner education on antibiotic prescribing, expanding the role of hospital pharmacists to improve and reduce the use of unnecessary antibiotics, the introduction of new laboratory methods and technologies for antimicrobial susceptibility testing, and the production of educational leaflets for patients and members of the public.

The full implementation of SARI is some way off. This is due to inadequate resources, including a lack of ring-fenced funding for SARI initiatives and delays in the approval of whole-time equivalent staff. This was well highlighted in a gap analysis undertaken in the middle of 2005 and during the joint SARI/Antimicrobial Resistance Action Plan (AMRAP, the equivalent strategy for Northern Ireland) meeting in November 2005, which highlighted significant developments in Northern Ireland, England and Belgium in reducing antimicrobial resistance.

In Ireland, there are inadequate numbers of consultant microbiologists, infection control nurses, antibiotic pharmacists, surveillance scientists and other staff, despite some appointments in recent years. Furthermore, high bed occupancy rates and insufficient numbers of isolation rooms impede the implementation of national guidelines such as in the control of MRSA in hospitals.

The failure to include ring-fenced funding in the estimates of the Department of Health and Children as part of the budget in December 2005 for SARI implementation in 2006 was a great disappointment to those involved nationally in providing leadership in this area, as well as the relevant individuals and groups on the ground, who have worked hard and enthusiastically to implement SARI in the face of inadequate resources.

Given the concern amongst members of the public and patients about antibiotic resistance, including MRSA, and despite re-assurances from the Department of Health and Children, the Tánaiste, and the Health Services Executive, progress is too slow. Five years after the launch of SARI national levels of antimicrobial resistance remain unacceptably high, and in the case of some pathogens have even increased. Levels of antimicrobial consumption in hospitals and the community also remain high. Ireland is one of the few countries in Europe without a national system for surveillance of healthcare-associated infections. There is an urgent need to allocate sufficient ring-fenced resources at national and local level both in the short-terms and for the next five to ten years, and to fast-track key appointments to correct the deficit in terms of personnel.

As healthcare professionals, we strive to provide a high quality service in a safe environment to our patients. There is considerable frustration, and even cynicism, amongst the various committee members, and the relevant healthcare workers on the ground about the priority given to the full implementation of the 2001 SARI recommendations. There are increasing demands for better data, (e.g. MRSA rates) and for improvements in the delivery of healthcare by way of reduced or even contained rates of hospital-acquired infection. However, these demands are not matched by the priority given to this area at national level through central funding and subsequent regional or local funding allocation. The resources allocated to date have provided a basic infrastructure but are insufficient to fully implement SARI. It is essential that in 2006 rapid progress in the implementation of the 2001 recommendations be made. If not, confidence in this strategy will evaporate and the perception of patients of our health system will be damaged.

2. Background

Ireland joined the European Antimicrobial Resistance Surveillance System (EARSS) in 1999. This demonstrated a high level of antimicrobial resistance in Ireland, compared to other European countries. Likewise the 1999 North-South MRSA survey found that the higher MRSA prevalence in the Republic of Ireland, compared to Northern Ireland, was associated with inadequate infection control resources. In response to these, and other, findings, the Strategy for the Control of Antimicrobial Resistance in Ireland (SARI) was launched by the Minister for Health and Children, Mr. Micheál Martin in April 2001.

SARI recommended the establishment of a national framework, and developments in the areas of surveillance, monitoring the supply and use of antimicrobials, education, enhancing infection control in hospital and in community settings, and research. These recommendations were in line with the 1998 European Union "Copenhagen recommendations" and SARI is now recognised as Ireland's formal "Inter-Sectoral Coordinating Mechanism" under the European Council Recommendation on the prudent use of antimicrobial agents in human medicine (2002/77/EC). Part of the national framework, including the National Committee, was established together with Regional Committees and Specialty Sub-Committees. This annual report summarises the activities and developments in the implementation of SARI during 2005, including the activities of the various Sub-Committees and progress in the regions.

Hilary Humphreys, Chairman, SARI National Committee and Robert Cunney, Honorary Secretary, SARI National Committee drafted this report on behalf of the National Committee, following the receipt of reports from the Regional and Specialty Sub-Committees. Both are grateful to the Chairs of the Specialty Sub-Committees and the Regional Committees, who are listed in Appendix I.

3. National Committee

The National Committee has 32 members and has wide representation from the Regions and the various relevant professional groups. Following the re-organisation of the Health Services in 2004, the National Committee reports to the Health Services Executive (HSE) since 2005 but has retained representation from the Department of Health and Children (DOH&C). During 2005, the National Committee met on five occasions.

The Committee reviewed the SARI structures and reporting relationships in the light of the recent changes in the Health Service. The National Committee will continue to provide expert advice to the HSE and the DOH&C on the implementation of SARI and will liaise closely with the HSE/SARI Implementation Group and the DOH&C/HSE/SARI Liaison Committee. It was also agreed that the minutes of the National Committee would be distributed to the members of the HSE/SARI Implementation Group and the DOH&C/HSE/SARI Liaison Committee and that the minutes of these two groups would in turn be circulated to the National Committee. However, there remains considerable confusion and frustration amongst members of the Regional Sub-Committees regarding their reporting relationships, as local structures are still being finalised.

During 2005, a gap analysis (see Appendix II) was carried out to outline of progress in the implementation of SARI and where there remains considerable work to be done. This has identified significant deficiencies, primarily due to inadequate ring-fenced funding and the cap on public sector recruitment. Whilst a national framework has been established, there have been difficulties about ensuring that money allocated for the implementation of SARI has been used for that purpose in some of the old health boards. While 20 surveillance scientists have been appointed since 2001 but there are inadequate numbers of laboratory scientists, consultant microbiologists (12 additional microbiologists have been appointed but there is a requirement for at least an additional 20) and infection control nurses (35 appointed, an additional 30 required). Pharmacists with responsibilities for antimicrobial prescribing are absent in most Irish hospitals.

A pilot project, which was funded by the National SARI Committee in 2004, demonstrated the cost-effectiveness of the employment of an antibiotic pharmacist in the HSE Midland Area (see Appendix III). However, this development has not been continued due to a shortage of funding. A general practitioner educational initiative (See Report from Community Antibiotic Stewardship Sub-Committee) was also funded as a pilot project in 2004 by the National Committee, but it has not been possible to extend this nationally due to a lack of funding.

An area that also requires urgent attention is the provision of a national framework for the surveillance of nosocomial or healthcare-associated infections in Ireland. Ireland remains without a national system for surveillance of healthcare-associated infections, despite this being a requirement under European Commission directive 2119/98/EC.

Following discussion at the National Committee, a submission to significantly fund SARI implementation was forwarded to the DOH&C by the HSE in advance of the budgeting estimates. However, there was much disappointment and frustration amongst members of the National Committee, and other Committees when the Departmental estimates did not include any specific allocation for the implementation of SARI during 2006.

The second SARI/Antimicrobial Resistance Action Plan or AMRAP (a similar strategy document to SARI for implementation in Northern Ireland) joint meeting was held in Armagh in November 2005 (See full report in Appendix IV). The theme of the meeting was antibiotic stewardship, and in particular, implementing strategies. There were presentations from Ireland, Northern Ireland, England and Belgium. It was clear

that considerable progress has been made in the UK, (e.g. in Northern Ireland the overall consumption of antimicrobial agents has fallen in recent years), and in Belgium where a mass campaign has resulted in significant improvements in antimicrobial prescribing practice. In Northern Ireland the Department of Health, Social Services and Public Safety has launched a five-year implementation plan to reduce healthcare-associated infection, which includes clear implementation targets and commitments to provision of additional infection control resources. The contrast between the progress that is being made in Northern Ireland and in many European countries, with the slow rate of progress in Ireland, is striking. This meeting was attended by over 100 delegates and there were poster presentations on a variety of issues relating to antimicrobial resistance and the control of healthcare-associated infection.

The National Committee is also concerned at the grading of infection control nurses and the failure to recruit suitable individuals in senior positions because of the unattractiveness of the pay scale and the relatively poor grading. Negotiations are ongoing between the relevant parties to try to address this. Finally, the HSE has established a group to review the need for, and the nature of, reference laboratories in Ireland. This will have implications for the surveillance of antimicrobial resistance in Ireland.

4. Specialty Sub-Committees

4.1 Infection Control

The Sub-Committee met on five occasions and amongst its activities were the launch of the guidelines on the control and prevention of MRSA and hand hygiene, by the Tánaiste and the Minister for Health and Children, Ms. Mary Harney in September 2005. There was a general welcome for the national hygiene audit and the results that were disseminated in October 2005. However, whilst hygiene is an important component of infection control and prevention, it is just one facet of a multi-disciplinary approach required to improve the situation in Ireland. In particular, this needs to be addressed with the allocation of appropriate resources if the implementation of national standards for both hygiene and infection control is to be achieved. However it is important that these two linked issues are not regarded as synonymous.

The Sub-Committee discussed in some detail the development of a national programme of surveillance for MRSA in the light of a demand from the public and patients for accurate and meaningful data. Current information is not standardised or audited and therefore comparisons are not valid. Amongst the four options considered were:

- improving the data collected as part of EARSS bloodstream infection data collection through linking this with Hospital In-Patient Enquiry (HIPE) data,

- accessing and collecting clinical details and risk factors when Computerised Infectious Disease Reporting (CIDR) is fully in place,

- initiating a limited form of surveillance in key clinical areas such as the intensive care and orthopaedic wards,

- MRSA surveillance as a component of the Hospital Infection Society (HIS) Prevalence Survey of healthcare-associated infection. This survey is being conducted between February and May 2006 in England, Wales, Northern Ireland and Scotland and is an excellent opportunity to benchmark the prevalence of HCAI in Ireland. In addition and this survey will also collect, standardised comparable data on infections caused by MRSA.

A specific on-going national programme of surveillance of MRSA in intensive care units will be re-considered after the HIS survey has been completed and analysed later in the year, but further national surveillance activity will require investment in personnel and infrastructure at both local hospital and national levels.

