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NHS Scotland MRSA Screening Pathfinder Programme

Final Report Volume 4: To Evaluate the Feasibility and Potential for Rollout of the MRSA Screening Programme

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by Health Protection Scotland

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1 Executive Summary

The vision of the programme was to make changes to hospital MRSA screening practices to enable the control and management of MRSA in the hospital sector in order to minimise or prevent MRSA infection. It was anticipated that this would reduce the negative impact MRSA infection has on patients and the additional burden on healthcare resources.

Screening for selected patient groups is current policy and practice is being developed to ensure this is in place by January 2010 in NHSScotland. This will mean that all elective patients are screened, and their status being known at admission will maximise the potential for intervention during their stay. For emergency admissions in targeted specialties (vascular, dermatology, care of elderly and nephrology), screening will also be carried out under current policy. There may be additional screening depending on existing local policy, most boards include orthopaedics and ICU as a minimum. This targeted approach has advantages in terms of cost restriction associated with the screening but is not the most clincally effective strategy to reduce MRSA.

The targeted 'high risk of colonisation' specialties identified in current policy were found to feature in the top ten of colonisation prevalence from the pathfinder study. There are issues with local definition of specialties and patient movement between specialties which create missed opportunities to reduce risk by screening on admission to selected specialties. The targeted approach also relies on staff identifying which patients should be screened and this may have an impact on compliance or uptake. The benefit of targeted screening (versus a phased approach to universal screening by clinical risk assessment and/or laboratory testing) in terms of achieving the vision of the programme identified above remains untested and should be evaluated within NHSScotland.

Requirements for national rollout of existing policy on MRSA screening and the pathfinder study are addressed in full in volume four of this report. In summary these included development of national information leaflets, guidance, and laboratory standard operating procedures (SOPs). The programme also addressed key ethical and legal issues including patient acceptability, which had not been addressed before. Potential unintended consequences such as impact on other services or the patient experience (deferrals and waiting lists) have also been examined and indicated no significant negative impact. Projections for national rollout of the pathfinder study across the rest of NHSScotland have also been calculated.

Implications for moving to universal from targeted screening (without clinical risk assessment as a formal screening tool) would result in a three fold volume increase in screening activity and cost for NHSScotland. There are challenges associated with universal screening in endemic settings, such as Scotland, due to the lack of available single room facilities; nonetheless the pathfinder project demonstrated a sustained

reduction in colonisation prevalence associated with universal screening despite this limiting step. If the modified model projections transpire in reality, a change in policy may be possible within three to five years within this time frame there could, potentially, be low endemic proportions of MRSA and a 'search and destroy' strategy could be employed at that time. This is the approach currently undertaken in countries with low endemic proportions of MRSA, such as the Netherlands, and has been successful in maintaining that low level over many years. This search and destroy approach involves clinical risk assessment and pre-emptive isolation in conjunction with decolonisation of the patient and their contacts. A change of policy in this direction from universal screening would mean that there would be far fewer laboratory screening tests required in the future.

Universal laboratory-based screening (without clinical risk assessment as a formal screening tool) might be promoted because it is easier to apply reliably in practice, is equitable, and therefore uptake may be higher than with targeted screening. It does however have substantial cost implications, and for some boards a commitment to substantial capital investment (e.g. building and equipping additional laboratory premises) for a short to medium term policy may be a challenge. Some laboratories would need to consider structural changes (e.g. new buildings) to cope with the change in volume required for universal screening. This would also involve tendering processes (even a requirement for EU tendering) and take time for delivery. If this commitment is made, consideration should be given to emerging technologies such as PCR which, although expensive, could be used for organisms other than MRSA in the longer term if policy were to change in response to low endemic levels of MRSA in the patient population in the future. This would require evidence that these technologies are appropriate and applicable to a range of diagnostic tests.

A number of issues require further work as part of any implementation programme for MRSA screening. These are identified as development of guidelines for decolonisation and confirmation of negative MRSA status, assessment of the value of completion of decolonisation therapy post discharge and engagement with primary care, and balancing the potential role and costs of new technologies in reducing risk of transmission of colonisation and infection. The patient journey, pre-admission and during the admission, should be redesigned in order to minimise the risk of hospital associated infection.

The national rollout of MRSA screening should continue to be coordinated across NHSScotland to ensure the lessons learned and work developed within the pathfinder project are shared with the whole service. Key performance indicators for the programme are a critical component in deciding future policy direction within NHSScotland.

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5 Background

5.1 National Rollout Project

An interim report published in March 2009 concluded that the role of universal screening in acute hospitals in reducing MRSA did not have a robust evidence base for wider implementation at that point. Following this publication the SGHD published a letter which outlined the national rollout of an MRSA screening programme within NHS Scotland. This letter [1] detailed areas where MRSA Screening was to be undertaken:

"the Cabinet Secretary has decided that a national MRSA screening programme should be rolled out across NHS Scotland over 2009/10. This will ensure the majority of elective admissions to acute specialties (excluding obstetric, paediatric and psychiatric specialties) and all emergency and elective admissions to the four specialties (nephrology, vascular surgery, dermatology and care of the elderly) identified above as having the highest prevalence of MRSA colonisation should now be routinely screened. The Cabinet Secretary also announced today that we plan to achieve full national rollout by January 2010."

5.1.1 National Rollout Project Objectives

- To implement screening for all elective procedures in NHSScotland by January 2010
- To implement screening for all patients admitted to the four specialties of nephrology, vascular surgery, dermatology and care of the elderly by January 2010 (this will include elective admissions, emergency admissions and patient transfers)
- To assess the recommendations from the Pathfinder Study and their implications for National Rollout
-

5.1.2 National Rollout Participating Boards

- NHS Borders
- NHS Dumfries and Galloway
- NHS Fife
- NHS Forth Valley
- NHS Grampian (Dr Gray's Hospital Only)
- NHS Greater Glasgow & Clyde
- NHS Highland
- NHS Lanarkshire
- NHS Lothian
- NHS National Waiting Times Centre
- NHS Orkney
- NHS Shetland
- NHS Tayside

NHS Ayrshire and Arran, NHS Grampian and NHS Western Isles have been able to share lessons learned from the Pathfinder Project at working group meetings.

6 Introduction

6.1 Aim 4: To evaluate the feasibility and potential for rollout of the MRSA screening programme in the Pathfinder Boards

The MRSA Screening Pathfinder Programme included the MRSA Screening Pathfinder Project, an implementation study to evaluate the universal screening strategy recommended within the NHS QIS HTA [2]. This involved extensive data collection to test the assumptions made in the HTA model. A number of other smaller projects were undertaken as part of the Programme which informed the final report on the Pathfinder programme.

Aim 4 objectives of the Pathfinder study are addressed in full in this volume of report. In summary these included: developing national information leaflets, guidance, and laboratory standard operating procedures (SOPs).

An interim report was published in March 2009. At the time of the interim report publication the SGHD published a letter which outlined the national rollout of an MRSA screening programme within NHS Scotland. This letter [1] detailed areas where MRSA Screening was to be undertaken:

"the Cabinet Secretary has decided that a national MRSA screening programme should be rolled out across NHSScotland over 2009/10. This will ensure the majority of elective admissions to acute specialties (excluding obstetric, paediatric and psychiatric specialities) and all emergency and elective admissions to the four specialities (nephrology, vascular surgery, dermatology and care of the elderly) identified above as having the highest prevalence of MRSA colonisation should now be routinely screened. The Cabinet Secretary also announced today that we plan to achieve full national rollout by January 2010."

At this time HPS were asked to co-ordinate and support the National Rollout and enable lessons learned from the Pathfinders to be used in the National Rollout.

The National Rollout project was developed within the overarching MRSA Screening Programme. There are two main objectives; the first was to implement MRSA screening for all elective procedures in NHSScotland by January 2010 (excluding obstetric, paediatric and psychiatric). The second was to implement screening for all patients admitted to the four specialties of nephrology, vascular surgery, dermatology and care of the elderly by January 2010 (this included elective admissions, emergency admissions and patient transfers).

This document aims to evaluate the feasibility and potential for rollout of the MRSA screening programme by addressing the following objectives;

Table 6-1: Pathfinder programme objectives relating to the Aim 4 which will be addressed within the interim report.

	Objective	Addressed in this report
1	To identify how many patients each year will be screened and their characteristics.	See interim report [3]
2	To describe current practice in the Pathfinder site and how much additional resource is required to implement MRSA screening of all acute in-patients.	See interim report [3]
3	To assess the projected supply of equipment and consumables needed to implement screening.	See interim report [3]
4	To describe the resources required for implementation of the programme.	See interim report [3]
5	To describe the organisational structures that will be established in the Pathfinder sites for the purpose of implementation.	See interim report [3]
6	To evaluate the staff training needs at pathfinder board level rollout.	See interim report [3]
7	To assess the technological needs for the initiation of the Pathfinder screening project.	See interim report [3]
8	To assess the equipment required for the Pathfinder project.	See interim report [3]
9	To assess the requirements for the procurement process involved.	See interim report [3]
10	To evaluate what data collection processes are needed initially for the Pathfinder Boards and totally for monitoring MRSA screening.	See interim report [3]
11	To determine the process for patient management when the patient is found positive at a pre-admission clinic.	See interim report [3]
12	To determine the process for patient management when the patient is discharged without a result and this is subsequently found to be positive.	See interim report [3]
13	To develop a Standard Operating Procedure (SOP) on chromogenic agar product, testing and organism identification, including confirmation of isolates in MRSA colonisation and infection.	Yes
14	To assess and fulfil the legal and ethical requirements for the programme	Yes
15	To assess if primary and secondary prevention measures are specified, resourced, in place and monitored in the Pathfinder Boards.	Yes
16	To assess the impact on service delivery of introducing MRSA screening of all patients. Inclusive of the following:	Yes
a)	the impact on current working practice and impact on workload in laboratory.	Yes
b)	the impact upon cancellation/delayed rates for surgical procedures and scheduled admissions.	Yes
c)	the impact on the pre-admission clinics.	Yes
d)	the impact on Accident and Emergency units.	Yes
e)	the impact on GP services.	Yes
f)	the impact on pharmacy services.	Yes
g)	the impact on the patient pathway.	Yes

	Objective	Addressed in this report
17	To monitor any unintended consequences/impacts of introducing MRSA screening of patients (Pathfinder Boards and HPS).	Yes
18	To develop a standard discharge protocol for those with unknown colonisation status and those not completing treatment.	Yes
19	To describe current practice in Scotland and determine how much additional resource is required for rollout of MRSA screening.	Yes
20	To define the scope for future screening in terms of who and where (inclusions and exclusions).	Yes
21	To assess whether there is adequate staffing and resources for the wider implementation of the programme.	Yes
22	To project how many patients each year will be screened and their characteristics.	Yes
23	To project the supply of products needed to implement screening and the national procurement implications.	Yes
24	To describe the organisational structure needed for governance of the programme nationally.	Yes
25	To describe the board level management arrangements required.	Yes
26	To evaluate the staffing needs / training requirements at board level rollout.	Yes
27	To assess the technological needs for the programme.	Yes
28	To determine the equipment required for the programme and the costs of that equipment.	Yes
29	To determine the start-up costs and capital investment required.	Yes
30	To project the operating costs of the ongoing screening programme.	Yes
31	To develop a plan for quality assurance of the programme.	Yes
32	To evaluate what data collection processes are needed for long term monitoring MRSA screening.	Yes
33	To evaluate the availability of laboratory facilities in NHSScotland.	Yes
34	To assess if primary and secondary prevention measures are specified, resourced, in place and monitored in NHSScotland.	Yes
35	To project the revenue implications for the programme post 2011	Yes
a)	SGHD / boards and how much shall be required	Yes
b)	MRSA reference laboratory implications	Yes
c)	HPS in Key Performance Indicator (KPI) monitoring role	Yes

7 Approach

A programme board was established by HPS with representation from each of the key stakeholder groups involved in MRSA screening. This group were responsible for the overall direction and management of the programme. The programme board approved all plans and authorised any major deviations from agreed plans.

HPS established two groups to undertake coordination and implementation of the programme. A Pathfinder Group meeting was held on a monthly basis to ensure consistent implementation of the Pathfinder project. This group consisted of representation from each of the Pathfinder Boards. A Technical Group was established to discuss the technical details of the protocol, epidemiological definitions and data management. In December 2008 these groups were merged as the protocol was well established and the merged Technical Group became an overseeing group for the five work streams which had been developed to ensure that projects within the programme were using a similar approach. (See Figure 7-1: Governance Structure for MRSA Screening Pathfinder Programme). The five work streams were: Epidemiology, Communications, Staff Patient Acceptability, Screening and National Rollout. Each work stream group had representation from the team members with HPS, pathfinder boards and the Technical Group who were responsible for working on the delivery of each of the Projects within the Programme.

The Pathfinder Boards each established a local Project Board, which was responsible for approving the protocols locally. Pathfinder project managers met regularly with their local Project Boards and reported local issues via the Pathfinder Meeting and a fortnightly Project Mangers Meeting. This structure ensured that the Project Managers could produce one monthly report detailing new risks and issues and progress each month which could be shared at all their meetings. The Pathfinder Boards have continued with universal screening whilst targeted screening has been implemented within the National Rollout Boards.

With regard to the National Rollout monthly working group meetings were arranged from May 2009. The purpose of the meetings was to support and manage the implementation of the national Rollout of the MRSA Screening Programme in NHS Scotland, to utilise the lessons learned in the pathfinder project and to provide an overview of the implementation of MRSA Screening and agree common processes where possible.

The meetings were led by HPS and attendees included representatives of all the health boards, the SGHD, NHS NES and also a public representative. In addition to this members of the MRSA Technical Group (formed for the Pathfinder Project) also attended. A full list of members can be found in Appendix 10. The meetings had a standing agenda which can also be found in Appendix 9.

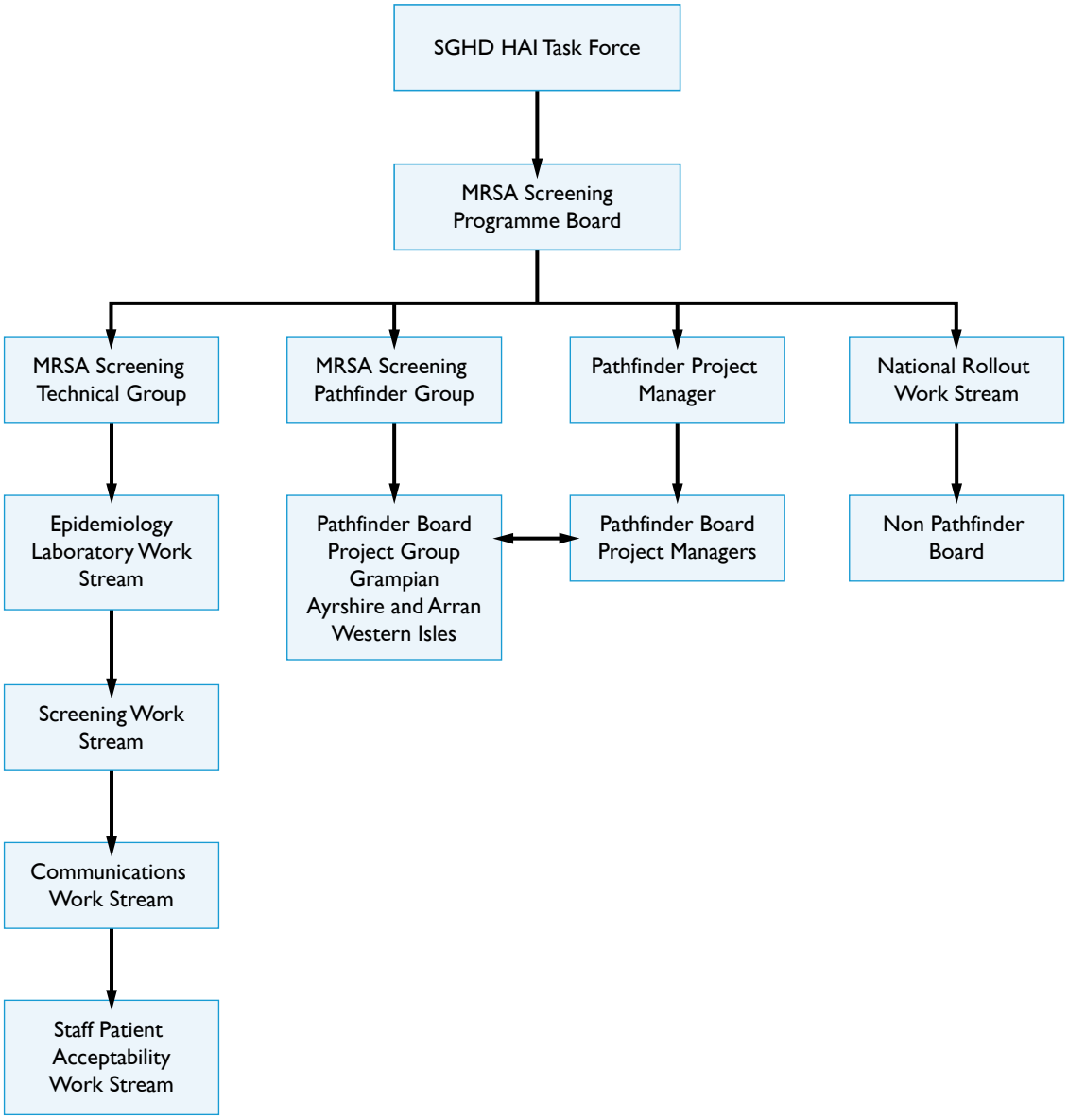
In addition to these meetings an area was set up on the E-Library shared space for Board team members to access relevant HPS documentation and also share information with other Boards on the discussion board.

A number of materials were produced by HPS and distributed to Boards to help to communicate the fact that the MRSA Screening Programme was being rolled out. These items included;

- Patient Information Leaflet
- Patient Information Film
- Pop-Up Banner aimed at staff, patient and visitors

All of these items can be seen in Appendix 4 to 6.

Figure 7-1: Governance Structure of MRSA Screening Programme



8 Discussion - Objectives

This section will address the objectives not met within the interim report [3]. Through this report both universal and targeted screen strategies will be discussed. In addition the Discussion-Organisation Issues section 9 will discuss the outstanding organisational issues not met in either the Pathfinder Project or the Targeted National Rollout.

8.1 Objectives1-12: See interim report

These objectives were fully addressed within the interim report [3].

8.2 Objective13: To develop a Standard Operating Procedure (SOP) on chromogenic agar product, testing and organism detection, including confirmation of isolates in MRSA colonisation and infection

An SOP for chromogenic agar testing was prepared by representatives of the Scottish Microbiology Forum and can be viewed in Appendix 1.

Key Summary Point

A chromogenic agar testing SOP has been developed.

8.3 Objective 14: To assess and fulfil the legal and ethical requirements for the programme

A number of ethical issues surrounding MRSA screening and its consequences were laid out in the Interim Report [3]. Since then, there has been a debate raised in the literature [4] surrounding the need to explore and deal with these issues before embarking on a national screening programme.

The key ethical issues around MRSA screening relate to patient acceptability, effectiveness and cost-effectiveness of the intervention, the screening of low-risk patients, social isolation in single rooms, deferral of treatment as a result of screening, the personal benefits of screening in relation to benefits solely for other patients, and the management of patients being discharged while known or suspected to be MRSA colonised. Each of these will be addressed in turn.

We expect this final report of the Pathfinder project to facilitate both the decision making processes for national policy in Scotland and the future formulation of a practical and pragmatic ethical framework.

8.4 Patient acceptability

One of the key ethical concerns expressed at the outset of the study was the potential imposition of a screening programme which patients may find unacceptable. One of the key findings of the patient and public acceptability study carried out as part of the Pathfinder programme [3] was that an overwhelming majority of patients, carers and staff took a highly positive view of the programme. This was strongly reinforced by the fact that only 0.03% of patients within the study refused consent for screening [5].

Key Summary Point

The MRSA Screening Programme was found to be acceptable amongst patients consulted.

8.5 Effectiveness and cost

There are ethical issues around investing in a costly programme that offers limited benefits, or some benefit at disproportionate cost, within a resource-limited health service. One of the main purposes of the Pathfinder programme was to test the assumptions and estimates within the NHS QIS HTA modelling on the effectiveness and cost-effectiveness of various screening strategies [2]. This was an attempt to examine critically the most clinically effective strategy in relation to cost, and was developed in the absence of a firm evidence base behind the pre-existing national recommendations for targeted screening [5]. The HTA modelling suggested that universal screening was more clinically and cost effective, and the Pathfinder Interim Report [3] noted that observed compliance with pre-existing targeted screening programmes was 'variable'.

Key Summary Point

Targeted screening was less clinically effective and the effectiveness has not been tested.

8.6 High risk and low risk

The concept of 'high risk' for MRSA screening is complex – this may refer to the patient's intrinsic health status, to the ward or the specialty housing a patient, or to the procedures being undertaken. It became clear at an early point in implementing the Pathfinder Project that rapid and repeated patient movement between wards made it impossible to apply a 'high risk only' strategy for decolonisation at ward or specialty level. In addition, colonised patients are at higher risk of self-infection [6]: even 'low risk' patients frequently have invasive procedures or indwelling devices, and the Pathfinder data confirm that the risk of infection is substantially higher in colonised patients than in those testing negative [5].

Key Summary Point

The concept of high risk and low risk categories of patients to determine if they should be screened was found to be impractical to implement and no difference was found in colonisation or infection.

8.7 Isolation in single rooms

The potential adverse psychological and clinical consequences arising from social isolation in single rooms have been identified in the literature [7]. However, there is an increasing strategic move toward delivering hospital care in single rooms across the UK and specifically in Scotland [8], based primarily on privacy and dignity considerations but also on the opportunities for better infection prevention and control. There is a generic issue for the NHS to address in terms of how we operationally deliver good patient care in the new context of single rooms, taking into account the different working patterns and practices this approach requires. In terms of patient opinion, a survey of patients in a single-room-only Scottish hospital showed a 93% preference for single rooms on their next admission [9] ,which is probably a better marker of acceptability than surveys involving those with no experience of care in single rooms.

Key Summary Point

Patient opinion suggests there is a preference for being cared for in a single room, however further work is required to ensure quality patient care is delivered within this setting as NHSScotland moves towards an increase in the number of single rooms within hospitals.

8.8 Deferral of treatment

The Pathfinder data show that only 14 patients had their treatment deferred. The decision on whether to defer treatment is one made on a clinical case-by-case risk assessment basis, balancing the urgency of treatment against the potential hazards of precipitating a move from colonisation to infection. This judgement will be informed by the risks presented by the patient's status and the procedures required. If a decision to treat is taken, additional precautions to protect the patient can be undertaken to minimise the infection risk. This is intrinsically a more ethical process than either a strict protocol of deferral of treatment for colonised patients or undertaking a high risk procedure in ignorance of colonisation status.

Key Summary Point

During the Pathfinder study only 14 patients had their treatment deferred which suggests there will be a low percentage of patients to have their treatment delayed as national rollout is implemented. In addition to this the decision to defer will be taken on clinical case-by-case risk assessment to ensure the interest of the patient is the main priority.

8.9 Risks to self vs. risks to others

The Pathfinder data have confirmed that there is a higher risk of infection in colonised patients than in those testing negative [5], but the fact that only half of the patients observed with MRSA infection were screened positive suggests that the others were largely as a result of transmission from person to person. The ethical principles of personal protection being equivalent or secondary to the protection of others in the wider population underlies many infection prevention interventions such as vaccination or Tuberculosis (TB) screening. This is an issue which needs wider examination, but the precedents for interventions to protect others have been set.

Key Summary Point

The precedence of intervention to prevent harm has been set with other interventions such as national vaccination programmes.

8.10 Discharge of MRSA colonised patients

There is no accepted protocol for the management of patients discharged from hospital who are known or suspected to be MRSA colonised. Decolonisation has an efficacy of 53% [2], even where fully applied, and only a very small minority of patients identified as colonised within the Pathfinder study had a complete application of the decolonisation protocol, including three confirmed negative swabs [9]. Intuitively, there is likely to be a significant clinical advantage in reducing the level of colonisation even through partial application of the protocol, though separating this element out from the other interventions (e.g. isolation) in terms of effectiveness in preventing infections will be impossible without further formal studies. The issue of increased risk for those previously diagnosed as MRSA carriers on previous admissions suggests that this is an area requiring further investigation and discussion.

Key Summary Point

In order to create a protocol for the management of patients found to be colonised once they have been discharged, further work is required to develop a protocol which would benefit patients likely to be re-admitted.

8.11 Objective15: To assess if primary and secondary prevention measures are specified, resourced, in place and monitored in the Pathfinder Boards

An audit of infection control practice was carried out by an independent auditor, commissioned by HPS, on two occasions in each of the boards during the pathfinder study. The purpose of the audit was to determine compliance with infection control procedures for patients with MRSA during the study. This was in order to provide evidence about infection control processes in order to evaluate any potential impact on outcome resulting from the screening intervention. This was deemed important as any additional infection control processes introduced during the study would confound the results obtained.

The Orion framework [10] was used by the auditor to summarise the observed infection control practice and this is detailed in appendix 11. Comparing the two audit periods there was no difference in policy or compliance with infection control policy in the two audit periods. There were areas of practice, common to all three boards, that required improvement in both audit periods. These practices included single side room doors, the use of personal protective equipment, cohorting and cleaning.

8.12 Objective16: To assess the impact on service delivery of introducing MRSA screening of all patients.

This information can be found in the Interim Report for each of the Pathfinder Boards on the following pages:

- NHS Ayrshire and Arran – [3] Pages 159 to 167
- NHS Grampian – [3] Pages 168 to 176
- NHS Western Isles – [3] Pages 177 to 186

8.13 Objective17: To monitor any unintended consequences/impacts of introducing MRSA screening of patients (Pathfinder boards and HPS).

The SGHD has announced a target for NHSScotland to ensure that patients wait no longer than 18 weeks from referral to treatment from December 2011. A milestone leading up to this target is to achieve 15 weeks maximum wait for both outpatient consultations and hospital admissions as an in-patient or day case by the end of March 2009. At 30 September 2009, over 99.9% of inpatients were waiting less than the 15 week maximum standard [11].

Data are also collected by ISD to monitor the number of patients who had treatment delayed due to medical reasons. For NHSScotland as a whole there was a 45% increase between June 2008 and June 2009 [12]. For the three Boards participating in the Pathfinder project there was an increase of between 8% and 176%. This increase is due to a number of reasons including; bed capacity, staff illness, surgeons not being available, outbreaks such as H1N1 and Norovirus. Participation in the MRSA Screening Project is not considered to be a contributing factor, however this is something that should continue to be monitored by all Boards during the next year.

Please note that there may be limitations to this data as the definitions used have changed over the course of the year such as the NWTC taking on all heart and lung surgery for the west of Scotland. Further details can be found in [13].

Key Summary Point

Findings of the Pathfinder project suggest MRSA screening will not significantly increase the number of patients who have their treatment deferred, but this should continue to be monitored.

8.14 Objective 18: To develop a standard discharge protocol for those with unknown colonisation status and those not completing treatment.

The majority of patients who are initiated on decolonisation are discharged before it is complete. The aim of decolonisation is to reduce the burden of MRSA at the time the patient is most at risk of passing on MRSA to other patients or of developing infection themselves. Currently within NHSScotland there is no standard protocol for completing decolonisation on discharge. Further work is required to assess if there would be an advantage continuing decolonisation post discharge for patients who are at increased risk of re-admission.

Key Summary Point

Currently within NHSScotland there is no standard protocol for completing decolonisation on discharge.

8.15 Objective 19: To describe current practice in Scotland and determine how much additional resource is required for rollout of MRSA screening.

MRSA screening practice in Scotland before the MRSA Screening Programme was varied as described within the NHS QIS HTA [2]. NHS Boards that did carry out screening in the main made use of clinical risk assessment to determine if a patient should be screened. The number of body sites swabbed varied depending on local historic practice, specialties and procedures being undertaken. The type of laboratory methods used to identify MRSA also varied with screening agar being the most common.

The MRSA Screening Programme has issued a protocol (see Appendix 2) which will ensure testing consistency amongst all NHS Boards. For Pathfinder Boards, all emergency admissions except those admitted to obstetric, paediatric and psychiatry are to be screened. With regard to elective admissions, all patients are screened except obstetric, paediatric and psychiatry and day cases.

For National Rollout Boards, all emergency admissions to the following four specialties will be screened by 31 January 2010; nephrology, vascular surgery, dermatology and care of the elderly. With regard to elective admissions, all patients will be screened by 31 January 2010 except obstetric, paediatric and psychiatry

Table 8-1: Number of single rooms within each NHS Board

NHS Board	Total Single Rooms	Average Number of Hospital Beds	Percentage Single Rooms
NHS Ayrshire and Arran	631	1,944	32%
NHS Borders	240	634	38%
NHS Dumfries and Galloway	247	764	32%
NHS Fife	295	1,613	18%
NHS Forth Valley	398	1,232	32%
NHS Grampian	720	2,813	26%
NHS Greater Glasgow and Clyde	1,614	7,281	22%
NHS Highland	530	1,750	30%
NHS Lanarkshire	579	2,362	25%
NHS Lothian	947	3,977	24%
NHS Orkney	16	64	25%
NHS Shetland	26	100	26%
NHS Tayside	563	2,273	25%
NHS Western Isles	55	220	25%
NWTC	116	116	100%
Overall NHSScotland*	**6,977**	**27,143**	**26%**

* Amended from the orginal with the removal of the State Hospital

This table is taken from the Single Room Provision Steering Group Report [9]. This report indicated that the average provision is around 26%. The NHS QIS HTA model was based on an average of three single rooms per 25 bed wards, which equates to 12% of beds being in single rooms. However, the HTA model also assumed that these singles rooms are able to be used for patients with MRSA at all times. In reality there are a number of competing pressures for the use of single rooms, such as patients requiring privacy and patients with other infectious diseases.

Additional resources required for the National Rollout are covered later in this report.

Key Summary Point

The total number of single rooms within NHSScotland is higher than the figure used in the NHS QIS HTA, however there are many other requirements for use of single rooms other than MRSA.

8.16 Objective 20: To define the scope for future screening in terms of who and where (inclusions and exclusions).

Currently within NHSScotland there are two strategies for MRSA Screening. The Pathfinder Health Boards (NHS Ayrshire and Arran, NHS Grampian and NHS Western Isles) are undertaking universal screening of all patients. Within non-Pathfinder Health Boards a targeted approach is being rolled out and is scheduled to be fully implemented by end of January 2010.Within the Pathfinder study [14] universal screening was found to be feasible to implement and early indications show a statistically significant reduction in both colonisation and infection within the year of the study. Overall, the Programme Board concluded that national policy decisions on MRSA screening need to balance clincal effectiveness with value for money in the context of overall healthcare expenditure.

The patient groups included within the Pathfinder study (all overnight admissions) and exclusion criteria shall remain the same (day patients, patients admitted to obstetric, paediatric and psychiatric specialties).

Key Summary Point

The Programme Board have recommended that universal screening should be implemented with the same exclusions as those used within the Pathfinder Project.

8.17 Objective 21: To assess whether there is adequate staffing and resources for the wider implementation of the programme.

For targeted national rollout of screening the number of admissions included within this screening strategy is approximately one third of all NHSScotland annual admissions. The move from targeted national rollout to universal screening of all overnight admissions will therefore result in a three times increase in staffing and resources required. This does not take into account capital investments in laboratory facilities (see objective 28).

NHS boards employed a number of staff from various disciplines to support the rollout of the screening programme. These include;

- Project Managers
- Biomedical Scientist
- Medical Laboratory Assistants
- Nurses
- Porters
- Domestics

The staffing levels were calculated based on the estimated number of additional screens Boards would be required to carry out and the additional staff this would entail. Funding for these staffing levels was provided by the SGHD for 2009/2010. Bids for funding after the announcement of government policy based on this report will be agreed with the SGHD.

Funding for 2010/2011 will be available as part of the HAI Task Force funding stream to cover the increase in patients screened until March 2011. Planning will be undertaken in collaboration with each Health Board and the Scottish Government to develop an equitable approach with realistic milestones. Consideration will need to be given to larger Health Board areas where capital investment may be required in order to increase laboratory capacity.