The Sub-Committee is conscious of the need to provide more information and education to the public and healthcare staff about healthcare-associated infection and antibiotic resistance. To this end, it has prepared patient information leaflets on general aspects of healthcare-associated infection, and MRSA. The Sub-Committee also heard a presentation from a company that is involved in the delivery of education and materials to healthcare staff in the National Health Service (NHS) in England. The Sub-Committee has recommended to the HSE that it consider such an initiative to update and educate all healthcare staff working in the Irish health service, similar to what is occurring in the UK NHS.

Further tasks for the Sub-Committee include the development of a template for a national infection control manual. Developments on this have already taken place in the Southern and Eastern Areas and the Sub-Committee is conscious of the need not to duplicate efforts. During the year, representation on the Infection Control Sub-Committee was expanded to include Public Health Nursing units.

Finally, it is not clear whether the Sub-Committee should take on board a broader remit of infection control in healthcare facilities generally (e.g. reviewing the facilities, space, ventilation required for various categories of patient areas) and not just that confined to the control of antimicrobial resistance. There is a lack of clarity on the role of this SARI Sub-Committee *vis a vis* the role and activities of various groups and agencies within the HSE, e.g. the development of infection control standards. This needs to be explored to ensure optimisation of effort and unnecessary duplication.

4.2 Hospital Antibiotic Stewardship

The Sub-Committee developed recommendations on the implementation of hospital antibiotic stewardship in Irish hospitals, including:

- Structures and staffing for antibiotic stewardship
- Strategies for optimising antibiotic therapy
- Local antibiotic formularies, policies and guidelines
- Point of prescribing interventions
- Appropriate use of diagnostics
- Prescriber education

These recommendations were incorporated as an appendix in the SARI Guidelines on Control and Prevention of MRSA, published in September 2005.

The Sub-Committee also addressed issues of prescriber education, and developed a draft pocket guide to the prevention of antimicrobial resistance in hospitals. The Sub-Committee also examined options for postgraduate training for clinical pharmacists in antibiotic liaison, including involvement of one or more Irish schools of pharmacy in such training.

The Sub-Committee has identified the following key priorities for 2006:

- Implementation of the recommendations on hospital antibiotic stewardship, as included in the SARI MRSA guidelines
- Appointment of antibiotic liaison/infectious disease pharmacists, in line with recommendations from the Irish Hospital Pharmacists Association.
- Development and delivery of an education programme for hospital clinicians on prudent antibiotic prescribing.

4.3 Community Antimicrobial Stewardship

The Sub-Committee is currently involved in the following activities:

- General Practitioner (GP) Educational Initiative
- GP Sentinel Study

- Development of GP prescribing guidelines

- Development of patient educational materials

GP Educational Initiative
In 2003, 112 GPs participated in an educational exercise on antibiotic prescribing in their small group Continuing Medical Education (CME) sessions. This educational exercise was designed to highlight whether or not prescribing was in line with internationally available guidelines, with regard to choice of antibiotics, dosages and durations to use etc. Base line data revealed that only 57% of prescribing was deemed to be compliant with international guidelines used, although most deviations were minor. Discussion of inappropriate prescribing mostly focused on the fact that patients often express a wish to be receive an antibiotic and would be displeased if they didn't get one. Following GP education, there has been a significant increase in the proportion of antibiotic prescriptions in line with guidelines. However, there has been no change in the proportion of patients receiving a prescription for an antibiotic.

GP Sentinel Study
Much of the antimicrobial resistance data that originates from hospital laboratories is skewed towards hospitalised patients and there is less reliable data available on patients being treated by GPs. This study investigated the costs and feasibility of establishing a GP sentinel network to collect data on resistance patterns and antibiotic consumption. Seven group practices, four urban and three rural, fully participated in the data collection. The Microbiology Department of Cork University Hospital processed the microbiological specimens and provided culture and antibiotic susceptibility results. Each GP was asked to send specimens and record data on antibiotic usage patterns and associated diagnoses for four weeks. Nasal swabs were sent on all patients with respiratory symptoms and urine specimens were sent on all patients presenting with urinary symptoms.

An average of two minutes 30 seconds were added to consultation time where urine specimens were collected, with a further one to five minutes of administrative time. The time added collecting nasal swabs was an average of four minutes 30 seconds, with two to seven minutes of additional administrative time. The estimated costs per specimen for transport was E6.20. When asked what they thought a reasonable remuneration fee would be the GP responses varied between E25-35 per specimen. The increased laboratory time involved in this study was substantial and the laboratory did struggle at times to keep up with the flow of specimens for the study.

Eight positive MSUs of 123 specimens submitted were positive for bacteria; all isolates were sensitive to co-amoxyclav and cephradine. Nasal swabs were taken from 362 patients and there were 70 significant isolates. Antibiotics were prescribed in 240 cases, 216 for immediate use and 36 for deferred use. Antibiotic resistance amongst the organisms isolated, to commonly used antibiotics, was low.

Development of GP prescribing guidelines
There are no Irish GP antimicrobial prescribing guidelines, and therefore guidelines on respiratory tract infections, urinary tract infections and skin infections were developed. These also include a chapter on avoiding unnecessary prescriptions for antibiotics. There is a need for GPs and indeed all doctors to take more ownership of the problem of antimicrobial resistance. Doctors, including GPs, may be more persuaded with evidence of drug safety (or lack of risk) of non-prescribing. The guidelines have been re-written in the light of this qualitative research.

Development of patient educational materials
Work has just begun on patient educational materials. An MSc student has been recruited to evaluate early drafts and to develop them further.

4.4 Surveillance of Antimicrobial Resistance

The Antimicrobial Resistance Surveillance Subcommittee completed its remit and developed a series of recommendations on national surveillance in 2003. The key requirements for further development of antimicrobial resistance surveillance are:

- Introduction of standardised susceptibility testing in all diagnostic laboratories (i.e. CLSI methodology)
- Introduction of a standardised data collection system in all diagnostic laboratories (i.e. CIDR)
- Provision of laboratory scientists with a dedicated surveillance role in all diagnostic laboratories

The above requirements have been only partially implemented, so additional developments in antimicrobial resistance surveillance have not taken place. However, national surveillance data is provided through the European Antimicrobial Resistance Surveillance System (EARSS).

Ireland has one of the highest levels of participation in EARSS, among participating European countries, with Irish EARSS data in 2005 representative of more the 98% of the population. Ireland still has a very high level of antimicrobial resistance, compared to most other European countries. The proportion of *Staphylococcus aureus* bloodstream isolates resistant to meticillin (i.e. the MRSA prevalence) has remained stable at approximately 42% since 2001. However this is among the highest proportions in any European country. While the prevalence of MRSA has remained stable, levels of resistance in other EARSS pathogens have been increasing. For example,

- Quinolone resistance in *Escherichia coli* increased from 5.4% in 2002 to 16.8% in 2005
- Resistance to aminoglycosides in *E. coli* increased from 2.7% in 2002 to 8.7% in 2005
- The proportion of vancomycin-resistant *Enterococcus faecium* (i.e. VRE) increased from 11.1% in 2002 to 29.3% in 2005, the second highest proportion in Europe

These increases in resistance to individual antibiotic classes has been accompanied by increased reporting of both *E. coli* and *E. faecium* strains that are resistant to multiple classes of antibiotics.

A voluntary system for enhanced surveillance of bloodstream infections, based on EARSS data, was introduced in 2004. Because of the additional workload involved in providing additional demographic and clinical data, only a subset of laboratories have the personnel resources to be able to participate in this enhanced surveillance system. Nevertheless, the data has been shown to be representative of the overall EARSS data set. Results from this enhanced system have shown that central venous catheters are the most frequently identified source for *S. aureus* bloodstream infection, including MRSA bloodstream infection, and that this should therefore be a focus for future surveillance and control measures. The enhanced system has also shown that increased patient age, length of hospital stay, and meticillin resistance are independent risk factors for mortality in *S. aureus* bloodstream infection. After controlling for other risk factors, the 14-day mortality for MRSA bloodstream infection is approximately twice that of meticillin sensitive *S. aureus* (MSSA) bloodstream infection.

Detailed results of EARSS and the enhanced bloodstream infection surveillance system are available from www.hpsc.ie.

4.5 Surveillance of antimicrobial consumption

The Subcommittee did not meet in 2005, due to staff shortages at Health Protection Surveillance Centre (HPSC). However, a number of antimicrobial consumption surveillance activities continued in 2005. Irish participation in the European Antimicrobial Consumption Surveillance (ESAC) network continues, with data on community antimicrobial consumption calculated from wholesale pharmacy sales data purchased from IMS Health. This data has shown a steady increase in the level of antimicrobial use in the community, coupled with increasing use of "broad spectrum" antibiotics in place of "narrow spectrum" agents. In 2005 the National Centre for Pharmacoeconomics (NCPE) also continued to provide detailed data on community antimicrobial use among patients covered by the General Medical Services (GMS) scheme. This data confirmed the high level of antimicrobial use in the community in Ireland, compared to other European countries.

In 2005 HPSC collaborated with the Hospital Pharmacists Association of Ireland (HPAI) in the collection of national data on hospital antimicrobial consumption. Data on antimicrobial consumption in 2004 was received from 15 hospitals. This showed that the level of antimicrobial consumption in Irish hospitals was considerably higher than the European average. Preliminary data for hospital antimicrobial consumption in 2005 has shown a slight increase compared to 2004 data.

Future priorities for surveillance of antimicrobial consumption are:

- Continued funding of surveillance activities at NCPE, to allow local data feedback to support GP antibiotic stewardship projects
- Increased participation in hospital antimicrobial consumption surveillance
- Establishment of community sentinel pharmacy surveillance, to obtain data on non-GMS antimicrobial consumption

Detailed results of antimicrobial consumption surveillance activities are available at www.hpsc.ie and at www.ncpe.ie.

5. Regional Committees

There are eight multidisciplinary SARI regional committees that meet regularly and, before the setting up of HSE, reported to the Chief Executive of the relevant Health Board/Authority. These committees advise on the implementation of SARI in their region or area, and devise the annual priorities for the SARI strategy in keeping with those defined at a national level. They also advise on the associated resources required to implement the strategy regionally.