Key Summary Point

Adequate funding to employ staff was provided to Boards during both the Pathfinder Project and also targeted rollout. Any changes to this level of screening may require funding to increase laboratory capacity within Boards.

8.18 Objective 22: To project how many patients each year will be screened and their characteristics.

Table 8-2 shows the numbers of eligible admissions for universal screening and targeted national rollout based on ISD figures [15] for 2007/2008.

Table 8-2: Projected number of patients to be screened

Board	Universal Screening				Targeted National Rollout		
	All Elective patient admissions	All Emergency Patient Admissions	All Transfers	Total	Rollout Elective patient admissions	Rollout emergency patient admissions (including transfers)	Total
	N	N	N		N	N	
NHS Ayrshire and Arran	10,810	42,872	10,427	64,109	0	0	0
NHS Borders	3,032	12,460	3,239	18,731	3,032	525	3,557
NHS Dumfries and Galloway	5,105	14,096	6,118	25,319	5,081	1,732	6,813
NHS Fife	8,897	27,738	13,328	49,963	8,788	3,529	12,317
NHS Forth Valley	5,164	26,156	6,834	38,154	5,164	7,365	12,529
NHS Grampian	22,968	48,172	18,408	89,548	2,100	0	2,100
NHS Greater Glasgow and Clyde	70,288	142,346	61,154	273,788	68,785	20,191	88,976
NHS Highland	10,152	28,275	12,219	50,646	10,058	1,552	11,610
NHS Lanarkshire	12,157	54,915	27,792	94,864	12,153	7,728	19,881
NHS Lothian	26,336	83,399	39,381	149,116	25,507	8,985	34,492
NHS Orkney	264	1,781	263	2,308	0	0	0
NHS Shetland	346	1,786	96	2,228	346	0	346
NHS Tayside	17,063	43,339	11,980	72,382	16,760	3,276	20,036
NHS Western Isles	1,059	2,723	203	3,985	0	0	0
NWTC	4,133	85	1,218	5,436	1,218	0	1,218
Total	**197,774**	**530,143**	**212,660**	**940,577**	**158,992**	**54,883**	**213,875**

These figures were calculated using the annual number of admissions the Boards received in 2007/2008 [15], certain areas will have changes due to new facilities and closures since these figures were collated and therefore provide only a guide to the number of admissions.

Key Summary Point

The annual number of patients predicted to be screened with targeted rollout is 214,000. The annual number of patients predicted to be screened with universal screening is 941,000.

8.19 Objective 23: To project the supply of products needed to implement screening and the national procurement implications.

Table 8-3 shows the expected number of additional decolonisation packs and additional screening tests for both universal and targeted screening. Please note the number of admissions with additional screens for universal is more than 3 times the number of additional screens for targeted rollout because the number of admissions with MRSA colonisation is as big an increase due to the fact that the prevalence within the targeted specialties is higher.

Table 8-3: Number of additional decolonisation packs and additional screening tests overall for universal and targeted screening (annually)

	Universal		Targeted	
	Additional Decolonisation Packs	Additional Screening Tests	Additional Decolonisation Packs	Additional Screening Tests
Total	**37,000**	**1,110,000**	**20,000**	**230,000**

National Procurement have been informed that due to the National Rollout there would be an increase in the amount of consumables purchased with the intention that future contracts can benefit from the economies of scale. They have also taken steps to ensure supplies of items such as swabs will still be available during periods of high demand.

Key Summary Point

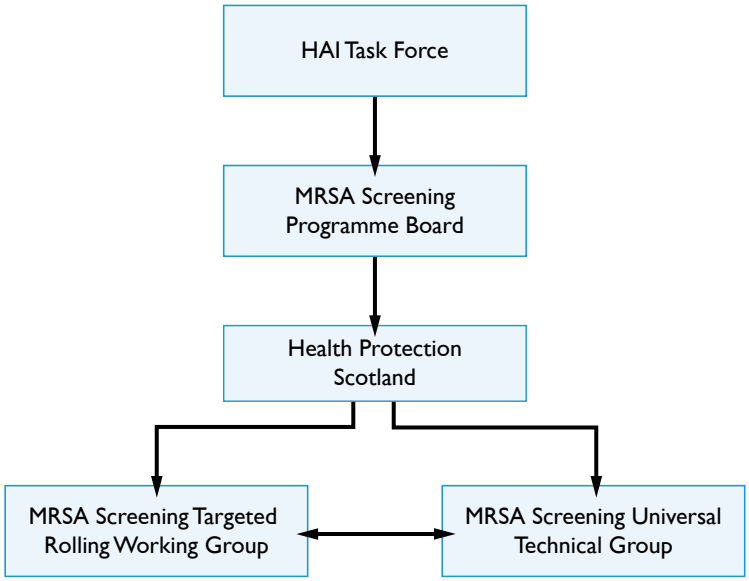
The increase in screening tests and decolonisation packs has been predicted for both targeted and universal screening. National Procurement will be informed to ensure best value can be achieved.

8.20 Objective 24: To describe the organisational structure needed for governance of the programme nationally.

The national rollout was commissioned by the HAI Task Force, which is part of the SGHD. They requested this work be nationally co-ordinated by HPS, as they already had responsibility for the MRSA Screening Pathfinder Programme. This also meant there was an existing governance structure for the National Rollout to report to, namely the MRSA Screening Programme Board. Within HPS the National Rollout was led by a full-time project manager, reporting to the MRSA Screening Programme Manager. A monthly Working Group was set up to allow all the Health Board Project Managers to meet and discuss issues related to the rollout and attempt to find common solutions. In terms of measuring progress, Boards were required to report progress via monthly reports to HPS. The monthly reports contain standard project reporting criteria such as;

- Overall RAG Status
- Critical Risks and Issues
- Milestone
- Financial Information
- Exceptions to Plan

Figure 8-1: The governance structure of the MRSA Screening Programme



Key Summary Point

A process has been developed where Boards submit monthly reports to enable progress towards implementation to be tracked. Monthly working group meetings, chaired by HPS, were held to allow common issues to be resolved, during which Pathfinder Boards were able to draw on their experience.

8.21 Objective 25: To describe the board level management arrangements that are required.

The matrix in Appendix 13, was issued to the Boards involved in the Rollout of Targeted Screening to ensure that the relevant stakeholder groups had been engaged within their own Board.

Information about the project team staff involved in each of the Rollout Boards can be found in Appendix 7.

Key Summary Point

Boards were given advice on what stakeholders should be engaged based upon the experience of the Pathfinder Boards.

8.22 Objective 26: To evaluate the staffing needs / training at board level rollout.

NHS NES were consulted over educational materials available to staff, and also to look at what additional materials could be created. In terms of existing materials, the following were available;

Online short courses;

- MRSA - A Clinical Scenario
- Helping Patients Cope with Isolation in Hospital
- Hand Hygiene Programme
- HAI Induction Programme
- Bacterial resistance
- Preventing catheter related blood stream infections

Cleanliness Champion Programme

NHS Boards were asked what further educational materials they required and the outcome of these discussions was that NES will develop an educational resource with the provisional learning outcomes;

- Explain MRSA
- Explain the rationale for MRSA screening
- Identify the specific specialties within hospitals that are subject to MRSA screening
- Describe how to take a MRSA screen
- Highlight the methods of processing a swab in the microbiology department
- Describe action to be taken following a positive MRSA swab

This educational resource will take the form of an on-line training tool which can also be printed for those without access to IT equipment and the aim is for it to be live by 31st January 2010.

Key Summary Point

The National Rollout Working Group considered what educational materials (in addition to those already available) would assist implementation. NES are working with the National Rollout Working Group to develop a new educational resource about MRSA screening.

8.23 Objective 27: To assess the technological needs for the programme.

The technology for the screening programme for the National Rollout is standard healthcare equipment. Within the laboratories the equipment required includes freezers, incubators, laboratory management and reporting systems and VITEK equipment. The VITEK machines are now in all laboratories in Scotland (please note these were not purchased solely for use with MRSA screening). The broader technologies required outside the laboratories are real time patient management systems to allow identification of new patients on admission. One of the key issues with the Pathfinder programme was the lack of a link between the patient management systems and the laboratory reporting systems. This issue is however much larger than the screening programme and the systems are designed to work within the hospital system rather than for the data collection during studies such as these. Future technological changes for laboratory testing (for example the implementation of rapid tests) is a complex issue [16]. There is a requirement to assess and evaluate new technologies for use in hospitals and a group has been set up to undertake such a task. Laboratory techniques are rapidly changing and a group of peers with expertise will be required to review ongoing technological developments for the SGHD, and test their use within NHSScotland and different health boards. It is proposed that the Scottish Microbiology Forum (SMF) is the most appropriate group to undertake this task.

Key Summary Point

The SMF have been identified as the appropriate group to assess and evaluate new technologies for use in MRSA screening.

8.24 Objective 28: To determine the equipment required for the programme and the costs of that equipment.

NHS Boards purchased various items of equipment for use in their laboratories to cope with the increased number of tests that will be carried out due to the MRSA Screening Programme. Items of equipment included;

- Incubators
- PCs
- Fridges
- Culture Plate Carriers
- Tube Racks
- Specimen Transport Boxes
- Workstations
- Transport Pods
- Vortex Mixers

The estimated cost for the equipment required for targeted rollout is £300,000. It is expected that a proportional increase would be required for universal screening.

Key Summary Point

There was a variety of laboratory equipment required by Boards as they implemented targeted screening. The SGHD provided adequate funding to allow this equipment to be purchased.

8.25 Objective 29: To determine the start-up costs and capital investment required.

Start-up costs include; adding up the project manager salary, project administrative support, all laboratory equipment purchased and all laboratory refurbishment works carried out. The initial sum provided to the boards in order to implement targeted National Rollout was around £900,000. Although the additional screens for universal screening will be three times this amount, we cannot estimate the exact cost as some areas will require capital investment in laboratory buildings which will be required to go to tender.

Key Summary Point

The capital investment required to implement universal screening cannot be accurately predicted as the work will require to go to tender within the European Union.

8.26 Objective 30: To project the operating costs of the ongoing screening programme.

The HTA used modeling to project the estimated cost of universal screening. This work was then modified for the planning of the National Rollout to include:

- Costs for staff and consumables to undertake screening
- Costs for staff and consumables within the laboratory (including additional costs for follow up tests for positive results)
- Costs for treatment for positive patients including staff time and consumables
- Cost for PPE for treatment of positive patients.

There are a further two crucial differences. Firstly the modified model does include the staff costs of a project team (including a project manager, administrative support, porters and pharmacy assistant). Conversely, the HTA does include the cost of using isolation rooms. The modified model excluded this cost.

Using this model to implement targeted National Rollout for 12 months the estimated costs are:

- £3.8m staff costs
- £1.8m consumable costs
- Total of £5.6m

To implement universal screening for 12 months would cost an estimated £13-£17 million (based on a prevalence of 3.9%). This compares to the cost of universal rollout in England of £159 million [17], which means universal rollout in Scotland would be proportionately the same cost per head of the population.

This is also in line with the HTA estimate that the total costs of screening would be £14.3m.

It should be noted that it may be possible to reduce the overall costs by removing the opportunity cost of staff time and the actual cost of PPE. A decision on the level of funding to be provided should be taken in the context of overall healthcare expenditure.

Key Summary Point

The cost of implementing universal screening is estimated to be between £13 to £17 million. On a proportionate scale this is comparable to the cost of universal screening in England.

8.27 Objective 31: To develop a plan for quality assurance of the programme.

The Quality Assurance (QA) plan developed for the Pathfinder project can be found in Appendix 3. A separate QA plan will be developed for Targeted Rollout post January 2010. The performance measures outlined in the Pathfinder QA plan were collected as part of the data collection task during the study and involved a considerable resource in order to collect and collate this information. It is not expected that such a detailed set of performance measures would be feasible throughout Scotland over a longer period. The programme board considered that routinely collected data should be used where possible.

The quality assurance for the Targeted National Screening Programme (implemented by January 2010) and any alteration to the policy post January 2010 shall take a two fold approach to the assessment of the overall MRSA screening programme. This will include a limited number of Key Performance Indicators (KPIs) which will address the three key aims of:

i. To provide a means by which the Scottish Government can monitor the delivery of the MRSA programme and be assured that eligible patients are being offered MRSA screening as per the national protocol.

ii. To provide a means by which to assess the impact of the programme itself.

iii. To facilitate ongoing quality improvement in relation to the programme at a local level.

Key Summary Point

The KPIs for targeted rollout are not expected to be as exhaustive as those for the Pathfinder project. Further information can be found in objective 32.

8.28 Objective 32: To evaluate what data collection processes are needed for long term monitoring MRSA screening.

Following the publication of the interim report of the MRSA Screening Pathfinder Programme [3], the Scottish Government Health Directorate (SGHD) announced the implementation of a National MRSA Screening Programme in Scotland. In this programme, to be rolled out by January 2010, all elective admissions to acute hospital specialties (excluding obstetric, paediatric and psychiatric specialties) and both elective and emergency admissions to care of the elderly, nephrology/renal, dermatology and vascular surgery specialties are to be screened for MRSA.

The UK National Screening Committee recommends that, before screening for a condition is initiated: *'there should be a plan for managing and monitoring the screening programme and an agreed set of quality assurance standards'* [18]. The development of key performance indicators (KPIs) for the National MRSA Screening Programme is therefore being addressed as part of the MRSA Screening Pathfinder Programme.

An initial discussion paper was prepared by Health Protection Scotland. This set out three key aims to be addressed by the KPIs for the National MRSA Screening Programme:

i. To provide a means by which the Scottish Government can monitor the delivery of the MRSA programme and be assured that eligible patients are being offered MRSA screening as per the national protocol.

ii. To provide a means by which to assess the impact of the programme itself.

iii. To facilitate ongoing quality improvement in relation to the programme at a local level.

The paper considered the relative merits of a range of candidate KPIs (based on both process and outcome measures) and presented a number of options for taking their development forward.

The paper was then presented to, and discussed with, key stakeholders on the MRSA Pathfinder Programme Technical Group and Programme Board, and at the National MRSA Screening Rollout meeting.

Overall, the need for a set of KPIs to address the three key aims outlined above was supported by stakeholders. However two key concerns were raised:

i. Due to limitations in existing IT systems (laboratory and patient administration systems), the accurate measurement of some indicators - such as MRSA screening uptake and MRSA colonisation rates - may not be feasible using routinely collected data.

ii. The financial and workload implications of implementing the KPIs needs to be considered before any recommendations are made.

Comments from stakeholders were then used to inform the further development of the KPIs for the National MRSA Screening Programme.

In light of the comments received from key stakeholders, and drawing on the experience of the MRSA Screening Pathfinder Programme, it is recommended that the Key Performance Indicators adopted for the National MRSA Screening programme should consist of three components as follows:

1. A KPI for NHS boards based on uptake of MRSA screening. Uptake will be estimated using local audit conducted on an agreed sample of patients.

   The required sample size, the level at which uptake rates are to be reported (by specialty, hospital or NHS board), and the format and frequency of reporting will need to be considered and agreed prior to implementation of the KPI during the calendar year 2010.

2. An assessment of the impact of the National MRSA Screening Programme will be undertaken by investigating:

    a. MRSA bacteraemia rates using data from the existing national *Staphylococcus aureus* Bacteraemia (SAB) Surveillance Programme. This will be conducted by Health Protection Scotland and the findings included in the annual report of the SAB Surveillance Programme. This is acknowledged to be useful but not immediately sensitive to changes in overall number of MRSA infection.

    b. MRSA first clinical isolates (excluding screening samples) which are routinely reported through ECOSS to HPS. This data will allow analysis of MRSA infection before implementation of the targeted national rollout and after in the same way Pathfinder data was analysed with Volume 1 of this report [14].

    Consideration should also be given to the development of specially designed and commissioned studies to assess the impact of the National MRSA Screening Programme on colonisation rates.

3. A recommendation that NHS boards should ensure that there are adequate processes in place to monitor the quality of their MRSA screening programmes and to identify any areas where these can be improved.

Key Summary Point

The KPIs for the targeted rollout have been developed to include monitoring of; uptake, impact and possible improvement.

8.29 Objective 33: To evaluate the availability of laboratory facilities in NHSScotland.

8.29.1 National Rollout Boards

Four health boards have more than one laboratory analysing MRSA screening test results, the others have a single laboratory. Seven health boards made physical alterations to cope with the increase in screening, and the majority of these were conversions of office space with the purchase of additional equipment.

Nine health boards made organisational changes as a result of the increased volume of screening. Eight of these health boards increased out of hours working and one altered their methodology by moving to Chromogenic Agar testing.

It is anticipated that some larger health boards will require a significant increase in laboratory faculties if universal screening is implemented. The changes are considered to be of a scale which would require a tendering process. The exact cost of this can not be calculated at this

time and will involve considerable analysis with the health boards in question. The tendering process takes considerable time before a contract is offered and therefore realistic timescales for National Rollout of MRSA Screening are important.

Key Summary Point

As well as physical alterations, the majority of Boards have made organisation changes to their laboratory facilities. Should universal screening be implemented then further alterations may be required in some areas.

8.29.2 Pathfinder Boards

Each of the three Pathfinder Boards have one single laboratory undertaking MRSA screening. This means that swab turnaround times include time from swab being taken, transportation to the laboratory and the test itself. Each of the Pathfinder Boards also made the physical alteration of converting office space. With regard to organisational alterations, one Board took on extra staff and additional working hours, another Board took on extra staff and also the processing of MRSA samples on the back shift was given higher priority and the remaining Board did not have to make any alterations.

Key Summary Point

Pathfinder Boards made physical and organisational alterations to their laboratory facilities in order to each achieve implementation.

8.30 Objectives 34 and 35: To assess if primary and secondary prevention measures are specified, resourced, in place and monitored in NHSScotland.

The essential primary prevention measures relating to reduction of MRSA contamination of previously MRSA-free patients are those which prevent transmission between patients. Secondary measures (i.e. those interventions aimed at controlling spread of infection once colonisation is identified) are basically the same – essentially hand hygiene, Standard Infection Control Precautions and environmental cleaning, with the addition of patient isolation (physical or functional). Table 8-4 outlines the current approaches to ensuring these primary and secondary prevention measures are specified, resourced, in place and monitored in NHSScotland

Table 8-4: Primary and secondary prevention measures for MRSA colonisation

(Key: 1 – intervention specified; 2 – resourcing arrangements; 3 – measures in place; 4 – monitoring arrangements)

	NHS Scotland	NHS Boards
Hand hygiene	1. National hand hygiene programme materials 2. Central funding for national programme 3. Running since 2007 4. National 2-monthly compliance audits	1. Local hand hygiene programmes 2. Central funding for local HH coordinators 3. Running since 2007 4. Local data for national compliance audits; Board HAI Reporting Template [19]
Standard infection control precautions	1. HPS commissioned to produce standard SICP model policies 2. No specific central funding within national HAI budget 3. Published on HPS website [20] 4. Healthcare Environment Inspectorate assessments	1. Local Board SICP policies and procedures 2. Within Board HAI budgets 3. Implementation required by NHS QIS HAI Standards 4. Healthcare Environment Inspectorate assessments
Patient isolation	1. National policy for minimum provision of single rooms in newbuilds and major refurbishments 2. Funding subsumed within capital planning 3. Policy effective from 2008 4. Plans for projects subject to individual review by SGHD	1. Local policies and procedures for isolation/cohorting – prioritisation via risk assessment 2. Funding subsumed within operational budgets 3. Pathfinder data show constraints based on room availability 4. Healthcare Environment Inspectorate assessments
Environmental cleaning	1. National Cleaning Services Specification [21] 2. No specific funding within national HAI budget 3. Mandatory application of Specification from 2004 4. National 2-monthly compliance audits (2005)	1. National Cleaning Services Specification 2. Funding within Domestic Services budget 3. Mandatory application of Specification from 2004 4. National 2-monthly compliance audits; HEI assessments[22]; Board HAI Reporting Template [19]

It is outwith the remit of the Pathfinder programme to assess or measure primary or secondary interventions or treatment in terms of full implementation, relative cost effectiveness or clinical effectiveness. There is evidence however that (for example) environmental cleaning performance and hand hygiene compliance have improved since mandatory reporting was implemented [23;24] and both show compliance by these measures in excess of 90%.

There is very limited information on quality and consistency of infection control within clinical procedures (e.g. insertion of intravascular lines). These are, however, all generic issues which are relevant to prevention and control of many infections other than MRSA, and it is difficult to attribute what portion of the resources applied would accrue to MRSA prevention. Screening for MRSA on the other hand brings no clear contribution to the prevention of non-MRSA infections, but costs can be calculated and offset against the known burden of MRSA infection.

8.31 Objective 36: To project the revenue implications for the programme post 2011

8.31.1 SGHD / boards and how much shall be required

Based on the modified HTA economic model (as decribed in section 8.26) the cost for targeted screening for one year will be £5.6 million. The costs predicted for full universal screening nationally are predicted to be between £13 and £17 million for the first year, this will include additional alterations to laboratory facilities, recruitment of additional staff to implement the programme (and move it towards business as usual) and additional consumables for testing. The model predicts a considerable year on year decrease in spend, due to the decrease in number of colonised and infected patients and therefore fewer positive tests, isolation and decolonisation.

Key Summary Point

Based on the modified HTA economic model the predicted cost of targeted screening is £5.6 million, with the predicted cost of universal screening estimated to be £13 million to £17 million. The cost of universal screening is expected to decrease year on year.

8.31.2 MRSA Reference Laboratory implications

The MRSA Reference Laboratory currently analyses all new MRSA isolates from each health board for the period of one month four times a year as part of the Snapshot Programme; the impact of MRSA Screening on the Snapshot Programme will be monitored and the programme can be adjusted if the numbers of new isolates during the snap shot period increase.

The proportion of anticipated number of new isolates in the year based on the Pathfinder project will be 1,850 for universal screening (assuming colonisation prevalence on admission of 3.9% in the first year and that the four specialties targeted within the National Rollout account for ten percent of total colonisations and within the Pathfinder study half of the isolates identified in patients who had no history of MRSA). Depending on the screening policy post January 2010, this may increase considerably. The proportion of anticipated number of new isolates in Scotland in one year based on the Pathfinder project will therefore be 18,500 for universal screening (ten times the volume of colonisation on admission will be detected by universal screening compared to targeted).

This increase will require additional funding for the reference laboratory if the current snapshot strategy is to be maintained. The snapshot programme may potentially be the only way to monitor MRSA colonisation prevalence over the long term and therefore a key recommendation will be for the SGHD to ensure compliance with the snapshot programme.

Key Summary Point

The impact of the MRSA Screening Programme on the MRSA Reference Laboratory continues to be monitored.

8.31.3 HPS in Key Performance Indicator (KPI) monitoring role

It is anticipated that HPS will continue its role in coordinating and supporting boards with any alterations to policy until the end of financial year 2010/11. In view of the performance indicators for MRSA screening outlined above, this task would be two-fold:

1. Impact on outcome of the screening programme, by
    a. MRSA bacteraemia rates using data from the existing national *Staphylococcus aureus* Bacteraemia (SAB) Surveillance Programme. This will be conducted by Health Protection Scotland and the findings included in the annual report of the SAB Surveillance Programme. This is acknowledged to be useful but not immediately sensitive to changes in overall number of MRSA infection.
    b. MRSA first clinical isolates (excluding screening samples) which are routinely reported through ECOSS to HPS. These data will allow analysis of MRSA infection before implementation of the targeted national rollout and after in the same way Pathfinder data was analysed with Volume 1 of this report [14].
2. Monitoring of the uptake of the MRSA Screening Programme. A KPI for NHS boards based on uptake of MRSA screening. Uptake will be estimated using local audit conducted on an agreed sample of patients. An outline protocol will be developed by HPS and plans for timing of the local audit and sampling strategy will be developed in Partnership with the SGHD and health boards. It will be the role of local boards to undertake the audit, and resource of this task should be found as part of the MRSA screening project teams. In order to undertake this task a resource would be continued to be required within HPS to be funded as part of the broader MRSA Screening Programme which will continue until the delivery of the special studies during 2010.

Key Summary Point

HPS are anticipated to play a role in measuring the KPIs of the MRSA Screening Programme and will require to be funded appropriately.

9 Discussion - Organisation Issues

Table 9-1: Summary of organisational issues progress

Interim Report Status	Issue	Final Report Status
Red	Risk assessment	Red
Red	Compliance is assumed to be 100%	Amber
Red	Patients admitted electively	Red
Red	The proportion of emergency patients screened on admission	Red
Red	Screening patients pre-admission	Red
Amber	Supply of decolonisation therapy to outpatients	Amber
Red	Turnaround time for reporting from sample collection to reporting	Red
Green	Delayed treatments	Green
Amber	Patients admitted to high risk and low risk specialties	Green
Red	Prevalence on admission and associated isolation of patients identified as colonised	Amber
Red	Pre-emptive isolation	Red
Red	Proportion of MRSA positive patients who receive decolonisation treatment	Red
Red	Length of stay	Red
Amber	Identifying new in-patients	Amber
Red	Patient management until MRSA screen results are reported	Red
Amber	Chromogenic agar protocol	Green
Red	High risk patients are decolonised and isolated and Low risk are isolated	Green
Amber	Legal and ethical issues of isolation	Green
Amber	Discharge testing	Amber
Amber	Decolonising all patients (potential harm from adverse reaction)	Green
Amber	Decolonising all patients (potential overuse of only licensed antibiotic for nasal decolonisation)	Amber
Green	Staff screening	Green
Red	Three isolation rooms available in each ward	Red
Red	Isolation is not always possible	Red
Green	Staff resources and training – identify role and responsibilities clearly within team	Green
Amber	Recruitment of laboratory staff	Amber
Amber	Laboratory set up and reporting	Green
Amber	Who undertakes screening?	Green

Interim Report Status	Issue	Final Report Status
Green	Awareness of screening programme in all clinical staff	Amber
Amber	Increase in screening materials	Amber
Amber	What to do with patients who have not completed decolonisation	Amber
Amber	Dealing with patients who have been missed	Amber
Amber	Limitation of 48 hours unknown colonisation status in some patients	Amber
Green	Unintended behavioural consequences of the screening programme	Green
Green	Outbreak events and other emergencies within the hospital	Green
Green	Patient information leaflets	Green
Amber	Patient management systems	Amber
Green	Increase in consumption of equipment to provide contact precautions	Green

9.1 Summary of Organisational Issues Progress

This section examines progress made on organisational issues raised as part of the Pathfinder Study.

9.1.1 Risk Assessment

Risk assessment remains a red issue. The NHS QIS HTA found that a combination of clinical risk assessment (CRA) and screening was the most clinically effective measure as it means patients can be isolated earlier. In Scotland there is no standard CRA and tools vary greatly between Boards, therefore work will be undertaken as part of the Special Studies (for which ethical approval has been received) to determine the effectiveness of CRA and the results are expected to be published in Summer 2010.

Indications from volume 1 [14] are that when CRA is done is it reasonably well applied as when you look at those pre-emptively isolated, 96% of patients were isolated either had a previous or current positive MRSA status

Key Summary Point

Further research is required into the effectiveness of CRA and this will be undertaken with the Special Studies.

9.2 Compliance is Assumed to be 100%

9.2.1 Compliance in Emergency Admission

Over the study period annual compliance was 85% [14] and this is comparable with other studies [25].

The main issue in achieving 100% compliance is identifying short stay patients and then arranging for them to be screened. Of the different approaches undertaken in the Pathfinder Boards it appears that the approach of NHS Ayrshire & Arran of ward staff screening is the most effective and it also has a shorter admission to swab time taken. Additional benefits of pursuing those not screened is questionable as 44% will be discharged within 2 days.

Key Summary Point

100% compliance was not possible within the Pathfinder Project.

9.2.2 Compliance in Elective Admissions

One quarter of elective admissions attended pre-assessment clinics. However uptake with these settings was high. Within NHSScotland there is variability between and within Boards who attends pre-assessment clinics. Attendance is dependant upon population distribution. Within the Pathfinder study screening was undertaken entirely within acute care. A more efficient model would be for patients who do not attend pre-assessment clinics to be screened (and if required prescribed decolonisation) by their GP. The benefits of this are; the GP will have full knowledge of the patient's medical history, the patient will not have to make a journey to a clinic far away from their home, which will save them time and money, meaning a better overall patient experience. For this to be implemented service redesign would be required, ensuring that adequate resourcing is available for primary care.

Key Summary Point

To improve the patient experience there should be a review of pre-screening clinics with a view to the work being carried out in primary care.

9.2.3 Decolonisation

9.2.3.1 Supply

The issue of supply of decolonisation, originally raised by Pathfinder Boards, was again raised by Targeted Rollout Boards. A meeting with the Scottish Association of Antimicrobial Pharmacists was organised in an attempt to find a common, national solution. The current situation means that different Boards are using different methods to supply decolonisation therapy to their patients. These include;

- Prepaid hospital prescription collected by a patient from the hospital clinic. The product is then collected from a community pharmacy
- Product sent to the patient's home
- Pre-paid prescription sent to the patient's home - product to be collected from a community pharmacy
- Out-patients clinics hold stock of product to be given directly to the patient via a Patient Group Directive
- GPs write the prescription and the product is then collected from a community pharmacy

These options were discussed by the antimicrobial pharmacists and the consensus was prescription by GPs was the preferred option as it is better for the patient to collect a prescription from a local community pharmacy rather than a hospital. To date this has not been undertaken by the Pathfinder Boards due to the timescales involved and so the appropriate discussions with the primary care sector have not yet taken place.

Key Summary Point

Discussions with the primary care sector should take place with a view to resolving the issue of decolonisation supply.

9.2.3.2 Standardisation

It has been generally agreed by the Targeted Rollout Boards that the preferred option is the provisions of standardised decolonisation therapy, along with nationally produced patient information. Currently Boards use a variety of bodywash products and use different patient information for nasal ointment and bodywash. The drawback of this is that it can be confusing for the patient and also means best value cannot be achieved with the procurement of the products.

The recommendation is that a review is undertaken of decolonisation products to ensure best value can be achieved and standardised patient information created.

Key Summary Point

Standardised patient information should be produced and a review undertaken of decolonisation products to ensure best value.

9.3 Turnaround Time for Reporting From Sample Collection to Reporting

The turnaround time for the screening test remains an issue with short length of stay meaning that many patients will be discharged before their results are returned. For pre-admission tests, chromogenic agar turnaround times are fit for purpose. New technologies do offer a shorter test turnaround time, however the time from admission to test and the dissemination of the test result to the ward remains constant for all test types (other than point of care testing). The model showed no significant benefit within the first three years using Polymerase Chain Reaction (PCR) due to the fact that demand for isolation facilities exceeded availability. There is no doubt that PCR both laboratory based and near patient testing offer potential within the MRSA Screening programme. The current limitations of the healthcare environment mean that there is limited availability of isolation facilities, nonetheless earlier identification could mean earlier initiated decolonisation treatment.

Key Summary Point

PCR would offer a shorter turnaround time, but the current limitations of the healthcare environment negate this.

9.4 Isolation Facilities

As discussed in Objective 19 isolation facilities are limited and in great demand. Isolation facilities are allocated according to clinical need and although SGHD policy [26] is to increase single room provision in the coming years, this will not solve the issue in the short term.

Key Summary Point

The availability of single rooms will increase in the years to come, but in the short term there will continue to be a shortage.

9.5 Proportion of MRSA Positive Patients who Receive Decolonisation Treatment

The proportion of MRSA positive patients who were decolonised was 45.2 % [27]. The majority of patients who were not decolonised were discharged before their result was known. Length of hospital stay was the most important predictor for being decolonised. Two thirds [27] of those who remained in hospital for 2 or more nights were commenced on decolonisation treatment. An outstanding issue is whether patients should be informed if they have been found to be positive post discharge. Within England policy suggests that patients who are found positive have their GP notified by the hospital, risk assessment is undertaken by the GP and decolonisation may be offered to the patient (dependant upon local policy). In order to ensure that this type of approach can be sustained GP involvement would need to be agreed upon and resourced appropriately.

Key Summary Point

Length of stay is the most important predictor for MRSA patients being decolonised.