5.1 Eastern Area

The SARI advisory remit is discharged by the ERHA Infection Control Advisory Committee (ICAC). Each meeting addresses:

- Updates from the national SARI committee with regional implications.
- Monitors progress on the agreed regional annual SARI priorities.
- Reviews and distributes the regional EARSS surveillance data.
- Reviews regional funding allocation and distribution.
- Audits SARI funded personnel posts.
- Develops/updates and distributes guidance documents relevant to the strategy.
- Co-ordinates applications for SARI funding.

Achievements

The committee met on four occasions and the priorities agreed and progressed were:

- To confirm the requirement of infection control standards as an essential quality component of health care delivery to management of such facilities. This was conveyed in regular communication with regional service planners and commissioners, who in turn communicated with the individual hospital managers.
- To advise on the requirement for adequate hand hygiene facilities and isolation rooms in health care facilities in the region. Any deficit was to be highlighted to management by their relevant professionals and resources sought to remedy the situation.
- The Committee endorsed the National SARI Hand Hygiene and MRSA Guidelines and requested a national one-week hand hygiene implementation initiative. This occurred successfully in October 2005.
- An anonymous pilot regional audit of environmental cleaning in some ERHA health care facilities was presented in May 2005. This confirmed deficits that were later published from the July 2005 national audit.
- An audit of the regional use of SARI training funds proved that this was a well utilised ring fenced resource in all health care facilities and supported the work of the strategy at a local level.
- Continuous audit of SARI funded personnel posts demonstrated a deficit in some appointments, despite SARI funds already allocated to these institutions. Various reasons were given for this: (1) A cap on appointments, this affected 4.5 whole time equivalent (WTE) infection control nurses, a Grade 5 Clerical

Officer and one WTE Public Health Specialist for the SARI core group at the ERHA; (2) Difficulty in finding appropriate appointees after advertisement.

- The committee produced a document advising on strategic regional SARI funding priorities to be considered for 2006, this was distributed regionally and to the National Committee. Individual facilities prepared and submitted their detailed SARI funding requests for 2006 to the HSE by July 2005 as requested.

5.2 Southern Area

Achievements
The infrastructure that has been funded for SARI implementation includes:

- Equipment
    - Automated zone readers for susceptibility testing have been purchased for three laboratories
    - Hospital acquired infection surveillance system has been obtained in four hospitals and the Department of Public Health.
- Personnel
    - Additional 0.5 WTE consultant microbiologist
    - Laboratory surveillance scientists in four laboratories
    - Surveillance scientist in Department of Public Health
    - Pharmacists in three 3 hospitals (1 WTE and 2 x 0.5WTE)
    - Infection Control Clinical Nurse Managers in three hospitals
    - Clerical support in one hospital

The following SARI related activities took place in 2005:

- Regional EARSS data available and a system for distribution agreed
- Laboratory antimicrobial resistance surveillance being developed for urinary tract susceptibility data
- Introduction of CLSI methodology, for antibiotic susceptibility testing, in three laboratories.
- Hospital-acquired infection (HAI) surveillance project commenced with the appointment of a surveillance assistant. Surveillance data is now being collected in three centres.
- Nationally funded projects interim reports were made available.
- Additional funds made available for expansion of pneumococcal project.

5.3 South Eastern Area

Achievements

Infection Control

- The regional decontamination policy for acute hospitals in the South East was revised and distributed by the Infection Control Nurses (ICNs) in the region and education programmes took place. The policy is being adapted for the long stay hospitals.

- An Infection Control Committee for the district, psychiatric and longstay hospitals in Carlow/Kilkenny was established. These are the only counties in the South East in which there is an ICN appointed (SARI funded) to non acute facilities.

- An infection control link nurse programme commenced in Wexford General Hospital and the setting up of a similar programme in Waterford Regional Hospital is being explored.

- Setting up of multidisciplinary *postoperative wound infection surveillance* in Wexford General Hospital is being planned. Members of the Northern Ireland Healthcare Associated Infection Surveillance Centre (HISC) attended a meeting in Wexford General Hospital to outline their experience and give advice to the multidisciplinary team.

- The Central Line Infection Control Policy has been revised.

- A Urinary Catheter Care Policy was produced by the ICNs.

- A formal annual infection control service plan was presented to the Infection Control Committee in each acute hospital at the beginning of the year and a progress report was presented at each subsequent Infection Control Committee meeting.

- There was considerable involvement by one of the ICNs and one of the Consultant Microbiologists in the hospital accreditation process in Wexford General and Waterford Regional Hospitals.

- Surveillance of endoscopy rinse water was commenced to comply with current recommendations.

- Bi-monthly infection control newsletters were produced by the ICNs for nurse mangers in Waterford Regional Hospital.

- A report on isolation room deficits was complied by one the ICNs in Waterford Regional Hospital for the hospital manager.

- A meeting was convened in a long stay hospital with a rehabilitation unit by the hospital manger to discuss issues relating to MRSA positive patients in the hospital.

Microbiology Laboratory

- Accreditation was obtained for four sections of the microbiology laboratory.

- The category 3 laboratory was commissioned. It was officially opened by the Minister for Health, Ms. Harney.

Department of Public Health

- An infection control policy for nursing homes was produced.

Antibiotic Usage

- One of the consultant microbiologists attended general practitioner CME meetings in Carlow and Kilkenny: Items discussed were appropriate use of the laboratory, MRSA and general practice and appropriate use of antibiotics.

- A number of initiatives have been established in the pharmacy departments in Waterford Regional Hospital and St. Luke's Hospital Kilkenny (e.g. surveillance of antibiotic usage, pharmacist ward visits).

5.4 Mid-Westen Area

Achievements

The following are the achievements at regional level

- A full time Consultant Microbiologist took up post on September 1st 2005

- A regional Infection Control study day for link nurses was attended by 105 staff

- An information booklet on MRSA for public and families (patients and visitors) – "Get Well – Stay Well", was produced.

- Audits of hand washing facilities and practice were carried out in five acute hospitals to establish adequacy of hand washing facilities and is being reviewed regarding resource implications.

- Alcohol hand rubs have been introduced in all acute hospitals in the Mid-Western Area.

- In one hospital, 114 staff were trained in standard infection control precautions, 31 infection control and antibiotic policies were revised, and care plans for MRSA and enteric pathogens were developed

5.5 Western Area

- A joint Regional Infection Control / SARI Committee was established.

- Each hospital now has an Infection Control Committee.

5.6 NorthWestern Area

- A regional infection control committee was established.

- A Surveillance Scientist is now in place in Sligo General Hospital.

- Interviews took place and the post accepted for a permanent Surveillance Scientist in Letterkenny General Hospital. The person currently acting in this capacity has been very active but got a promotional post elsewhere. Therefore this position is now vacant.

5.7 North Eastern Area
No report received

5.8 Midland Area

Achievements
The main achievement in this region was the work undertaken in relation to antibiotic stewardship in Midland Regional Hospital at Tullamore (MRHT), Co Offaly, which has national implications if implemented elsewhere. An evaluation of the project showed it to be highly effective in reducing inappropriate antibiotic prescribing with a resulting improvement in patient care, reduction in secondary infections and hospital costs. This involved –

• Prescribing guidelines to reduce risk in prescribing and administering antibiotics

• Development and issue of antibiotic administration chart and booklet to all clinical areas

•Development and issue of pocket chart to support the appropriate and safe prescribing of antibiotics

•Antibiotic bulletins on selected drugs

•Education sessions for non-consultant hospital doctors (NCHDs)

•Presentations at grand rounds

Overall Results

• Definite prescribing trend changes with shift in prescribing from broad spectrum to narrow spectrum agents

    • Reduction in secondary fungal and viral infections, e.g. thrush. This is supported by a decrease of 50% and 18% in the expenditure on antifungals and antivirals respectively.

•Significant decrease in cases of *Clostridium difficile* diarrhoea

    •Cases: 2004 = 13 (66,345 inpatient bed days)
    •Cases: 2005 = 4 (60,701 inpatient bed days)

•Reduction in antibiotic expenditure against an increase in overall drug expenditure

Full details are to be found in Appendix III.

6. On-going Challenges and Difficulties in the Full Implementation of SARI

There is considerable frustration, and even cynicism, amongst the various committee members, and the relevant healthcare workers on the ground about the slow pace of the full implementation of the 2001 SARI recommendations. There are increasing demands for better data, (e.g. MRSA rates), and for improvements in the delivery of healthcare by way of reduced or even contained rates of hospital-acquired infection. However, these are not reflected in the priority given to this area at national level through central funding and subsequent regional or local funding allocation. The resources allocated to date have provided a basic infrastructure but are not sufficient to fully implement SARI. Feedback from the various committees has highlighted consistent and very prevalent themes. These are:

The HSE Reform Process

- The HSE reform process, commenced in 2005 created uncertainty as to the structures within which the Regional Committees should operate. This relates to confusion about the new administrative areas that do not coincide with the service delivery areas. The number of regional committees required nationally remains undecided. The reporting relationship of the Regional Committees is unclear and the route to seek resources for the strategy regionally requires clarification. One committee decided to suspend all its activities until clarification on the above was available, and an administrator assigned to the committee for SARI implementation resigned in July 05 due to HSE reallocation of duties, with no replacement. It has also been stated that there is a need for clarification of governance and accountability structures between HSE directorates in terms of SARI implementation.

Lack of ring-fenced funding and personnel

- Many SARI-related activities could not take place in 2005 due to lack of adequate resources and ceiling on staff appointments. SARI funds are also sometimes difficult to identify within general health board/HSE regional funding.

- Activities, developments and implementation of SARI strategy in 2006 will also be seriously restricted due to lack of adequate resources.

- A lack of feedback on the requests for 2006 SARI funding before the end of the year has had a negative impact locally and places Regional Committees in a redundant position. The absence of feedback is due to inadequate communication mechanisms between the DOH&C, the HSE and all those involved in SARI.

- The lack of additional resources allocated to the strategy in 2005 impeded further implementation. One committee advised approval of the requests for an additional three WTE Surveillance Scientists but these appointments were not progressed due to lack of funding.

- Introduction of appropriate antibiotic stewardship programme, CLSI methodology, enhanced EARSS bacteraemia surveillance and hospital-acquired infection (HAI) surveillance due to lack of consultant microbiologists and infection control nurses in many hospitals. In 2000, it was estimated that five consultant microbiologists were required in one region based on workload and on staffing recommendations of the Royal College of Pathologists. Currently there are only three WTEs. In three other regions there is only one WTE consultant microbiologist in each.

- Expansion of appropriate antibiotic stewardship programme due to lack of appropriate personnel e.g. pharmacy support, clerical support, and surveillance scientist support.

- Participation in ESAC – the national hospital antimicrobial consumption surveillance system introduced in 2004 as part of a European network- has not been possible in many regions. Hospital pharmacists with a remit to monitor antibiotic use and to contribute to antibiotic stewardship are absent from most Irish hospitals.

- Establishment of national HAI surveillance, as required under European Commission directive 2119/98/EC, has not been possible due to the failure to appoint sufficient infection control and surveillance personnel at local hospital level, along with the ongoing failure to appoint the minimal staffing requirement for national coordination of HAI surveillance at HPSC.

Lack of suitable infrastructure

- Full implementation of National MRSA guidelines published in September 2005 in all hospitals due to lack of adequate infrastructure and appropriate infection control staffing levels. The National Committee acknowledged the likelihood of this at time of publication.

- The full implementation of National Hand Hygiene guidelines published in September 2005 due to lack of adequate infrastructure and appropriate infection control staffing levels to deliver educational element However, there is a responsibility on all healthcare professionals to comply with best professional practice in this area but the opportunity to optimise compliance is being lost.

- Deficits in the containment of patients with infections, including those with antibiotic-resistant bacteria, such as inadequate isolation facilities, are a major impediment. High bed occupancy is identified as a major obstacle to flexibility to facilitate isolation and cohorting of patients with transmissible infections.

- The recommended number of Infection Control Nurses for one region is seven but only five are in post. Two further infection control nurses and a Divisional Nurse Manager in Infection Control are required here also. Only one of the eight ICN posts sought for the district and long stay hospitals in one region has been funded to date; a senior grade ICN is also required. There are also gaps in many regions and hospitals in terms of administrative support, biomedical (laboratory) and surveillance scientists and public health specialists.

- There is insufficient hospital pharmacy staff in most hospitals to provide the required input to monitor and advise on antibiotic usage in conjunction with the clinical microbiology personnel.

Appendices

I Members of the National Committee, Sub-Specialty Committees and Chairpersons of the Regional Committees Membership of SARI National Committee, including Chairpersons of Regional Committees (2005)

Nominating Body		Representative
Royal College of Surgeons in Ireland		Professor Hilary Humphreys* (Chair)
Health Protection Surveillance Centre		Dr Robert Cunney** (Honorary secretary)
Academy of Medical Laboratory Science		Ms Margaret Fitzpatrick
Health Board CEO Group / HSE	1	Dr Declan McKeown
	2	Mr Éamonn Fitzgerald
	3	Ms Mary Diver
Consumers' Association of Ireland		Ms Dorothy Gallagher
Department of Agriculture & Food		Dr Michael Gunn
Faculty of Paediatrics		Dr Karina Butler
Faculty of Pathology		Professor Martin Cormican
Faculty of Public Health Medicine		Dr Máire O'Connor
Faculty of Veterinary Medicine		Dr Nola Leonard
Food Safety Authority of Ireland		Mr David Nolan
Infection Control Nurses' Association		Ms Roma Ruddy
Irish College of General Practitioners		Professor Colin Bradley***
Irish Pharmaceutical Healthcare Association		Dr Rebecca Cramp
Pharmaceutical Society of Ireland		Ms Marita Kinsella
Royal College of Physicians of Ireland		Dr Lynda Fenelon
University Dental School and Hospital		Dr Christine McCreary
Department of Health and Children	1	Dr Eibhlín Connolly
	2	Mr Brian Mullen
	3	Mr Pat Clifford
Chairs of Regional SARI Committees	East	Dr. Eleanor McNamara
	Midlands	Dr. Phil Jennings
	Midwest	Dr. Kevin Kelleher
	Northeast	Dr. Rosemary Curran
	Northwest	Dr. Anthony Breslin
	Southeast	Dr. Anne Moloney
	South	Dr. Olive Murphy
	West	Dr. Diarmuid O'Donovan
Chair of SARI Hospital Antibiotic Stewardship Subcommittee		Dr. Edmond Smyth
Department of Health, Social Services and Public Safety (Northern Ireland) (Observer)		Dr Lorraine Doherty

* Also chair of SARI Infection Control Subcommittee
** Also chair of SARI Antimicrobial Resistance and Antimicrobial Consumption Surveillance Subcommittees
*** Also chair of SARI Community Antibiotic Stewardship Subcommittee

Membership of SARI Infection Control Subcommittee (2005)

Nominating Body	Representative
Faculty of Pathology	Prof. Hilary Humphreys (chair)
Irish Society of Clinical Microbiologists	Dr. Mary Crowe
Infection Control Nurses Association	Ms. Eleanor Devitt
Faculty of Public Health Medicine	Dr. Maire O'Connor
Health Protection Surveillance Centre	Dr. Robert Cunney
Faculty of Occupational Medicine	Dr. Blánaid Hayes
Directors of Public Health Nursing	Ms Jean Whelan
Infection Control Nurses Association	Ms Mairead Twohig
Infection Control Nurses Association	Ms Teresa Farrell
Royal College of Physicians of Ireland	Dr Catherine Fleming

Membership of SARI Community Antibiotic Stewardship Subcommittee (2005)

Nominating Body	Representative
GP Chair	Prof. Colin Bradley (chair)
GP CME Tutor	Dr Mary Favier
Health Protection Surveillance Centre	Dr. Robert Cunney
Consumers' Association of Ireland	Ms. Dorothy Gallagher
Faculty of Public Health Medicine	Dr. Cliodhna Foley Nolan
Irish Society of Clinical Microbiologists	Dr. Bartley Cryan
Pharmaceutical Society of Ireland	Ms. Fiona Bogan
Irish College of General Practitioners	Dr. Nuala O'Connor
Irish Pharmaceutical Healthcare Association	Dr John Farrell

Membership of SARI Hospital Antibiotic Stewardship Subcommittee (2005)

Nominating Body	Representative
Irish Society of Clinical Microbiologists	Dr. Edmond Smyth (chair)
Health Protection Surveillance Centre	Dr. Robert Cunney
Royal College of Physicians in Ireland	Dr. Colm Bergin
Royal College of Physicians in Ireland	Dr. Bernard Silke
Royal College of Surgeons of Ireland	Prof. Cathal Kelly
Faculty of Paediatrics	Dr. Geraldine Nolan (resigned)
Hospital Pharmacists Association	Ms. Olivia Flynn
Hospital Pharmacists Association	Ms. Emer Fitzgerald
Irish Pharmaceutical Healthcare Association	Dr. John Stinson

Membership of SARI Antimicrobial Resistance Surveillance Subcommittee (completed remit in 2003)

Nominating Body	Representative
Health Protection Surveillance Centre	Dr. Robert Cunney (chair)
Health Protection Surveillance Centre	Mr. Ajay Oza
European Antimicrobial Resistance Surveillance System (EARSS)	Mr. Stephen Murchan
Irish Society of Clinical Microbiologists	Prof. Martin Cormican
Academy of Medical Laboratory Scientists	Ms. Margaret Fitzpatrick
Infection Control Nurses Association	Ms. Helena McGrath
Faculty of Public Health Medicine	Dr. Joan O'Donnell

Membership of SARI Antimicrobial Consumption Surveillance Subcommittee (2005)

Nominating Body	Representative
Health Protection Surveillance Centre	Dr. Robert Cunney
Irish Society of Clinical Microbiologists	Dr. Anne Moloney
Department of Health and Children (GMS division)	Ms. Celine Brosnan
Health Protection Surveillance Centre	Mr. Ajay Oza
Irish College of General Practitioners	Dr. Emer O'Reilly
Faculty of Public Health Medicine	Dr. Colette Bonner
Irish Pharmaceutical Healthcare Association	Dr. Martina Dempsey
National Centre for Pharmacoeconomics	Dr. Michael Barry
Hospital Pharmacists Association	Mr. Michael Fitzpatrick
Pharmaceutical Society of Ireland	Ms. Marita Kinsella

II SARI Implementation: Gap Analysis and Future Priorities, July 2005

SARI Recommendation	Progress to date	Gaps	Action required	Timeline*	Comments
1: THE DEVELOPMENT OF A NATIONAL FRAMEWORK					
1. Development of a three-tier strategy, with local, regional and national tiers.	1. Regional committee in place in each former health board region. Very effective committees with ring-fenced allocation of funds in some regions.	1. a: No formal local structures for SARI b: Some regional committees have very little input into SARI funding decisions c: Role and reporting relationships for regional committees unclear under new healthcare structures	1. a: Reinforcement of corporate responsibility for SARI at local hospital and community levels b: Appointment of financial officer to each SARI regional committee c: Redefine regional committee roles and reporting structures	1. a: A b: A c: A	DoHC instructed Health Boards in 2004 to ensure financial officer included on all regional SARI committees and requested details of funding allocation, including whether or nor SARI-related posts have been filled (responses included in SARI Progress Report 2005). Current structures and funding allocations weighted towards acute hospital services.
2. The national committee should be co-ordinated by the Health Protection Surveillance Centre.	2.National committee established as DoHC committee (now transferred to HSE).	2. Role and reporting relationships for national committee unclear under new healthcare structures	2. Redefine national committee roles and reporting structures	2: A	
3. International co-operation, via national committee.	3. International links to European AMR working group and various surveillance programmes via HPSC.	3. No formal international links through national committee and some links via HPSC currently suspended due to reduction in microbiology staffing	3. Establish formal links to EU AMR committee and provision of additional personnel at HPSC	3: A	