9.6 Identifying New In-Patients

The identification of new admissions to hospital continues to be an issue as it relies upon high quality real time information being provided by patient management systems. The most effective way of identifying new patients for screening is to have ward staff carrying out the screening immediately on admission. Improved-health technology may offer solutions to some of these issues.

Key Summary Point

Ward staff carrying out screening on admission is the most effective way of identifying new in-patients.

9.7 Patient Management until MRSA Screen Results are Reported

It can be 48 hours until the MRSA status of a patient is known using chromogenic agar. Patients are nursed on an open ward until the screening result is known unless they are previously known positive. PCR would reduce this time and mean negative patients could be boarded in open ward, but there is still the issue of the limited number of isolation rooms available.

Key Summary Point

The current turnaround time for chromogenic agar means it can be 48 hours until the MRSA status of a patient is known.

9.8 Discharge Testing

The rate of cross transmission of MRSA within acute care is unknown. An understanding of the rate of cross-transmission will inform patient management, future modelling and infection control practice relating to MRSA. A Special Study (official approval for which has been given) will investigate this and is due to report in Autumn 2010.

Key Summary Point

The questions of discharge testing cannot be answered until work is carried out to establish the cross transmission of MRSA within acute care. Work to establish this is currently underway.

9.9 Decolonising all Patients (Potential Harm from Adverse Reaction)

From July 1963 until September 2008 there were a total of 62 adverse drug reaction reports, the majority of which were skin disorders [27;28]. Because of this small number of adverse reactions it seems important that those prescribing are fully aware of a patient's medical history.

Key Summary Point

It is important for the clinician prescribing decolonisation therapy to have fully knowledge of the patient's medical history to minimise the risk of an adverse reaction.

9.10 Decolonising all Patients (Potential Overuse of Only Licensed Antibiotic for Nasal Decolonisation)

During the Pathfinder study mupirocin resistance was monitored, no significant change in mupirocin resistance was found from the year previous to the Pathfinder Project commencing to the first year of the Pathfinder Project. This should continue to be monitored throughout the MRSA Programme.

Key Summary Point

No significant change in mupirocin resistance has been found to date, but this should continue to be monitored.

9.11 Recruitment of Laboratory Staff

Universal screening will require considerable laboratory staff recruitment and there may be issues in recruiting outside the central belt and so Boards should be given adequate time to resolve this issue.

Key Summary Point

Recruitment of laboratory staff to Boards outside the central belt may be challenging.

9.12 Laboratory Set up and Reporting

Within the Pathfinder study there were five factors that affected turnaround time. These were type of admission, hospital, time swab was taken, day swab was taken and the result [27]. If a patient's screen is taken after 5.00 pm or at the weekend there was a significant increase in turnaround time. Hospitals with longer shift patterns were able to attain shorter turnaround time.

Within NHS Grampian, where the shortest turnaround times were achieved, positive results were reported back on presumed positive samples and these were phoned to the ward, whereas other Pathfinder labs awaited confirmation of a positive result before reporting results. The Scottish Microbiology Forum (SMF) were consulted on this matter and responded they would not make a national recommendation for this approach and would prefer to use local discretion. While isolation may be undertaken the SMF expressed concern about cohorting or decolonising patients before their status is confirmed.

Key Summary Point

Several factors impact on the turnaround time of reporting including the time the screen has been taken and when in the week it is taken.

9.13 Increase in Screening Materials

National Procurement were contacted and advised that consumption of screening materials would increase due to the Targeted Rollout within 2009/2010. When a decision is taken on what shape MRSA screening will take in 2010/2011 National Procurement will again have to be advised if the implications for screening materials.

Key Summary Point

National Procurement contracts for MRSA screening materials should ensure best value for NHSScotland.

9.14 What to do with Patients who have not Completed Decolonisation

The majority of patients will have been discharged before they were able to receive three consecutive post decolonisation tests and so this is an important area for consideration in the context of the whole programme. The public health benefit of MRSA screening is achieved through minimising the risk whilst in hospital care, and there is reduced risk to patients when they are discharged, therefore there is questionable benefit of decolonising after discharge. However, the number of re-admissions (44% of admissions) suggests that post discharge decolonisation may be of public health benefit as fewer patients would be potentially colonised on readmission. The discharge testing study being carried out as part of the Special Studies should help inform policy development around post discharge decolonisation.

Key Summary Point

At present there is questionable benefit of decolonising patients after discharge, but the Special Studies should help to shape future guidance on this issue.

9.15 Informing Staff and Patients of MRSA Screening

9.15.1 Patients

Volume 3 [29] reports that of their sample, a third of patients reported they had enough information prior to screening and that distribution of the pilot programme MRSA screening information leaflet seemed variable. This finding appears to coincide with the recently published Healthcare Environment Inspectorate (HAI) Reports [22;27], which noted that the provision of information regarding prevention and control of infection for patients was inconsistent, with the recommendation that Boards review their procedures for the dissemination of patient leaflets.

HPS have provided Boards with national patient information leaflets about the MRSA Screening Programme and encouraged to liase with their communications teams to establish the best way of communicating this information. The national leaflet was developed according to equality and diversity protocols and also received a Crystal Mark from Plain English which assures it is written in a way which can be understood by the public. It is available in a variety of formats, including alternative languages, Braille and large print. It can be downloaded from: http://www.hps.scot.nhs.uk/haiic/sshaip/mrsascreeningprogramme.aspx

A patient information film was developed and given to the Boards with the intention of it being shown in patient areas to give information about what to expect from MRSA screening. The film can be viewed at: http://www.hps.scot.nhs.uk/haiic/sshaip/mrsascreeningprogramme.aspx

Feedback from the Pathfinder Study Technical Group suggested there is concern that information for carers of patients who have been found positive is lacking and as part of service improvement suitable information should be prepared.

9.15.2 Staff

Volume 3 [29] also reported that with regard to staff and the information they had received about the MRSA Screening Programme, 8.3% (n=18) had not received any information about the programme, and of these 4 were directly/indirectly involved in screening and another 13 were in occupations with a high level of patient care.

Awareness events have been run locally and where required HPS have provided support. Feedback from Boards suggest the events have helped to achieve the overall aim of informing all staff groups of the introduction of targeted screening and its impact on their clinical areas.

HPS will also supply Boards with pop-up banners which will be placed in high-traffic areas of hospitals to also raise awareness amongst staff.

Key Summary Point

A variety of national information materials have been produced and passed to Boards to communicate the implications of the MRSA Screening programme, however there is a general issue of ensuring these materials reach their intended audience and this cannot be controlled from a national level.

10 Issues Arising from Universal Screening and Targeted National Rollout

This section addresses the organisational issues outlined in the Interim Report and gives an update on the work which has continued to resolve them since the Interim Report.

10.1 Screening

With targeted screening there is the issue that patients take a variety of routes through hospital before they reach their destination wards. This means there is the potential for patients either being missed or wards containing a mixture of patients who have and have not been screened. This would be overcome if there was universal screening.

Key Summary Point

Universal screening would solve the issue of wards containing a mixture of patients, some of whom have been screened and some who have not.

10.2 Legal and Ethical Issues

With targeted screening there is the risk that a patient who is not being treated in one of the chosen specialties becomes infected with MRSA and the negative impact of infection the question may be asked if they had of been screened, would this have been prevented. There is an organisational risk that partial screening does not provide each admission with an equitable service and the policy is based upon perceived risk.

Currently three Boards have implimented universal screening. Two if these Boards will undertake special studies during 2010 and all of the Pathfinder Boards will continue universal screening until a policy decision has been made for all NHSScotland. If the National Rollout remains targeted, a decision will have to be made as to whether the Pathfinder Boards continue with universal screening and continue to gather additional information on MRSA. This would mean that there are two different MRSA screening strategies within NHSScotland.

Key Summary Point

A decision will have to be made as to whether the Pathfinder Boards continue with universal screening. Universal screening throughout NHSScotland would remove the current inequity of targeted screening.

10.3 Staff and Resourcing Issues

With targeted screening there is scope for confusion for staff as they attempt to determine if the patient falls within one of the categories that means they need to be screened. Humphreys suggests that the Netherlands, a country with very low MRSA prevalence rates, has the simplest set of guidelines and suggest that the success in their control of MRSA could be related to the clarity of their guidelines [30].

The Pathfinder Boards consider that universal has been positive and have concerns about cutting back on screening practice.

Key Summary Point:

Targeted screening has the potential for staff confusion due to the categories of which patients should and should not be screened. Universal screening would solve this issue and also means it can be applied with simple guidance.

10.4 Staff Screening

It is possible that there will be public pressure to expand the MRSA screening programme to include the routine screening of health care workers (HCWs). One of the key findings from the acceptability study conducted as part of the Pathfinder Programme [29] was that there is strong support for the screening of NHS staff from patients, their visitors, the wider community, and NHS staff themselves. Similarly, in a recent survey of 260 UK doctors attending two national conferences, 63% of participants were in support of routine medical staff screening for MRSA [31].

Current UK guidelines [5] recommend the use of staff screening in certain situations e.g. to assist in outbreak investigation; and recommendations for targeted MRSA screening of HCWs have been made elsewhere [32-36]. With regard to the routine screening of healthcare workers, however, a recent literature review conducted by HPS found no published controlled studies examining the impact of routine staff screening as an intervention in the prevention and control of MRSA infections in the endemic setting [3]. The literature review concluded that further research is required to clarify the role of the colonised HCW in the transmission of MRSA and the effectiveness of staff screening as an infection control measure. Similar calls for further research have been made elsewhere [2;37].

A number of practical and ethical issues relevant to the implementation of routine staff screening have also been raised in the literature [5;34;36-41]; these include:

- The optimum timing and frequency of staff screening
- The optimum treatment regime for colonised staff
- Whether, and for how long, colonised staff should be excluded from work
- The potential impact of staff exclusions on staffing levels

- The financial costs of providing cover for excluded staff
- The potential psychological impact on colonised staff
- The potential stigmatisation of colonised staff
- The management of staff found to be persistently colonised despite treatment, and the occupational consequences for these staff
- Whether screening and decolonisation should be extended to the families of colonised staff to prevent re-colonisation
- The management of staff who refuse to be screened or treated

Key Summary Point

The issue of routine staff screening is a topic of much debate. There is evidence to suggest that routine staff screening is, in principal, acceptable to both patients and NHS staff. However, before any recommendation can be made to introduce routine screening across NHSScotland, further research is required to determine its clinical and cost effectiveness as an infection control measure; and the related ethical and practical issues would need to be considered and addressed in full.

10.5 Implementation Issues

Several Boards encountered delays with initiating recruitment as a number of roles were new posts and therefore were required to gain Agenda for Change approval before being advertised. Where possible Pathfinder board job descriptions were shared, however turnaround time for recruitment was variable across Scotland. Contingencies put in place included making use of bank staff and offering current staff to increase their working hours.

Key Summary Point

Staff recruitment can take a substantial period of time to complete and this has the potential to negatively impact on achieving compliance with MRSA screening.

11 Summary of Findings

This balance sheet outlines the findings from the other three volumes of this final report [27].

Table 11-1: Comparison of current policy of targeted screening and universal screening

For Universal Screening	Against Universal screening
Generally acceptable to patients and public	Additional initial capital investment for laboratory alterations and equipment
Generally acceptable to staff	Additional investment in consumables over five years
Statistically significant reduction in colonised patients as observed within Pathfinder study	Requirement for additional health board staff to implement and maintain universal screening
Statistically significant reduction in patients with infection as observed within Pathfinder study	Short length of stay make interventions difficult
Avoidance of damage and distress	Demand for facilities makes isolation difficult
Decrease in use of isolation facilities for MRSA over time therefore available for other HAI	Chromogenic agar turn around times combined with short length of stay makes intervention for short stay patients difficult
Equitable for all patients	Monitoring of effectiveness at national level will require additional resources over next five years
Practical to implement as all patients undergo same admission protocol	
Decrease in costs over 5 years as projected by model	
Considerable cost attributable to MRSA infection without screening	

On balance it appears that the additional cost of universal screening will be £15 million pounds per year, the total number infections potentially avoided (if we were able to maintain the annual decrease observed within the Pathfinder hospitals) it is estimated that over five years universal screening of all overnight admissions would prevent 15,000 infections. There are costs associated with each of these infections in terms of additional length of stay, additional treatment costs and resources associated with follow-up in primary care. Costs to patients and their carers would also be incurred. Targeted screening would prevent a proportion of these 15,000 infections; however, the magnitude of this proportion is not yet quantifiable.

12 Recommendations

- National policy decisions on MRSA screening need to balance clincal effectiveness with value for money in the context of overall healthcare expenditure
- Information gathered during the Special Studies on cross transmission and clincal risk assessment should help to inform decision making
- Guidelines should be created for:
  - Decolonisation and identification of negative MRSA status
  - Completion of decolonisation therapy post discharge
  - The role of new technologies in reducing the risk of transmission of colonisation and infection
- A training package should be created for staff on how to isolate, cohort and separate patients
- The primary care sector should be engaged with regard to them potentially carrying out MRSA screening and prescribing decolonisation therapy
- A general leaflet about MRSA for patients and their carers should be created
- A leaflet for the primary care section with information about how to screen and decolonise should be created
- The impact of MRSA screening on waiting times should be monitored as Boards work towards the 18 week RTT target
- If universal screening is introduced it should be implemented following the five clinical effectiveness and quality improvement criterions which were set out by NHS Quality Improvement Scotland as part of the Safe and Effective Care and Service standards [42]
- If screening is increased, the timescale involved should allow for:
  - Adequate planning at a national level
  - Staff recruitment to the Boards
  - Engagement with other bodies e.g. NHS 24, GPs and Pharmacy
  - The process of tendering and then carrying out physical alterations to laboratories

13 Limitations

- The model suggested that while significant reduction to MRSA colonisation and infection can be achieved within three to five years this trend is not linear and there may be a point where due to facilities no further reduction can be achieved.
- Length of stay is reducing and this affects the patient population who can be identified decolonised and isolated.
- Isolation facilities are limited and the effectiveness of the screening strategy depends on the reduction in cross transmission by isolation of patients.
- Some targeted screening is currently underway, however uptake is poor and application is not consistent.
- Involvement with primary care within the Pathfinder study was limited, however it is acknowledged that to improve both compliance and the quality of service to patients this should be developed further.
- GPs are not funded currently to support screening, decolonising or repeat testing patients, although this is the preferable option for patients.
- Within NHS Scotland there are a range of rural and urban health boards, some adaptations to protocols may be required in order to provide the best service to patients.
- The potential additional workload is of concern to GPs.
- MRSA patients are not followed up in community and decolonised.
- Effectiveness of decolonisation is not known.
- Costing is based on the assumption that all other health boards in Scotland have similar MRSA colonisation prevalence to the Pathfinder boards.
- Costing is based on staffing requirements required for the Pathfinder study (excluding the data collection resource) and the targeted National Rollout bids which were based on the HPS ready reckoner and local amendments made.
- Costing for alterations to laboratory facilities is approximate and final costs will only be confirmed when National Rollout is announced and quotes for buildings work are received.
- Predictions for costing include overhead costs calculated by NHS QIS, staff salaries are based on current AFC bandings.

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15 Acronyms

Table 15-1: Acronyms used within this document

Acronym	Expanded Acronym
AFC	Agenda for Change
BMS	Biomedical Scientist
CRA	Clinical Risk Assessment
GP	General Practitioner
HAI	Healthcare Associated Infection
HCW	Healthcare Worker
HTA	Health Technology Assessment
HPS	Health Protection Scotland
ICU	Intensive Care Unit
ISD	Information Services Division
IT	Information Technology
KPI	Key Performance Indicator
MRSA	Meticillin Resistant *S. aureus*
MLA	Medical Laboratory Assistant
NES	National Education for Scotland
NHS	National Health Service
NWTC	National Waiting Times Centre
PCR	Polymerase Chain Reaction
PM	Project Manager
PRINCE2	Projects In A Controlled Environment
QIS	Quality Improvement Scotland
SGHD	Scottish Government Healthcare Directorate
SOP	Standard Operating Procedure
TAT	Turnaround Time
TB	Tuberculosis

16 Glossary

Acute hospital: Hospitals in Scotland are classified as acute hospitals and non-acute hospitals. Acute hospitals were defined using the classification proposed by ISD. Acute hospitals provide a wide range of specialist care and treatment for patients. Typically, services offered in the NHS acute sector are diverse. They include: consultation with specialist clinicians (consultants, nurses, dieticians, physiotherapists and a wide range of other professionals); emergency treatment following accidents; routine, complex and life saving surgery; specialist diagnostic procedures; and close observation and short-term care of patients with worrying health symptoms.