SARI Recommendation	Progress to date	Gaps	Action required	Timeline*	Comments
2: THE SURVEILLANCE OF ANTIMICROBIAL RESISTANCE					
1. An infrastructure both at public health and laboratory level is established to ensure that reproducible, standardised, antimicrobial resistance data are collected and analysed locally, regionally and nationally in a timely manner.	1. SARI surveillance scientists appointed to 4 Departments of Public Health and to 16 laboratories. Participation in EARSS extended to all hospital laboratories.	1. Many laboratories lack surveillance scientists and not all approved/funded posts filled. Additional posts required for Departments of Public Health	1. Appointment of surveillance scientist to all laboratories (1 WTE for larger laboratories, 0.5 for smaller labs) and Departments of Public Health	1: B	HSE establishing committee to oversee establishment of reference laboratories. Additional personnel required for national HAI surveillance included in HPSC service plan.
2. DOHC establishes a network of national reference laboratories as a priority to service routine laboratories, help develop and evaluate new technologies and provide epidemiological data and facilitate research in this area. In addition, these laboratories should provide expert advice on areas of clinical practice and infection control.	2. NMRSAL established and funding provided for national mycobacterial reference laboratory.	2. National streptococcal reference service withdrawn. Requirement for other reference laboratories relating to AMR. Inadequate funding for current reference services.	2. Appropriate funding of existing reference laboratories and establishment of additional reference laboratories	2: B	CIDR roll-out proceeding. Some SARI funding, unspent due to failure to fill approved posts, has been used for provision of standardised susceptibility testing in some regions. National HAI surveillance is a requirement under EC directive 2119/98/EC.
3. Routine laboratories are resourced to enable them to provide reproducible and standardised antimicrobial resistance data in a timely manner.	3. AMR surveillance modules planned for CIDR. Funding for standardised susceptibility testing and laboratory information systems provided in some regions. 29 microbiologists	3. a: Most laboratories have insufficient number of laboratory scientists. b: Awaiting roll out of CIDR to all laboratories.	3. a: Appointment of additional laboratory scientists b: CIDR roll out	3.a: B b: B	Many microbiologist currently in post have non-clinical sessions, so minimal staffing requirements in SARI report likely to be an underestimate.

SARI Recommendation	Progress to date	Gaps	Action required	Timeline*	Comments
2: THE SURVEILLANCE OF ANTIMICROBIAL RESISTANCE (continued)					
The provision of an electronic data handling system will be an essential element. These laboratories should be managed by consultant clinical microbiologists.	in post or appointed.	c: Funding for standardised susceptibility testing not provided to all laboratories d: Additional 12 microbiologists required to meet minimum recommended by SARI (additional 20 to meet requirements in Hanly report). 33 hospitals with no on-site microbiologist commitment.	c: Ring-fenced funding for laboratory resources d: Prioritise appointment of additional microbiologists	c: B d: B	Funding for some additional microbiology posts in place, but posts unfilled due to cap on recruitment or failure to approve posts.
4. A general practice based sentinel surveillance system is established to ensure adequate geographic sampling for antimicrobial resistance in the community.	4. Pilot sentinel surveillance project underway in Southern region.	4. GP sentinel surveillance only at pilot phase in one region. No on-going funding provided.	4. Ring-fenced funding for GP sentinel surveillance, perhaps linked to expansion of sentinel influenza surveillance.	4: B	
5. A hospital based surveillance system is established to detect hospital-acquired infections and ensure adequate sampling for antimicrobial resistance in this population.	5. Enhanced bacteraemia surveillance system in place (15 hospitals participating to date). Local HAI surveillance systems in place in some regions.	5. a: Most hospitals unable to participate in enhanced bacter-aemia surveillance due to lack of resources. b: No national HAI surveillance system.	5. a: Appointment of additional laboratory scientists, surveillance scientists and icrobiologists b: Appointment of additional surveillance scientists, micro-biologists and infection control nurses (ICNs) (see section 6.2). Appointment of additional posts required at HPSC	5. a: B b: B	

SARI Recommendation	Progress to date	Gaps	Action required	Timeline*	Comments
3: THEMONITORING OF THE SUPPLY AND USE OF ANTIMICROBIALS					
1. The tight legislative controls that exist in the area of antimicrobial prescribing are maintained and enforced.	1. No change	1. No data on compliance with legislative controls.	1. Audit of compliance with legislative controls	1: C	Joint annual report on antibiotic consumption in Ireland for 2004 planned by HPSC and NCPE. Resources for establishment of sentinel pharmacy surveillance included in HPSC service plan. Some elements of agreed minimal data set (e.g. indication for therapy) unlikely to be available through routine surveillance systems and will require periodic audit. Additional surveillance initiatives planned at NCPE, including feedback to local GP educational initiatives, pending continuation of current funding.
2. A system for the collection and analysis of antimicrobial use and prescribing in hospitals and the community is established.	2. National surveillance of community antibiotic consumption in place, via HPSC and National Centre for Pharmacoeconomics (NCPE). Limited surveillance of hospital antibiotic consumption in place (HPSC).	2. a: Only 15 hospitals providing antibiotic consumption data to date. b: No ongoing funding for surveillance at NCPE	2. a: Provision of quarterly data by all hospital pharmacies b: Continued funding and expansion of NCPE surveillance	2: A	
3. A basic set of data agreed by the committee be collected, i.e. the origin of the prescription, e.g. hospital or community, the agent and dose prescribed, the indication and the length of treatment.	3. Some elements of basic data set available for GMS antibiotic consumption. Prescribing audits carried out in some hospitals.	3.. a: Prescription level surveillance via community pharmacies required. b: No standardised format for hospital prescribing audits. Lack of resources for hospital prescribing audits.	3. a: Establishment of community pharmacy sentinel surveillance b: Agree standardised minimum data set for hospital prescribing audits. Appointment of clinical pharmacists (see Section 4.3)	3. a: B b: B	

SARI Recommendation	Progress to date	Gaps	Action required	Timeline*	Comments
4: THE DEVELOPMENT OF GUIDANCE IN RELATION TO THE APPROPRIATE USE OF ANTIMICROBIALS					
1. Expert opinion on the diagnosis, investigation and management of patients with infection is available 365 days a year to all medical practitioners both in the community and hospitals.	1. Appointment of additional microbiologists and infectious disease physicians (see Section 2.3)	1. See Section 2.3	1. See Section 2.3	1: B	Roll out of GP educational initiative will need to be supported by provision of educational materials and national public awareness campaign.
2. National guidelines for appropriate antimicrobial usage are drawn up and introduced in all aspects of clinical practice both in hospital and the community. These must be evidenced based, exist for both the prescribing and non-prescribing of agents, have adequate information on dose etc. and highlight local variation.	2. Draft GP guidelines on prescribing prepared. Local guidelines in place in 35 hospitals.	2. a: No national guidelines on hospital prescribing. No local guidelines in about half of all hospitals. b: GP guidelines only in draft format at present. No funding for guideline development.	2. a: Appointment of additional microbiologists (see Section 2.3) and infectious disease pharmacists (see Section 4.3). Provision of resources for national guideline development (possibly via HIQA) b: Provision of funding for development of GP guidelines.	2. a: B b: A	Infectious disease pharmacists shown to be cost-saving to hospitals, through reduction in antibiotic use and reduction in medication errors. Larger hospitals will need at least one FTE, smaller hospitals will require at least 0.5 FTE with responsibility for antibiotic stewardship. No training currently available in Ireland for infectious disease pharmacists: this should be introduces as a post graduate course in one or more schools of pharmacy.
3. A process by which a reduction in inappropriate use of antibiotics can be achieved should be defined. This will differ in different settings, e.g. hospital versus community and will need to be developed accordingly.	3. Pilot GP educational initiative established. Recommendations on promotion of prudent antibiotic use in hospitals produced by Hospital Stewardship Subcommittee.	3. a: GP educational initiative only in pilot phase and no ongoing funding available. b: Insufficient resources in most hospitals to implement antibiotic stewardship recommendations	3. a: Funding for continuation of GP education pilot and national roll out. b: Appointment of additional microbiologists (see Section 2.3) and appointment of infectious disease pharmacists to all acute hospitals.	3. a: A b: B	

SARI Recommendation	Progress to date	Gaps	Action required	Timeline*	Comments
4: THE DEVELOPMENT OF GUIDANCE IN RELATION TO THE APPROPRIATE USE OF ANTIMICROBIALS (continued)					
4. Interventions aimed at changing clinical practice are supported, encouraged and reinforced by a process of regular audit.	4. Antibiotic audits included as part of GP educational initiative. Antibiotic audits carried out in 26 (40%) of hospitals in SARI hospital survey.	4. See section 4.3	4. See section 4.3	4: B	
5. Methods, which will aid the above processes, are developed, e.g. decision-support systems, computer assisted prescribing or other prescribing aids.	5. Printed materials to aid prudent prescribing being developed by General Practice and Hospital Antibiotic Stewardship Subcommittees	5. No development of decision support systems or computer assisted prescribing	5. See section 4.3. Possible collaboration with academic institutions to develop computer assisted prescribing	5: C	
6. Improvements in vaccine uptake, in particular influenza and pneumococcal vaccine, should be targeted and prioritised	6. Local promotion of vaccine uptake by individual GP practices and hospital clinicians.	6. General lack of knowledge among health professionals of the importance of influenza and pneumococcal vaccination of at risk patients.	6. As per section 4.3, plus appointment of additional ICNs (see section 6.2). Increased awareness among patients, public and health professionals.	6: B	
7. A monitoring system is established to measure effectiveness of these interventions.	7. No progress to date	7. No national system for audit, in hospital or community practice	7. Development of audit systems as part of overall quality management (probably through HIQA)	7: C	

SARI Recommendation	Progress to date	Gaps	Action required	Timeline*	Comments
5: EDUCATION					
1. Educational programmes form the foundation for implementation of guidance strategies and a comprehensive programme should commence at undergraduate level. These programmes must be directed at all clinical professional groups providing patient care, the pharmaceutical industry and the general public.	1. Educational materials for promotion of prudent prescribing and infection control being developed by relevant subcommittees. Hand hygiene awareness week planned for late 2005, with accompanying educational materials. Targeted educational interventions in place in most medical schools.	1. a: Lack of mass media campaign. b: No requirement for education in these areas among undergraduate or post graduate health professionals.	1. a: Mass media campaign b: Requirement for infection control and prudent antibiotic use education for all health professionals. Provision of appropriate resources for same.	1. a: A b: B	Multiple educational resource materials available, but insufficient staff at local and national levels to implement these. Improvement in housing and social conditions will depend on government policy, and is probably outside the scope of SARI
2. Education on home hygiene, attention to public health issues, and those developing the strategy consider the maintenance and/or improvement of housing and social conditions.	2. No progress to date	2.	2. Public information campaign.	2: A	