Admission: Occurs when an inpatient occupies an available staffed bed in a hospital and remains overnight whatever the original intention. See Inpatient definition for more details.

Admission screen: Left and right nostrils using a single nasal swab, this will be undertaken by hospital staff on or as soon after admission as is possible according to local protocols.

Admission types – emergency or unplanned: For clinical reasons, a patient is admitted at the earliest possible time, usually immediately, after seeing a doctor - the patient will not necessarily be admitted via an accident and emergency department.

Admission types – routine, planned or elective: All admissions where the patient is admitted as planned are termed "routine". In most cases patients are admitted directly from their home for inpatient or day case treatment following a period on the waiting list.

Anterior: Situated before or towards the front.

Antibiotic: A substance that kills or inhibits the growth of bacteria. They are used to treat or prevent infection.

Antimicrobial: A general term that covers all medicines that kill or inhibit the growth of microorganisms such as bacteria, fungi or viruses.

Antiseptic: A substance that inhibits the growth and survival of microorganisms that is usually only applied externally.

Assessment: A scientific process of examining and reporting properties of a technology used in health care, such as safety, efficacy, feasibility and indications for use, cost and cost-effectiveness, as well as social, economic and ethical consequences.

Audit: The process of setting and adopting standards and measuring performance against those standards with the aim of identifying both good and bad practice.

Bias: In general, any factor that distorts the true nature of an event or observation. In clinical investigations, a bias is any systematic factor other than the intervention of interest that affects the magnitude of (i.e. tends to increase or decrease) an observed difference in the outcomes of a treatment group and a control group. Bias diminishes the accuracy (though not necessarily the precision) of an observation. Randomization is a technique used to decrease this form of bias. Bias also refers to a prejudiced or partial viewpoint that would affect someone's interpretation of a problem. Double blinding is a technique used to decrease this type of bias.

Boarder: A patient who is under the care of a specialty not usually attendant on the ward.

Body site: Area of the patients' body where a swab sample is taken from.

Capture rate: The proportion of patient admissions who are screened compared with the total number of admissions.

Clinical effectiveness: The extent to which a specific intervention, procedure, regimen, or service does what it is intended to do under ordinary circumstances, rather than controlled conditions. Or more specifically, the evaluation of benefit to risk of an intervention, in a standard clinical setting, using outcomes measuring issues of importance to patients (e.g. ability to do daily activities, longer life, etc.).

Clinical governance: Ensures that patients receive the highest quality of care possible, putting each patient at the centre of his or her care. This is achieved by making certain that those providing services work in an environment that supports them and places the safety and quality of care at the top of the organisation's agenda. Management of clinical risk at an organisational level is an important aspect of clinical governance. Clinical risk management recognises that risk can arise at many points in a patient's journey, and that aspects of how organisations are managed can systematically influence the degree of risk.

Clinical pathway: A multidisciplinary set of daily prescriptions and outcome targets for managing the overall care of a specific type of patient, e.g. from pre-admission to post-discharge for patients receiving inpatient care. Clinical pathways often are intended to maintain or improve quality of care and decrease costs for patients in particular diagnosis-related groups.

Cohorting: Patient is placed in a room and cared for by dedicated nursing staff along with other patients who are (in the context of this programme):

a. known to be MRSA colonised positive due to admission test result.

b. known to be MRSA colonised positive due to pre-assessment clinic test result.

c. known to be MRSA infection positive as a result of a laboratory confirmed infection.

d. known to be MRSA positive from a previous MRSA positive result (pre-emptive isolation until shown to be negative by appropriate screen result).

Cohorting can be undertaken for any other pathogen not just MRSA. Cohorting should be undertaken according to the HPS infection control Contact Precautions Policy and Procedure see http://www.hps.scot.nhs.uk/haiic/ic/guidelinedetail.aspx?id=37303.

Cohort study: An observational study in which outcomes in a group of patients that received an intervention are compared with outcomes in a similar group i.e. the cohort, either contemporary or historical, of patients that did not receive the intervention. In an adjusted- (or matched-) cohort study, investigators identify (or make statistical adjustments to provide) a cohort group that has characteristics (e.g. age, gender, disease severity) that are as similar as possible to the group that experienced the intervention.

Colonisation: MRSA is present on any body site without causing any infection or adverse effect to the individual.

Community acquired MRSA: Describes a number of strains of MRSA which are seen in individuals who would not normally be expected to acquire MRSA. These strains can both colonise and/or infect patients. These strains are found in patients who have not recently been in hospital, undergone surgical procedures or prolonged treatment with antibiotics. They are associated with individuals who have close living and physical contact with others, e.g. athletes involved in contact sports. Some countries have seen these strains with hospitals. Not all MRSA strains are clearly categorised in CA-MRSA and HA-MRSA.

Community associated MRSA infection: A laboratory confirmed MRSA positive clinical sample is taken <48 hours after admission and patient shows signs or symptoms according to CDC infection criteria. This will include all MRSA strains regardless of where it was acquired. The definition relates to the location where the infection became prevalent.

Consent: If a patient agrees to have a nasal swab taken in a pre-assessment clinic or on admission implied consent is given. Patients are free to decline consent. This must be recorded as an indicator of acceptability of the nasal screening process. If a patient is unable to give consent, pathfinder hospitals should follow local policy.

Contact precautions: Techniques used in infection prevention and control to prevent person to person contact and spread of pathogens.

Control (s):

1. [In a controlled trial:] A participant in the arm that acts as a comparator for one or more experimental interventions. Controls may receive placebo, no treatment, standard treatment, or an active intervention, such as a standard drug.
2. [In a case-control study:] A person in the group without the disease or outcome of interest.
3. [In statistics:] To adjust for, or take into account, extraneous influences or observations.

Cost-benefit analysis: A comparison of alternative interventions in which costs and outcomes are quantified in common monetary units.

Cost-consequence analysis: A form of cost-effectiveness analysis in which the components of incremental costs (of therapies, hospitalization, etc.) and consequences (health outcomes, adverse effects, etc.) of alternative interventions or programs are computed and displayed, without aggregating these results (e.g. into a cost-effectiveness ratio).

Cost effectiveness analysis: A comparison of alternative interventions in which costs are measured in monetary units and outcomes are measured in non-monetary units, e.g. reduced mortality or morbidity.

Critical appraisal: The process of assessing and interpreting evidence by systematically considering its validity, results and relevance.

Day case: A patient who makes a planned attendance to a specialty for clinical care sees a doctor or dentist or nurse (as the consultants' representative) and requires the use of a bed or trolley in lieu of a bed. The patient is not expected to, and *does not*, remain overnight. Many of these patients require anaesthesia. (These patients are excluded from the pathfinder project)

Decolonisation: Treatment designed to reduce the burden of MRSA colonisation on a patient known to be MRSA positive. This will be undertaken according to local protocols for decolonisation.

Deferred admission: Patients who, when first placed on a waiting list, were under either social or medical constraints which affected their ability to accept an admission date if offered. Examples specific to this programme are: Patients who are not medically ready for admission, due to a condition other than that requiring treatment, where the time taken to become medically fit would delay admission relative to the normal waiting time for that treatment, e.g. a hip replacement which is delayed because the patient is considerably overweight; an operation which is delayed because the patient is found to have a heart arrhythmia which needs treating by a Cardiologist or a patient for whom it is considered better to attempt decolonisation of MRSA carriage before their planned procedure is undertaken.

Deferred admission: Patients who, when first placed on a waiting list due to either MRSA screen or infection a decision has been made to delay their admission due to their MRSA status.

Discharge: An inpatient discharge marks the end of an inpatient episode of care and occurs when the patient:

- Is discharged to a location external to the NHS.
- Is transferred to another NHS hospital.
- Dies.

Hence inpatient discharges include deaths and inpatient transfers-out.

Economic evaluation: The comparative analysis of alternative courses of action, in terms of their costs and consequences.

Economic model: In healthcare, a mathematical model of the patient pathway that describes the essential choices and consequences for the interventions under study and can be used to extrapolate from intermediate outcomes to long-term outcomes of importance to patients.

Elective or planned admission: A patient who has been admitted at a pre-arranged time for a planned procedure. Elective patients attending a pre-assessment clinic should have had a swab taken at the clinic and undergone a decolonisation procedure before admission and MRSA status should be known on admission. Elective patients not attending a pre-assessment clinic should be screened on admission.

Emergency or unplanned admission: A patient who has been admitted without a pre-assessment appointment. These patients will include urgent GP referrals, accident and emergency patients, clinical referrals.

Empirical: Empirical results are based on experience (or observation) rather than on reasoning alone.

Endemic: Something peculiar to a particular people or locality, such as a disease which is always present in the population.

Endemic MRSA: Describes the strains of MRSA which is present within the population.

Epidemic MRSA (EMRSA): A level of MRSA in the population which is significantly greater then usually present over a short period of time.

Epidemiology: The study of the occurrence, distribution and control of infectious and non infectious diseases in populations. This is a key part of public health medicine.

Equilibrium colonisation rate: A rate of spread at which the overall level of colonisation in a population stays the same.

Evaluation research: Various research methods that are used to assess a program, agency, policy, etc., particularly with respect to elements such as organization, processes, outcomes and utility.

Formative evaluation: An ongoing review to describe and analyse how an activity is carried out and to interpret the outcomes. It is valuable in helping those directly involved in the activity to assess its strengths and weaknesses and the changes required to improve its effectiveness.

GROS (General Register Office for Scotland): Part of the devolved Scottish Administration. It is responsible for the registration of births, marriages, civil partnerships, deaths, divorces, and adoptions. It runs the Census and uses Census and other data to publish information about population and households. It is the main source of family history records.

Guidelines: A systematically developed statement to assist practitioner and patient decisions about appropriate health care for one or more specific clinical circumstances. The development of clinical practice guidelines can be considered to be a particular type of HTA; or, it can be considered to be one of the types of policymaking that is informed or supported by HTA.

Hospital Associated MRSA infection: A laboratory confirmed MRSA clinical sample is taken >48 hours after admission and patient shows signs or symptoms according to the CDC Nosocomial infection definition criteria.

Healthcare Associated MRSA infection: An MRSA infection which is generally associated with healthcare, but not necessarily attributed to a particular hospital admission.

Health Protection Scotland (HPS): Health Protection Scotland (HPS) was established by the Scottish Government in 2005 to strengthen and co-ordinate health protection in Scotland. HPS plan and deliver effective and specialist national services which co-ordinate, strengthen and support activities aimed at protecting all the people of Scotland from infectious and environmental hazards. This is done by providing advice, support and information to health professionals, national and local government, the general public and a number of other bodies that play a part in protecting health. Website address: http://www.hps.scot.nhs.uk/

HEAT: Local Delivery Plans set out a delivery agreement between the Scottish Executive Health Department and each NHS area board, based on the key Ministerial targets. Local Delivery Plans reflect the HEAT Core Set - the key objectives, targets and measures that reflect Ministers' priorities for the Health portfolio. The key objectives are as follows:

- Health Improvement for the people of Scotland - improving life expectancy and healthy life expectancy;
- Efficiency and Governance Improvements - continually improve the efficiency and effectiveness of the NHS;
- Access to Services - recognising patients' need for quicker and easier use of NHS services; and
- Treatment Appropriate to Individuals - ensure patients receive high quality services that meet their needs.

High risk specialties: Specialties within which admitted patients are considered to be exposed to a high level of risk of contracting an MRSA infection or treat more vulnerable patients.

Incidence: The number of new cases of an illness in a defined population during any defined period.

Incremental cost effectiveness ratio: The additional cost of the more expensive intervention as compared with the less expensive intervention divided by the difference in effect or patient outcome between the interventions, e.g. additional cost per *QALY*.

Infection prevention and control measures: These include isolating, cohorting and decolonisation where appropriate, with the ultimate aim of minimising the risk of patients infecting themselves or infecting/colonising others as a result of their colonisation status.

Inpatient: Patients who are admitted to an acute speciality and who stay overnight. These patients would be included in ISD overnight returns.

Internal validity: The extent to which the findings of a study accurately represent the causal relationship between an intervention and an outcome in the particular circumstances of that study. The internal validity of a trial can be suspect when certain types of biases in the design or conduct of a trial could have affected outcomes, thereby obscuring the true direction, magnitude, or certainty of the treatment effect.

Invasive devices: Any device which temporarily is inserted into the body. These include: peripheral vascular catheters (PVCs); central vascular catheters (CVCs); urinary catheters; and ventilators.

Isolation: Patient is placed in a single room with hand washing facilities, ideally with en-suite toilet and shower where available. Isolation should be undertaken according to the HPS Infection Control Contact Precautions Policy and Procedure see http://www.hps.scot.nhs.uk/haiic/ic/guidelinedetail.aspx?id=37303.

Likelihood ratio:

1. Compares the chance of positive (or negative) test results in those with the disease to the chance in those without the disease. The likelihood ratio for a positive test result is sensitivity/(1 minus specificity). The likelihood ratio of a negative test result is (1 minus sensitivity)/specificity.
2. A statistical indicator comparing the adequacy of two related models to data, allowing hypothesis testing in a large number of situations.

Low risk specialties: Specialties within which admitted patients are considered to be exposed to a low level of risk of contracting an MRSA infection.

Mean: The average value, calculated as the sum of all observed values divided by the total number of observations.

Median: The middle observation when data have been arranged in order from lowest to highest value.

Meticillin: An antibiotic related to the penicillin class used in the identification of MRSA.

Meticillin Resistant Staphylococcus aureus (MRSA): Strain of the bacterium *Staphylococcus aureus* which is resistant to the antibiotic meticillin.

MRSA infections: Infection will be defined as an MRSA positive sample and associated signs or symptoms according to the Centre for Disease Control (CDC) criteria.

Meticillin sensitive Staphylococcus aureus (MSSA): Strain of the bacterium *Staphylococcus aureus* which is not resistant to the antibiotic meticillin.

Model: A simplified yet accurate representation of a program or intervention based on a set of assumptions.

Mupirocin: An antibiotic used in a nasal cream to decolonise patients colonised with microorganisms including MRSA from the nose.

Nares: Nostrils.

Negative predictive value: Is the proportion of patients with negative test results who are correctly diagnosed as negative.

NHS QIS: See NHS Quality Improvement Scotland.

NHS Quality Improvement Scotland (NHS QIS): NHS QIS was established in 2003 and leads the use of knowledge to promote improvement in the quality of healthcare for the people of Scotland. It performs four key functions: providing advice and guidance on effective clinical practice; setting standards; driving and supporting implementation of improvements in quality; and assessing the performance of the NHS, reporting and publishing the findings.

In addition, NHS QIS also has central responsibility for patient safety and clinical governance across NHS Scotland. Website address: http://www.nhshealthquality.org.

NHS board: There are 22 NHS boards of two types: 14 territorial boards responsible for healthcare in their areas and eight special health boards which offer support services nationally.

Nosocomial MRSA Infections or Healthcare Associated MRSA Infections: A laboratory confirmed MRSA clinical sample is taken >48 hours after admission and patient shows signs or symptoms.

Opportunity cost: The amount that could be spent on alternative healthcare strategies if the health technology in question was not used.

Outcomes: Components of patients' clinical and functional status after an intervention has been applied.

Patient care pathway: A plan of care that outlines key activities within specified times. The pathway follows the patients' journey of care.

Patient journey: The pathway through the health services taken by the person who is receiving treatment, and as viewed by that person.

Peer review: The process by which manuscripts submitted to health, biomedical, and other scientifically oriented journals and other publications are evaluated by experts in appropriate fields (usually anonymous to the authors) to determine if the manuscripts are of adequate quality for publication.

Personal protective equipment (PPE): Items as gloves, gowns, medical masks, or eye protection (such as a face shield, goggle, or visor).

Point Prevalence: The ratio of the total number of cases of an event in a population at a particular point in time compared with the total population at the same point in time.