SARI Recommendation	Progress to date	Gaps	Action required	Timeline*	Comments
6: THE DEVELOPMENT OF PRINCIPLES IN RELATION TO INFECTION CONTROL IN THE HOSPITAL AND COMMUNITY SETTING					
1. National infection control standards and principles are set both for hospitals and the community.	1. Draft HSE standards for infection control and environmental hygiene in hospitals currently in consultation phase. National guidelines on hand hygiene and control of MRSA produced.	1. No standards for community practice.	1. Develop standards for community practice, using same process as for hospital standards.	1. B	Funding for some additional ICNs in place, but posts unfilled due to cap on recruitment or local diversion of SARI funds to other areas. Infection control training coordinator appointed to RCSI.
2. The necessary infection control services to meet the set standards are resourced and established in hospitals and the community.	2. 35 additional ICNs appointed. 8 additional microbiologist appointed. Infrastructural improvements in some hospitals.	2. a: Further 30 ICNs required to meet minimal SARI staffing recommendations (does not include requirement for community-based ICNs) b: See section 2.3 c: Insufficient single rooms, hand hygiene facilities and other infrastructural requirements in most hospitals. No national standards or requirements for hospital infection control infrastructure.	2. a: Appointment of additional ICNs. Address current grading and working conditions of ICN posts b: See section 2.3 c: National technical standards required. Ensure infection control input early in design stage of new hospital developments. Long term target of minimum 50% single rooms in hospitals, as per UK standards.	2. a: B b: B c: C	ICN staff grading currently under review by ICNA Recommendations for provision of single rooms included in revised MRSA guidelines. HSE NHO to ensure corporate responsibility for infection control is established.
3. The education of all health care workers on issues relating to infection control is prioritised.	3. See section 5.1	3. See section 5.1	3. See section 5.1	3: B	

SARI Recommendation	Progress to date	Gaps	Action required	Timeline*	Comments
6: THE DEVELOPMENT OF PRINCIPLES IN RELATION TO INFECTION CONTROL IN THE HOSPITAL AND COMMUNITY SETTING (continued)					
4. The importance of well-established preventative measures, e.g. handwashing or equivalent methods of hand decontamination are reinforced and compliance improved.	4. National hand hygiene guidelines prepared. Hand hygiene awareness week and other promotional activities planned for late 2005	4. Currently no overt corporate responsibility for infection control in hospitals. Insufficient resources to implement hand hygiene guidelines in most institutions.	4. Ensure corporate responsibility for infection control is established and enforced. Also see section 6.2	4: A	
5. A monitoring system is established to measure the effectiveness of these interventions.	5. No progress to date	5. National system of HAI surveillance and audit required.	5. See section 2.5. National audit via HIQA?	5: B	
7: FUTURE RESEARCH IN THIS AREA					
1. The financial support provided by governmental bodies for research and development in the area of antimicrobial resistance is increased in line with needs and that such funding is prioritised.	1. Once-off funding for SARI-related pilot projects and research provided in 2003.	1. No ongoing funding earmarked for SARI-related research	1. Repeat funding for research with national steering committee established to oversee grant allocation	1: A	
2. Antimicrobial resistance becomes a priority for funding bodies supporting health care and biomedical research.	2. No progress to date	2.	2. Prioritisation of AMR related research funding by HRB	2: A	

SARI Recommendation	Progress to date	Gaps	Action required	Timeline*	Comments
7: FUTURE RESEARCH IN THIS AREA (continued)					
3. Pharmaceutical companies are encouraged to continue the development of new agents and their collaboration with academic units in Ireland.	3. Ongoing local collaboration between academic institutions and pharmaceutical industry	3. Not applicable	3. None		
4. A network of national reference laboratories is established to support the above research structure.	4. See section 2.2	4. See section 2.2	4. See section 2.2	4: B	

*Timeline: A = Short term/immediate requirements (Action/funding required within 12 months)
B = Medium term requirements (Action/funding required within 1-3 years)
C = Longer term requirements (Action/funding required within 3-6 years)

5. Report from the HSE Midland Area - Outcome Analysis of SARI Funding of Antibiotic Pharmacist

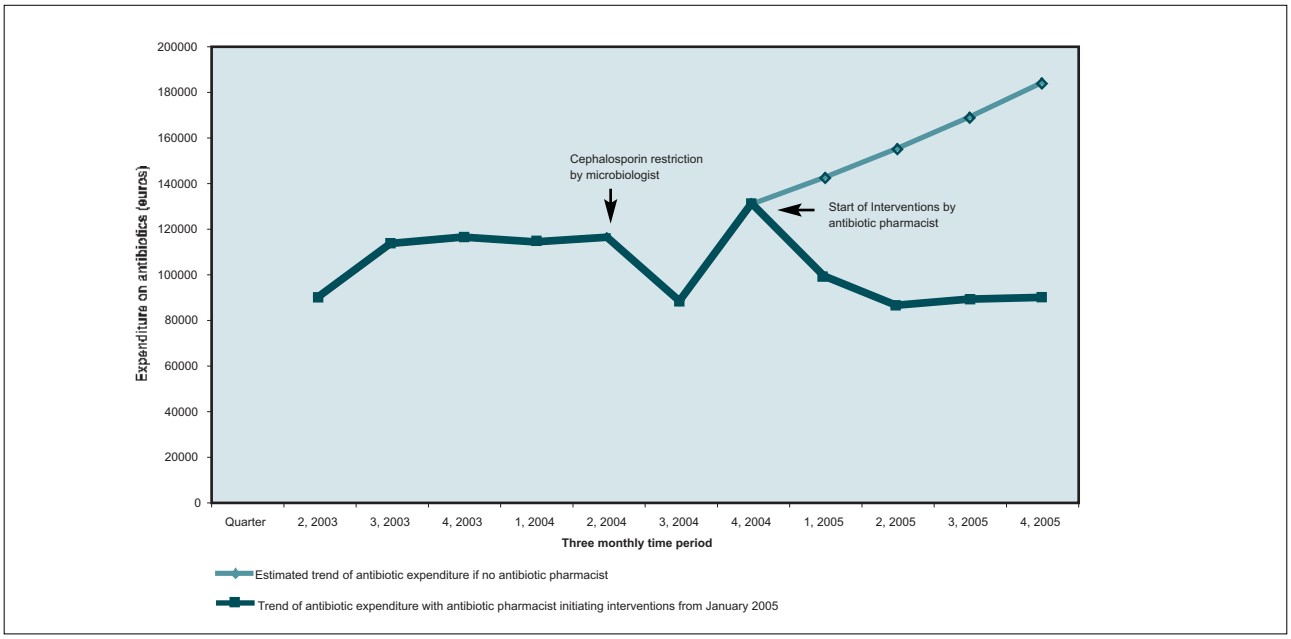
Interventions

- Prescribing guidelines to reduce risk in prescribing and administering antibiotics
- Development and issue of antibiotic administration chart and booklet to all clinical areas
- Development and issue of pocket chart to support the appropriate and safe prescribing of antibiotics
- Antibiotic bulletins on selected drugs
- Education sessions for NCHDs
- Presentations at grand rounds

Overall Results

- Definite prescribing trend changes with shift in prescribing from broad spectrum to narrow spectrum agents (Table 1)
- Reduction in secondary fungal and viral infections, e.g. thrush. This is supported by a decrease of 50% and 18% in the expenditure on antifungals and antivirals respectively.
- Significant decrease in cases of clostridium difficile diarrhoea
- C diff cases: 2004 = 13 (66345 inpatient bed days)
- C diff cases to date in 2005 = 4 (60701 inpatient bed days)
- Reduction in antibiotic expenditure against an increase in overall drug expenditure

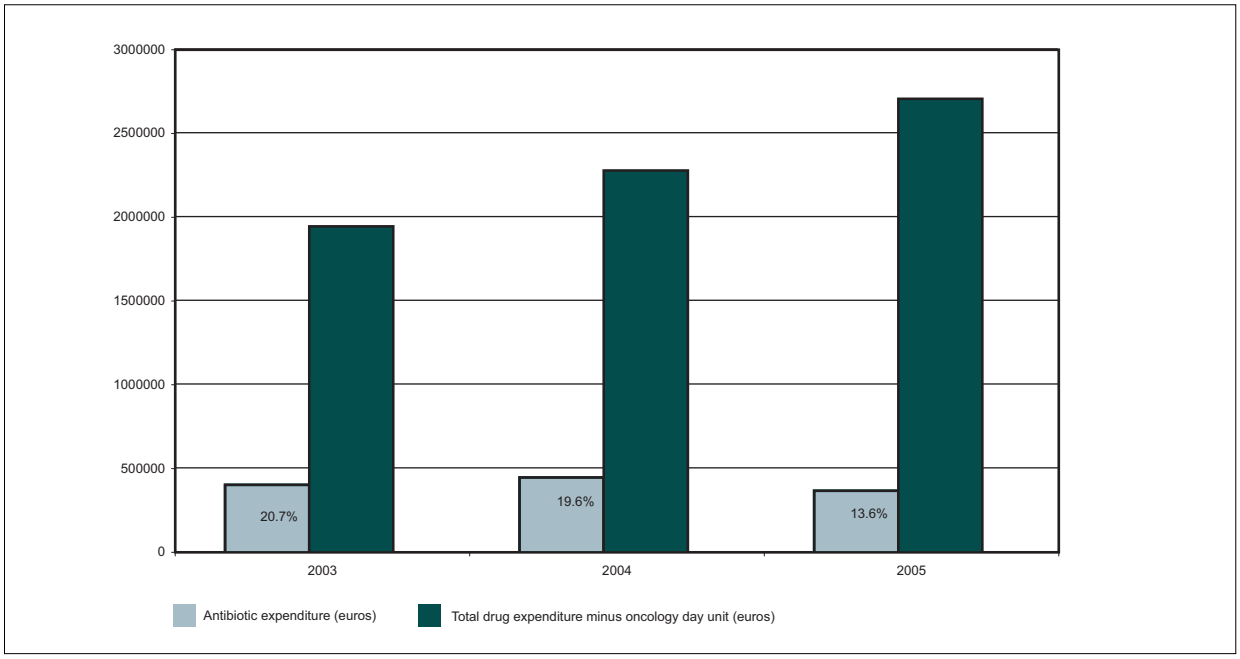
Figure 1: Cost saving benefit of having an antibiotic pharmacist in post in MRHT in 2005.