Policy: The highest level statement of intent and objectives within an organisation. A policy can also be a required process or procedure within an organisation.

Polymerase chain reaction (PCR): A laboratory method for detecting the genetic material of an infectious disease agent in specimens from patients. This type of testing has become an essential tool for detecting infectious disease agents.

Population register: A data collection system in which characteristics of all or part of a population are recorded over time.

Positive predictive value: Or precision rate, or post-test probability of disease, is the proportion of patients with positive test results who are correctly diagnosed as positive. It is the most important measure of a diagnostic method as it reflects the probability that a positive test reflects the underlying condition being tested for. Its value does however depend on the prevalence of the disease, which may vary.

Post decolonisation test: MRSA screening for decolonisation should take place at least 2 days after the cessation of the decolonisation treatment. This requires 3 sets of nasal swabs taken with at least two days elapsing between each sample being taken.

Pre-admission clinic: Clinic attended by patients prior to admission where they are screened for MRSA. This will include pre-admission clinics and outpatient clinics.

Pre-admission screening: This will be undertaken before patients are admitted.

Pre-emptive isolation: Where patients are known to have been MRSA positive previously and are isolated on admission.

Probability distribution: Portrays the relative likelihood that a range of values is the true value of a treatment effect (or other outcome or result). This distribution may follow the form of a particular function, e.g., a normal, chi square, binomial, or Poisson distribution. An estimate of the most likely true value of the treatment effect is the value at the highest point of the distribution. The area under the curve between any two points along the range gives the probability that the true value of the treatment effect lies between those two points. Thus, a probability distribution can be used to determine an interval that has a designated probability (e.g. 95%) of including the true value of the treatment effect.

Prospective study:

1. In evaluations of the effects of healthcare interventions, a study in which people are divided into groups that are exposed or not exposed to the intervention(s) of interest before the outcomes have occurred. Randomized controlled trials are always prospective studies and case control studies never are. Concurrent cohort studies are prospective studies, whereas historical cohort studies are not (see cohort study), although in epidemiology a prospective study is sometimes used as a synonym for cohort study.
2. A study in which the investigators plan and manage the intervention of interest in selected groups of patients. As such, investigators do not know what the outcomes will be when they undertake the study.

Protocol: The plan or set of steps to be followed in a study. A protocol for a systematic review should describe the rationale for the review; the objectives; and the methods that will be used to locate, select and critically appraise studies, and to collect and analyse data from the included studies.

Quality assurance (QA): Activities intended to ensure that the best available knowledge concerning the use of health care to improve health outcomes is properly implemented. This involves the implementation of health care standards, including quality assessment and activities to correct, reduce variations in, or otherwise improve health care practices relative to these standards.

Randomised controlled trials (RCT): An experiment of two or more interventions in which eligible people are allocated to an intervention by randomization. The use of randomization then permits the valid use of a variety of statistical methods to compare outcomes of the interventions.

Retrospective study: A study in which investigators select groups of patients that have already been treated and analyze data from the events experienced by these patients. Retrospective studies are subject to selection bias because investigators can select groups of patients with known outcomes or exposures or that are otherwise not truly representative of the broader population of interest. Case control studies are always retrospective, cohort studies sometimes are, randomized controlled trials never are.

Review: A review article in the medical literature which summarises a number of different studies and may draw conclusions about a particular intervention. Review articles are often not systematic. Review articles are also sometimes called overviews.

Risk: The risk is the ratio of people with an event in a group to the total in the group.

Risk assessment: The qualitative or quantitative estimation of the likelihood of adverse effects that may result from exposure to specified health hazards or from the absence of beneficial influences.

Risk factor: An aspect of a person's condition, lifestyle or environment that increases the probability of occurrence of a disease. For example, cigarette smoking is a risk factor for lung cancer.

Risk management: bA systematic approach to the management of risk, staff and patient/client/user safety, to reducing loss of life, financial loss, loss of staff availability, loss of availability of buildings or equipment, or loss of reputation. Risk management involves identifying, assessing, controlling, monitoring, reviewing and auditing risk.

Screening: A public health service in which members of a defined population, who do not necessarily perceive they are at risk of a disease or its complications, are asked a question or offered a test, to identify those individuals who are more likely to be helped than harmed by further tests or treatment.

Selection: The non-random survival and reproduction of an organism which alters the frequency of occurrence of a particular gene and therefore trait in that organism.

Sensitivity: The ability of a test to detect a disease when it is present.

Sensitivity analysis: A means to determine the robustness of a mathematical model or analysis (such as a cost-effectiveness analysis or decision analysis) that tests a plausible range of estimates of key independent variables (e.g. costs, outcomes, probabilities of events) to determine if such variations make meaningful changes the results of the analysis. Sensitivity analysis also can be performed for other types of study; e.g. clinical trials analysis (to see if inclusion/exclusion of certain data changes results) and meta-analysis (to see if inclusion/exclusion of certain studies changes results) (INAHTA).

Separated: Patients who have the same MRSA status i.e. are:

a. known to be MRSA colonisation positive due to admission test result
b. known to be MRSA colonisation positive due to pre-assessment clinic test result
c. known to be MRSA infection positive as a result of a laboratory confirmed infection
d. known to be MRSA positive from a previous MRSA positive result (pre-emptive isolation)

Are housed within the same room as patients who are not MRSA positive but are separated by at least 3 feet from any adjacent persons by use of: cubicles or use of closed bed curtains. This is considered to be a step down from full cohorting. These patients do not have separate nursing staff.

Specificity: The ability of a test to indicate non-disease when no disease is present.

Standard operating procedure: Detailed, written instructions to achieve uniformity of the performance of a specific function.

Standard precautions: A group of infection prevention practices that apply to all patients, regardless of suspected or confirmed diagnosis or presumed infection status. Standard Precautions are a combination and expansion of Universal Precautions and Body Substance Isolation. Standard Precautions are based on the principle that all blood, body fluids, secretions, excretions (except sweat), non-intact skin, and mucous membranes may contain transmissible infectious agents. Standard Precautions include hand hygiene, and depending on the anticipated exposure, the use of gloves, gown, mask, eye protection, or face shield. Also, equipment or items in the patient environment likely to have been contaminated with infectious fluids must be handled in a manner to prevent transmission of infectious agents (e.g. wear gloves for handling, contain heavily soiled equipment, and properly clean and disinfect or sterilize reusable equipment before use on another patient).

Stochastic model: A model or equation that incorporates a random variable.

Summative evaluation: A review designed to judge the effectiveness of an activity in terms of its outcomes and impact. The focus may be on measuring outcomes and quantifying costs and benefits. It is often carried out at the end of a process.

Surveillance: The ongoing, systematic collection, analysis and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know.

Systematic review: A review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyse data from the studies that are included in the review.

Turnaround time: The time interval between taking the nasal swab until the result is reported on the laboratory system for action by the ward.

Universal screening: Every eligible patient admitted to the hospital in question is screened either before admission or on admission.

17 Appendix 1: Laboratory protocol for Chromogenic agar screening method

17.1 Background

As indicated in CEL 55 [1] screening for MRSA carriage is to be instituted in all Scottish hospitals. The HTA NHS QIS publication 'The clinical and cost effectiveness of screening for meticillin-resistant *Staphylococcus aureus* (MRSA) 2007' indicated chromogenic agar as the most cost effective screening method . Whilst some NHS laboratories might choose to move to other technologies chromogenic agar remains at the core of the programme pending further analysis of alternative methods in an updated run of the HTA model.

This SOP is produced following discussion between representatives on the pathfinder project and SMF.

17.2 Swabs

- Swabs for sample collection are those routinely provided by the laboratory. Further guidance on swab type may be forthcoming on completion of a special study assessing different swab types available.

17.3 Culture

- Direct plating* onto chromogenic agar e.g. Oxoid Brilliance, Biorad MRSAselect.
- NB the Pathfinder Boards have experience with Oxoid Brilliance. If alternative chromogenic agars are being used then local validation needs to be undertaken to ensure there is equivalence with OB
- Plating out should achieve single colonies.

** a separate special study will be conducted on the use of enrichment media , until that study reports use of enrichment culture is not recommended as part of the protocol.*

17.4 Incubation

- Plates must be incubated for a minimum of 18 hours before a negative result is reported. Positive results may be available earlier.

17.5 S. aureus identification

Colonies meeting the criteria for MRSA should be tested using local procedures for identifying presumptive *S. aureus* e.g. latex test / coagulase test direct from the chromogenic agar.

17.6 Confirmation: identification and sensitivity testing of MRSA

Confirmatory tests using local standard laboratory methods should be carried out on MRSA screen positive bacterial isolates from :

- Newly identified patients
- Patients previously known to be MRSA positive but who have had three negative screens or no MRSA isolated/reported for over 1 year.

e.g. DNase plate, Vitek 2 id card etc

Where alternative methods are used to screen for MRSA carriage equivalent epidemiological and sensitivity data should be collected.

All new isolates of MRSA from screening results should have an extended antibiogram performed using the VITEK 2 *S. aureus* card.

17.7 Reference laboratory referral

Screening isolates should only be referred to the MRSA reference laboratory as part of the ongoing snapshot programme or for unusual/ difficult strains as per the reference laboratory referral protocol.

18 Appendix 2: Protocol for MRSA Screening National Rollout in Scotland

18.1 Introduction

18.1.1 Background

In April 2009, the Scottish Government Health Directorate (SGHD) announced the implementation of a National MRSA Screening Programme in Scotland. The policy was based on the interim report of the MRSA Screening Pathfinder Programme published in April 2009 [3]. The policy states that all elective admissions and emergency admissions to care of the elderly, nephrology/renal, dermatology and vascular surgery specialties should be screened for MRSA. The report presented interim findings of a programme of work to implement the findings of the NHS QIS HTA which recommended universal screening of all patients using chromogenic agar laboratory test as the most clinical and cost effective strategy to reduce cross transmission and infection of MRSA.

18.1.2 Aims of Screening

The aim of screening patients for MRSA is to identify patients that are colonised or infected with the organism. These patients can then be managed appropriately to reduce the risk of self-infection and of transmitting the organism to other patients.

These measures aim to reduce the negative impact that MRSA has on patients and the additional burden on healthcare resources.

18.1.3 Purpose of this Document

The purpose of this document is to provide NHS Boards with the information and protocols required to carry out MRSA screening as required by the SGHD.

18.1.4 Who should be screened?

1) All elective patients that are planned to be admitted and are expected to stay overnight should be screened. Elective patients should be screened at a pre-admission or out-patient clinic, where possible, or on admission to hospital. If elective patients are not screened pre-admission they should be treated using the same protocol for emergency admissions. The complete patient pathway for patients attending pre-admission clinics is presented in Flowchart 18.2. The complete patient pathway for elective patients that do not attend pre-admission clinics is included in Flowchart 18.3.

2) All emergency patients that have been admitted and are expected to stay overnight in care of the elderly, dermatology, renal/nephrology or vascular surgery specialties should be screened. This should include transfers from other hospitals. The complete patient pathway for these patients is included in Flowchart 18.3.

3) All patients transferred to a care of the elderly, dermatology, renal/nephrology or vascular surgery specialty from another specialty in the hospital should be screened. Patients that are transferred to a screening specialty as boarders should also be screened on admission to the specialty. The complete patient pathway for these patients is included in Flowchart 18.3.

As per current UK guidelines, routine screening of staff members is not recommended.

18.1.5 When should they be screened?

Patients who are admitted electively and have a planned admission date should be screened at a pre-admission or outpatient clinic where possible. If this is not possible, they should be screened on admission to hospital.

Patients admitted as emergency cases should be screened on or as soon after admission to one of the named specialties as possible. It is not recommended that screening is attempted in A&E.

Patients transferred into one of the named specialties from another specialty in the hospital should be screened as soon after admission to the specialty as possible.

18.1.6 How will the screen sample be taken?

Sample collection is the responsibility of the staff member running pre-assessment clinics, admitting patients or designated 'screener' within the health boards. This requires training and a few minutes of time to collect the swab, complete a laboratory request form, complete the form and place the sample in the dispatch box.

The minimum screen will be a nasal swab. This sample will be taken from the anterior nares (nose), both nostrils on one swab. Any wounds, skin breaks or sites of invasive devices should also be sampled on another swab. If additional sites are swabbed due to nature of the procedures to be undertaken, additional body sites should be considered. These include axilla, throat, groin and perineum.

Following explanation of procedure, patients should be provided with a patient information leaflet and given the opportunity to read the leaflet and discuss fully with clinical staff. Clinical staff should emphasise that MRSA screening detects colonisation not infection and that patients may receive treatment as a result of a positive screen. Verbal consent to have nasal swab taken should be sought from the patient prior to screening. The following procedure should be employed to obtain a nasal swab for MRSA culture.

The following equipment is required;

1. Sterile swab for culture in Ames medium or charcoal medium (single sterile tipped applicator swab/ plastic outer transport case with transport medium). Check expiry date.
2. Sterile water sachet
3. Sterile galipot
4. Laboratory request form (specimen for culture)
5. Plastic specimen bag

18.1.7 Collection Procedure

1. If patient has nasal discharge ask them to clear the discharge by blowing his/her nose into a non scented tissue.
2. Do not attempt to clear the discharge with swabs as this may be excessively traumatic.
3. After washing hands, put on clean gloves.
4. Empty sterile water sachet into sterile galipot
5. Open and remove sterile tipped swab applicator from transport casing.
6. Moisten tip of swab in sterile water
7. Taking care to avoid other contact with swab, insert the swab approximately 2 cm (approx ¾ inches) into the nares.
8. Rotate the swab against the anterior nasal mucosa for 3 – 5 seconds.
9. Using the same swab, repeat for other nares.
10. Carefully place used swab back into transport tube and secure.
11. Fill in appropriate patient details as requested or affix patient label on outer aspect of transport tube. Ensure that date and time swab was collected are included as well as location: either ward, pre-admission clinic etc.
12. Complete the specimen request form as per local laboratory protocol. This would normally include the following information:

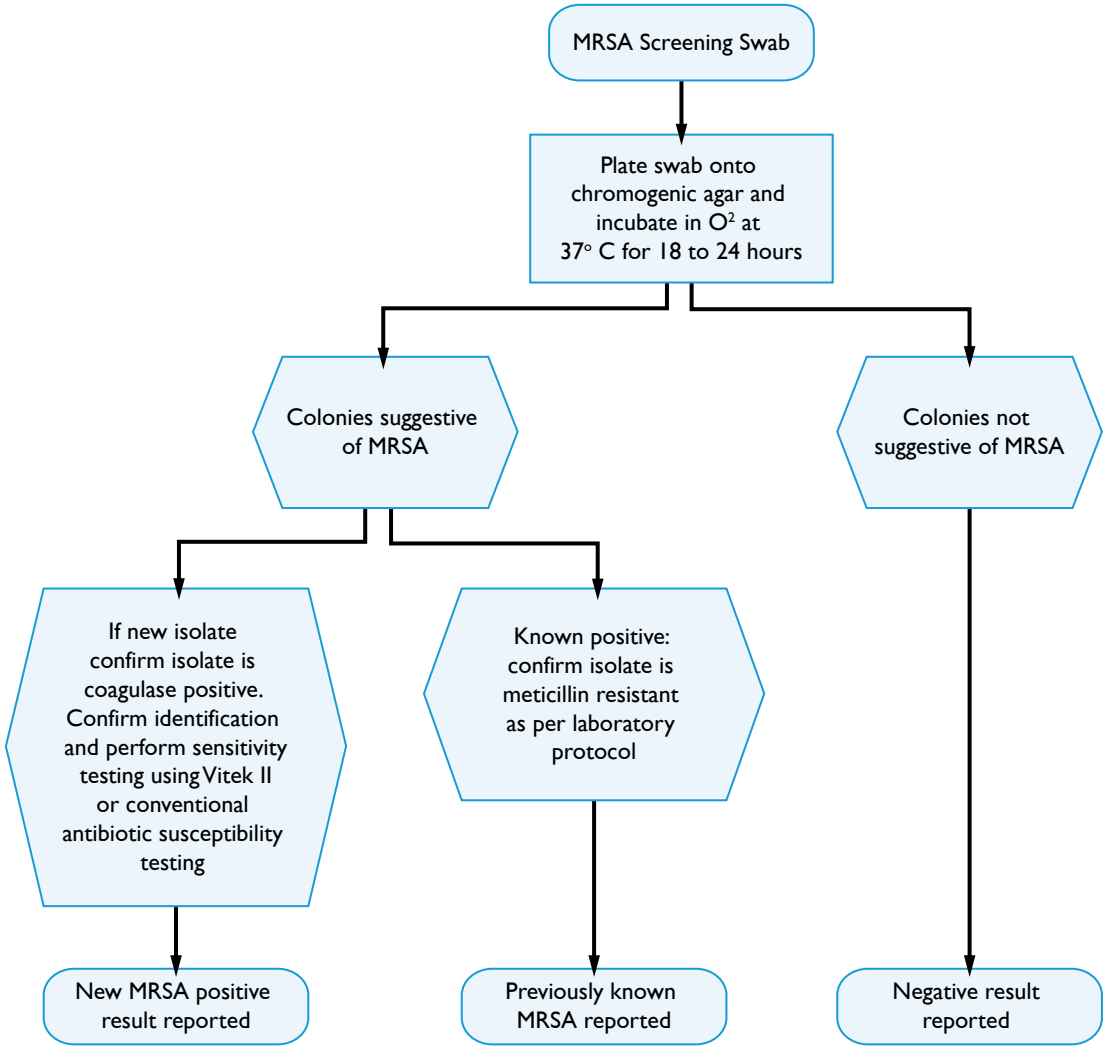
    Name
    Age
    Date of Birth
    CHI number if available.
    Location: either ward area/ pre-assessment clinic
    Test request: culture and sensitivity
    Purpose / rationale: MRSA screening
    Date and time sample collected
    Antibiotics currently prescribed
    Reason for admission

13. Place swab specimen and laboratory request form in specimen bag and secure.
14. Leave for collection in designated area as per normal procedure for uplift and transfer to the laboratory. If pick up is delayed and swab is likely to be left overnight place in dedicated specimen fridge until the next collection is due.