Discussion

Figure 1 shows cost saving benefit of having an antibiotic pharmacist in post in MRHT in 2005. The average increase in antibiotic expenditure in 2003/4 was 8.4% per quarter. If this increase had continued in 2005 the total spend of antibiotics for 2005 would have been almost E650,000. Having an antibiotic pharmacist in post in 2005 reduced this spend to E370,000 (saving E270,000). This reduction in antibiotic expenditure was achieved in the context of an overall 18.7% increase in drug expenditure 2004 to 2005.

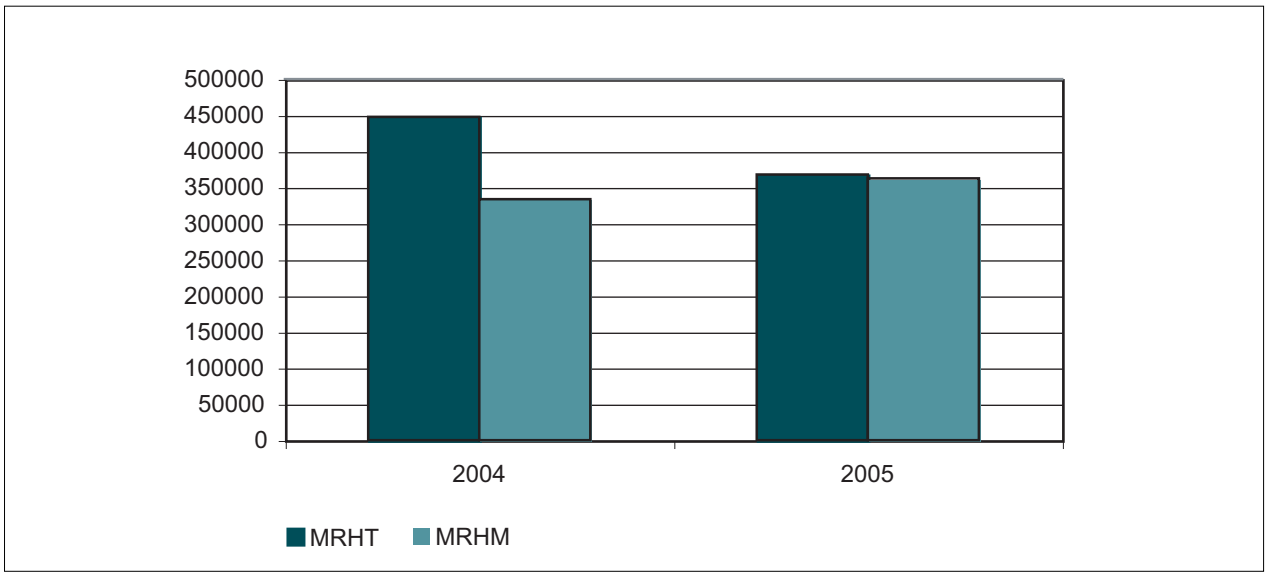
Figure 2. Reduction in antibiotic expenditure with appointment of antibiotic pharmacist



Comparison with similar hospital

To prove the reduction in antibiotic expenditure in MRHT was as a result of interventions carried out by the antibiotic pharmacist, the total expenditure for antibiotics in MRHM was examined. There is no antibiotic pharmacist post in MRHM. There was an increase of 10% in antibiotic expenditure in MRHM from 2004 to 2005. It is significant that MRHM does not have the oncology/haematology speciality (MRHT) which uses high volumes of antibiotics.

Figure 3. Impact of antibiotic pharmacist on antibiotic expenditure trend

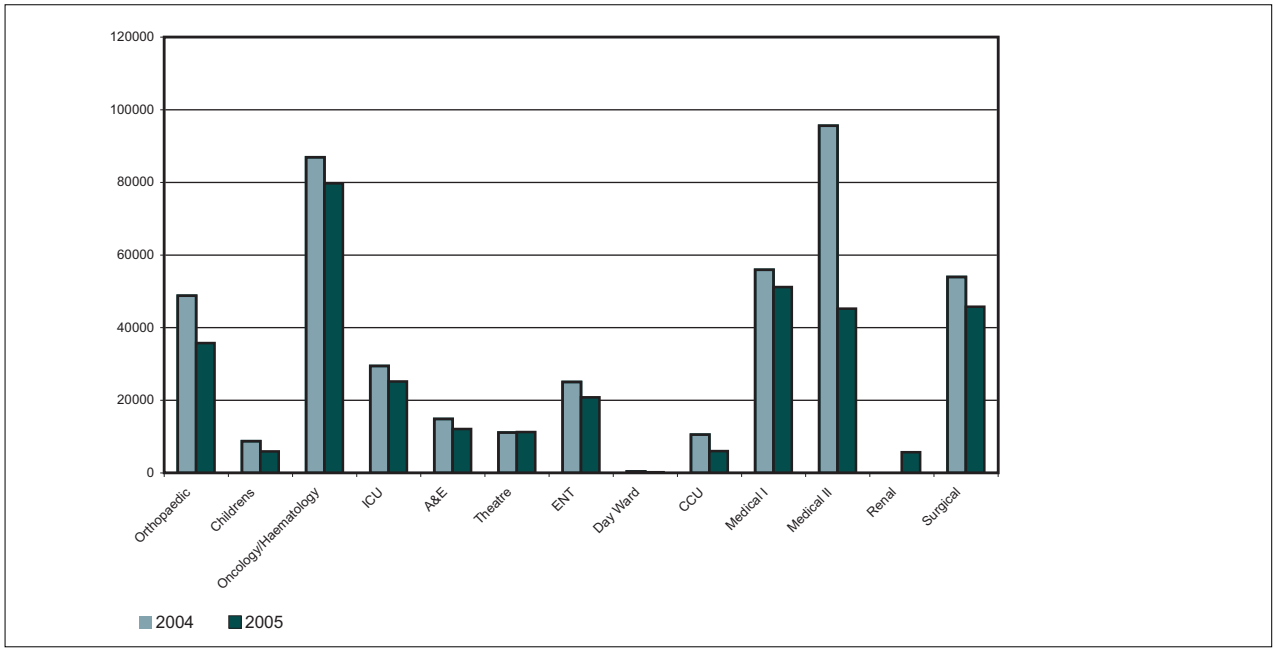


Continuous pharmacist interventions are required for successful management of antibiotic usage. An increase in expenditure in nine antibiotic classes (Table 1) arose in the absence of the antibiotic pharmacist (mid May to end July) compared with the same period in 2004.

Table 1 Pharmacist monitoring and trends in the use of broad spectrum agents 2004 to 2005

Antibiotic Group	Broad or narrow spectrum	% change ("-" = Decrease, "+" = Increase)	Comment
Benzylpen + Pen V	Narrow	-17	
Flucloxacillin	Narrow	-11	
Broad Spec Penicillins	Broad	-0.3	
Tazocin	Broad	+73	Undesirable. Actively promoted by company representative. Present spend MRHT = 60,000/annum. Action plan in development for 2006.
Cephalopsorins	Broad	-14	
Tetracyclines	Broad	+30	Desirable. Old class of drugs. Actively promoted by microbiologist and antibiotic pharmacist instead of more expensive options
Aminoglycosides	Narrow	+62	Desirable.
Macrolides	Narrow	-6	
Clindamycin	Narrow	74	
Others	Narrow	+14	Breakdown later
Sulphonamides	Narrow	-40	
Anti TB		+43	Not relevant, only initiated on results from lab
Metronidazole	Narrow	-24	
Quinolones	Broad	-70	
UTIs	Narrow	+58	Desirable.
Antifungals		-50	
Antiviral		-18	
Antimalarials		-24	
Anthelminthics		-18	

Figure 4: Reduction in antibiotic expenditure in all clinical areas in MRHT post pharmacist intervention



Conclusion

The valuable role of the senior pharmacist in the management of antibiotic consumption is clearly demonstrated in the above discussion. This role improves the quality of inpatient care by reducing secondary infections. It reduces actual hospital costs by encouraging the prudent use of antibiotics in the inpatient setting. It enhances population health by reducing antibiotic resistance.

IV. Report of the 2nd Joint Conference on the Antimicrobial Resistance Action Plan (AMRAP) and the Strategy for the Control of Antimicrobial Resistance in Ireland (SARI) - Antibiotic stewardship - Implementing Strategies

1. Background

The second joint AMRAP/SARI meeting took place on 30th November 2005 in the City Hotel, Armagh. This year it was decided to focus particularly on antibiotic stewardship, as this is a key component of both strategies, North and South. In addition to the formal presentations, there were also 21 posters which covered such areas as the use of antibiotics, in vitro laboratory investigations of antibiotic resistance, epidemiology of antibiotic resistance, and the control and prevention of health-care associated infection. The day was divided into three sessions, the first considered implementing strategies to reduce healthcare-associated infections, the second focussed on European and English perspectives on antibiotic stewardship, and finally issues relating to antibiotic stewardship in the hospital and in the community, in particular, were covered in the last session. The meeting was organised by Mr. Jeff Dudgeon, Department of Health, Social Services and Public Safety (DHSSPS), Belfast and the Organising Group consisted of himself, Dr Hugh Webb, Dr. Tim Wyatt, Professor Hilary Humphreys and Dr. Robert Cunney.

2. Implementing Strategies

This session, which was chaired by Professor Hilary Humphreys (SARI Chair), looked at the current approaches to controlling healthcare-associated infection (HCAI) in the North and in the South. The first presentation was by Dr. Lorraine Doherty, Consultant Epidemiologist/Senior Medical Officer at DHSSPS in Belfast. She sketched the background to the development of Northern Ireland's five-year strategy to reduce HCAI, including recent issues such as endoscope decontamination, hygiene, MRSA and other matters. It is accepted that this strategy will minimise but cannot eradicate or eliminate all HCAI. Priorities in the strategy include appropriate organisation, enhancing the culture of infection prevention, education, governance, surveillance and a partnership between patients, the public and healthcare professionals. Each hospital trust will be required to produce an annual plan for reducing HCAI and the existing HCAI surveillance infrastructure will be strengthened, with the appointment of a HCAI surveillance coordinator to each trust. The commitment of all stakeholders to the implementation of this strategy and a time frame were especially noteworthy.

The second presentation was from Dr. Kevin Kelleher, Assistant Director of Population Health at the Irish Health Services Executive. He argued that the science is clear about what needs to be done in terms of the prevention of antibiotic resistance and reducing healthcare-associated infection. Although structures are similar to those in Northern Ireland, there are deficiencies in infrastructure and there is a need for specific and immediate interventions, such as strengthening corporate responsibility for infection control, improving resources for surveillance and addressing the deficiencies identified in the recent gap analysis of SARI implementation. He reviewed the recent national hygiene audit, which showed that only 9% of hospitals were rated as 'good', and he discussed some quotations from a recent Oireachtas Joint Committee where patients and their relatives came before the parliamentarians to recount their experiences of MRSA. He outlined how the professionals are on the back foot in terms of political and public opinion, which have driven this agenda in recent months.

Following this, there was a panel discussion involving the two speakers and Ms. Isobel King, Senior Infection Control Nurse at the Ulster Community Hospitals Trust, Belfast. Amongst the issues raised during this discussion were, where the infection control and prevention teams fits into an institution. In particular, it should have clear lines of communication and accountability to senior management and not

be subsumed by risk management, for example. There was also some discussion on the role of the media in recent controversies concerning MRSA. Speakers from the floor argued that the health professionals should use the media better and not engage in blaming the media for inappropriate stories.

3. The European and English Perspective

This session was chaired by Dr. Hugh Webb (AMRAP Chair) and looked at issues concerning the use of antibiotics throughout Europe and interventions to improve antibiotic use in hospitals. The first speaker was Professor Herman Goossens who has a high international profile in the area of antibiotic stewardship. In particular he was organiser of a European conference on antibiotic use in 2001 during the Belgian EU presidency. He traced back developments at EU level to 1998, during the term of the Danish Presidency. A meeting held then recommended that surveillance systems should be put in place and that certain antimicrobial agents be phased out of food production. This was a major decision that appears to have resulted in reduced vancomycin-resistant enterococci (VRE) in Europe. In 2002, the EU looked at whether recommendations had been implemented and in 16 states there were plans in place and in 14, these were in preparation. However, it was recognised that it was difficult to collect data on antibiotic use in hospitals. In Belgium, there has been a public campaign to reduce the pressure on prescribers to use antibiotics to treat respiratory tract infections in the community. This has taken the form of media campaigns and almost E450,000 has been allocated each year to this component of antibiotic stewardship by the Belgian government. This has resulted in reduced overall antibiotic use since 1997 in Belgium, reduced antibiotic costs and these campaigns have been accompanied by a fall in the prevalence of penicillin-resistant pneumococci, a common community pathogen. The direct savings in antibiotic costs alone are almost 10-times higher than the annual cost of the programme. Similarly in France, there has been a 16% reduction in antibiotic use since 2001. One of the priorities of the recently established European CDC has been to co-ordinate surveillance activities and the Framework 7 Programme includes antibiotic resistance among its priorities. This presentation clearly illustrated what can be done when there is a national programme that is adequately resourced to reduce the use of unnecessary antibiotics nationally.

The next speaker was Dr. Erwin Brown, who is a Consultant Microbiologist in Bristol and who is a member of the British Society for Antimicrobial Chemotherapy Working Party that has conducted a Cochrane review looking at what interventions result in better antimicrobial use in hospitals. The group conducted a major literature search resulting in 743 articles of which 56 were appropriate for further analysis. It was found that there was no difference between single or multiple interventions or between educational and restrictive antibiotic approaches, however restrictive interventions have a greater immediate effect. The only clear beneficial effect as assessed by microbiological results was a reduction in *Clostridium difficile* infection in four or five studies that sought to improve antibiotic use. It was not clear from the review whether the costs of the various interventions were less than cost savings due to less antibiotics being used. The group has proposed that interrupted time sequence studies are the best research approach for assessing the impact of interventions and that these should be accompanied by at least three observations before the intervention and twelve afterwards. It is likely that multiple interventions are effective but it is not clear which ones are the most effective. Finally, he advocated the importance of an antibiotic control committee as a sub-group of a drugs and therapeutics committee in every hospital to oversee the appropriate use of antibiotics.

After the two formal presentations, the panel discussion focussed on the design of appropriate trials to look at antibiotic interventions, the role of nurses in helping ensure optimal antibiotic stewardship. For example, there is often significant time savings for nurses if fewer and more focussed studies are used. Finally, it was advocated that antibiotic stewardship programmes should be linked closely with infection control and prevention strategies in the hospital.

4. Antibiotic stewardship in the hospital and the community

This session looked at recent developments the North and in the South and also reviewed the role of the infectious disease pharmacist in antibiotic stewardship. The session was chaired by Dr. Tim Wyatt, CDSC/Mater Hospital, Belfast. Dr. Robert Cunney, who is a Consultant Microbiologist at The Children's University Hospital, Temple Street, Dublin and the Health Protection Surveillance Centre, Dublin and Honorary Secretary of SARI, reviewed recent antibiotic consumption data in the Republic of Ireland. There has been an increase of 16.3% in antibiotic consumption overall from 1993 to 2004, and compared with other European countries we are in the high to moderate range of antibiotic consumers. This contrasts with the overall reduction in antibiotic use in Northern Ireland over the same time period. Similar to high usage countries, there is considerable seasonal variation in overall antibiotic use in Ireland. The data from 15 hospitals for 2004 were also reviewed. There was much greater variation in antibiotic use in smaller hospitals. Compared with other European countries we are again in the high to moderate usage group. In a household survey in which there was a 27% response rate, 40% of the public had had an antibiotic in the previous 12 months. General Medical Service (GMS) patients were more likely to have had an antibiotic. In another survey of public perceptions, 18% believed that an antibiotic helped them to get better if they had an upper respiratory tract infection and 44% had expected an antibiotic by the time they consulted a doctor with an upper respiratory tract infection. Although some of the data are better than a similar recent survey in the USA, the results were inferior to similar surveys carried out recently in Belgium where there has been considerable investment in public education campaigns.

The next presentation was by Professor Bryony Dean Franklin, Principal Pharmacist at the Hammersmith Hospitals in London. Here there are four hospitals in one Trust and they have a multi-disciplinary team looking at antibiotic stewardship. Barriers to optimal antibiotic stewardship include parallel hierarchies, consultant clinical autonomy and the lack of shared vision. However, since 1995, one infectious disease pharmacist has resulted in savings of £77,000 per year. A recent national UK initiative has increased the proportion of UK hospital trusts with infectious disease pharmacists from 30% in 2000 to 90% in 2005. An antibiotic steering group in the hospital can take initiatives in antibiotic restrictions, encouraging IV to oral switch, conduct antibiotic audits and provide internet and pocket guidelines for optimal antibiotic use. Recent point prevalence surveys have been carried out every six months since 1999 and this data is collected over 1 to 5 days. These have shown that approximately 33% of patients are on antibiotics at any one time, there is no seasonal variation in antibiotic use, and 54% of patients on antibiotics were receiving them intravenously. She argued that antibiotic stewardship needs to be integrated with the infection control and prevention team, such as looking at the prevalence of *Clostridium difficile*, and this can then be used as a performance management indicator.

Professor Colin Bradley, who is Professor and Head of the Department of General Practice in University College Cork, reviewed recent efforts to develop policies and procedures in General Practice. A review of the reasons for prescribing antibiotics included the clinical need, patient expectations, the use of a therapeutic trial to make a diagnosis etc. Patients may anticipate an antibiotic because that is what they received in a similar situation in the past. Furthermore, the presence of a bacterium does not indicate the need for an antibiotic, as many bacterial respiratory tract infections are self-limiting. Vital signs and a history of smoking and age are important considerations when deciding whether or not to use an antibiotic. Guidelines have been developed by the SARI Community Antibiotic Stewardship Subcommittee, which is chaired by Prof Bradley. These guidelines include the rational for antibiotic use, guidance on the treatment of acute infections and what microbiological tests if indicated, should be done. As part of the evaluation of these guidelines, 112 GPs have been asked to collect data on 100 consultations to assess the level of adherence. To date the data has shown that there is 40% strict adherence. It was agreed that sometimes the guidelines were unclear and GPs were uncomfortable prescribing antibiotics in 5.5% of consultations.

In the panel discussion that followed, and which also included Dr. Brenda Bradley, Senior Prescribing Advisor, Belfast, there were suggestions regarding how these GP guidelines could be extended beyond the local area. It was also argued that individual feedback to GPs and GP practices was more beneficial than formal meetings in driving change. Finally, although there have been some developments, it was agreed that electronic prescribing was not the answer at this stage to better antibiotic use either in hospital or in the community.

5. Conclusions

This was a very successful and well-organised meeting, which attracted 150 delegates from North and South. A feature of the meeting was also the presentation of posters covering a range of areas related to antibiotic resistance and the prevention of HCAI. It was clear that the issue of antibiotic stewardship in particular struck a chord with many of those present as attempts to reduce antimicrobial resistance must focus on better antibiotic use as a priority. It is also clear that there is a need for annual meetings of this kind but that they should focus on a particular aspect of antibiotic resistance rather than trying to cover too many broad areas of the subject. It is also obvious that national initiatives that are adequately resourced and funded, e.g. the resources put in to reducing antibiotic use in Northern Ireland, Belgium and France, are essential if we are to contain antibiotic resistance. However, central government agencies and others must acknowledge this.

Hilary Humphreys on behalf of the Organising Group
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