18.1.8 What laboratory test will be undertaken on the screening sample?

The sample should tested using chromogenic agar. If the colour change is suggestive of MRSA colonies, a confirmatory coagulase test and sensitivity testing should be carried out. Mupirocin resistant strains should be referred to the Consultant Microbiologist. The laboratory testing protocol is shown in Flowchart 18.1.

Flowchart 18.1: Laboratory testing of MRSA samples



18.1.9 What should the laboratory do when the results of an MRSA screen is known?

Patients who have a negative MRSA screen are added to the lab system as per local protocol. [INSERT LOCAL TEXT HERE].

Patients who have a negative MRSA screen are reported to the ward according to local protocol. [INSERT LOCAL TEXT HERE].

18.1.10 When is a patient considered MRSA positive?

For the purposes of this programme, on admission, a patient is considered "MRSA positive" (and therefore should be isolated where possible) when they fulfil one or more of the following criteria;

- Patients identified as colonised at a pre-admission or outpatient clinic and not successfully decolonised before admission
- Patients positive for MRSA colonisation as identified by admission screen (to either hospital or specialty)
- Patients who are known to have previously been colonised with MRSA
- Patients who are known to have previously had an MRSA infection
- Patients who are known to have an active MRSA infection on admission.

Patients who have a laboratory confirmed MRSA positive sample from a screen or clinical specimen on admission should be isolated/cohorted and considered for decolonisation therapy.

18.1.11 What should happen to patients who are identified as MRSA positive?

Patients that have been identified as MRSA positive by laboratory confirmed chromogenic agar should be isolated and considered for decolonisation treatment.

These patients should also be provided with a second patient information leaflet providing detailed information on MRSA colonisation and their treatment. They should be provided with an opportunity to discuss the implications of their diagnosis with a trained member of staff and their clinical team.

18.2 Decolonisation

The aim of decolonisation is to reduce the burden of MRSA carried by the patient at a time when they are undergoing invasive procedures and are at most risk. A second aim is to reduce the likelihood of cross-transmission of MRSA from patient to patient. All patients identified as MRSA positive by screening should be considered for decolonisation. Decolonisation is undertaken according to current guidelines [5]. The following steps should be carried out:

18.2.1 Inpatient identification of MRSA colonisation

1) Patient is identified as MRSA positive by screen taken on admission to hospital or specialty.
2) Agreement to commence decolonisation treatment should be obtained from the patient and clinician
3) MRSA positive patients should receive nasal mupirocin, three times daily for five days and should bathe daily for 5 days in chlorhexidine body wash.
4) If the patient remains in hospital, the second screening sample should be taken at least two days after completion of the decolonisation treatment.
5) If the results of the second screen are positive, a second course of mupirocin, three times daily, and chlorhexidine, daily, for five days should be given.
6) If the patient remains in hospital, the third screening sample should be taken two days after completion of the second decolonisation treatment.
7) If the results from the third screening sample are positive, the patient should be referred to the Consultant Microbiologist.

18.2.2 Pre-admission identification of MRSA colonisation

1) Patient identified as MRSA positive by screen taken at pre-admission clinic
2) Decolonisation treatment should be sent to the patient*. Home decolonisation treatment using mupirocin and chlorhexidine should be used as per protocol for inpatient decolonisation.
3) Patients with positive pre-admission screen are called back to the pre-admission clinic after completion of the decolonisation treatment to be re-screened.

* *In order to minimise impact on GP workload, the patient should receive decolonisation treatment by one of the following options;*

- Via out-patient department
- Via district nurse

- Recorded delivery of treatment directly to patient's home
- Prepaid prescription sent to the patient's home

The delivery of a prepaid prescription to the patient's home is the preferred option.

Adverse reactions to decolonisation treatment should be reported using existing local protocol.

18.3 Isolation

MRSA positive patients should be isolated wherever possible. If isolation is not possible, MRSA positive patients should be cohorted or separated alongside other MRSA positive patients. Isolation, cohorting and separation are defined below.

Isolation: Patient is placed in a single room with hand washing facilities, ideally with en-suite toilet and shower where available. Isolation should be undertaken according to the HPS Infection Control Contact Precautions Policy and Procedure. http://www.hps.scot.nhs.uk/haii/ic/guidelinedetail.aspx?id=37303.

Cohorting: Patient is placed in a room and cared for by dedicated nursing staff along with other patients who are MRSA positive. Cohorting should be undertaken according to the HPS infection Control Contact Precautions Policy and Procedure. http://www.hps.scot.nhs.uk/haiic/ic/guidelinedetail.aspx?id=37303

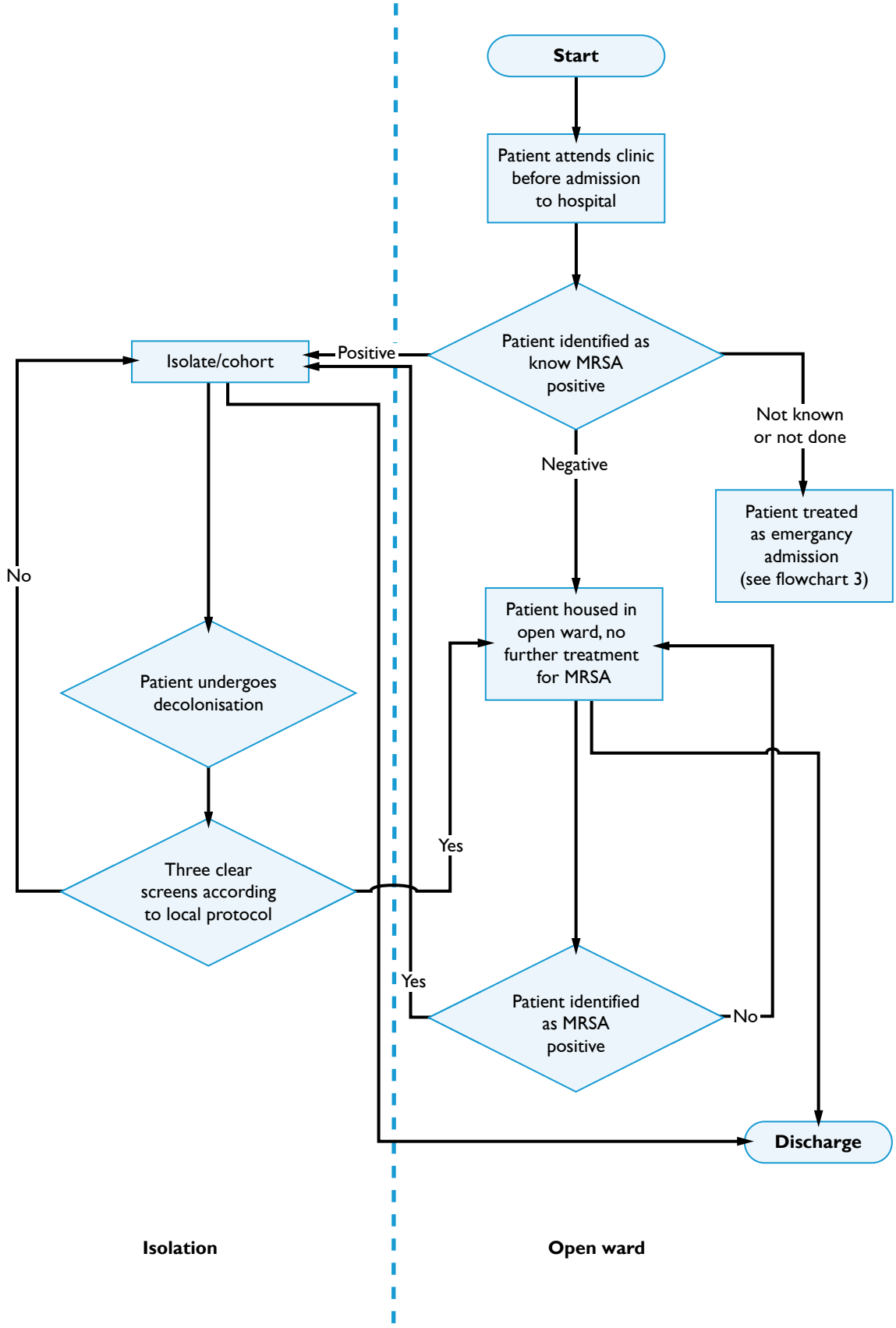
Separated: Patients who are MRSA positive are housed within the same room as patients who are not MRSA positive but are separated by at least three feet from any adjacent persons by use of: cubicles or use of closed bed curtains. This is considered to be a step down from full cohorting. These patients do not have separate nursing staff.

Patients that are known to have been previously MRSA positive on admission to hospital should be pre-emptively isolated while awaiting their screening sample result.

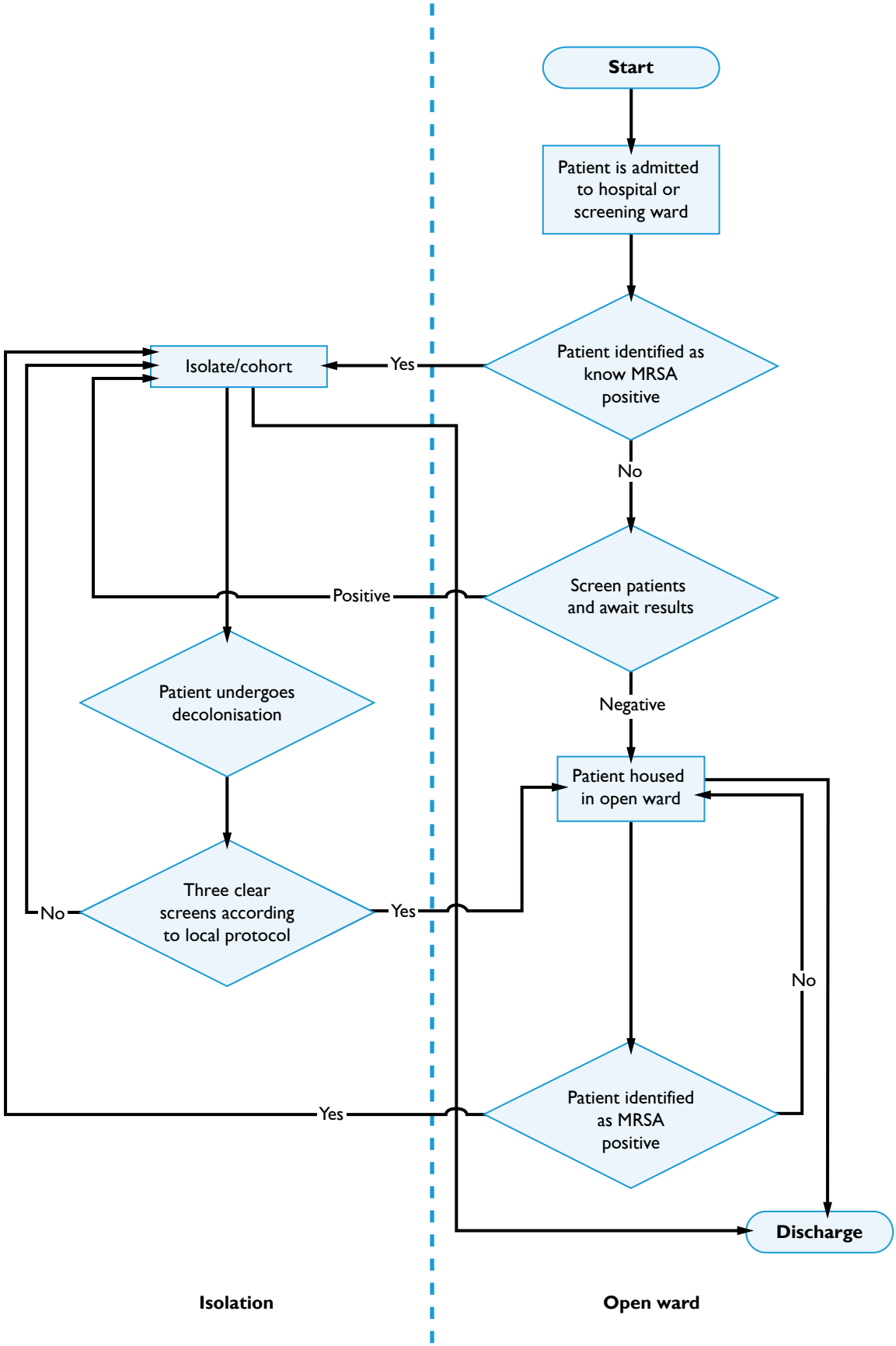
Patients that are not known MRSA positive on admission are screened, and nursed on the open ward until the screening result is known. They should not be pre-emptively isolated. Standard Infection Control Precautions [20] should be adhered to rigorously at all times as a proportion of patients on the open ward may be MRSA positive.

MRSA positive patients should remain in isolation until they have been decolonised and had three consecutive negative screens.

Flowchart 18.2: Complete patient pathway for elective patients that have attended a pre-admission clinic and have a screen result



Flowchart 18.3: Complete patient pathway for emergency patients admitted to a screening specialty or elective patients without a pre-admission screen result



19 Appendix 3: Quality Assurance

19.1 Purpose

The purpose of this document is to provide an overview of quality assurance arrangements for the MRSA Screening Pilot Programme. The document does not contain detailed review and evaluation techniques, criteria or metrics.

19.2 Scope

The Quality Assurance Plan applies only to the MRSA Screening Pilot Programme coordinated by Health Protection Scotland. This document describes issues related to quality assurance only. The intended distribution of this document is:

- MRSA Screening Pilot Programme Team.
- Programme Board/Steering Group.
- Programme stakeholders.

19.3 Programme design

The design of the programme has been informed by findings from a health technology assessment (HTA) carried out by NHS Quality Improvement Scotland (NHS QIS) in 2007. The HTA follows established NHS QIS methodology to evaluate clinical and cost effectiveness benefits of MRSA screening programmes and so determine the optimum means of programme delivery.

19.4 Performance Indicators

The Pathfinder project will determine and validate necessary quality criteria for an MRSA screening programme. Pilot performance indicators will be set to measure the extent to which pilot boards are meeting programme objectives and will be used to determine the most appropriate indicators for future MRSA Screening programmes.

Performance indicators have been determined by the programme group:

1. Overall uptake of screening in emergency admissions (Target = 100%).
2. Overall uptake of screening in elective admissions (Target = 100%).
3. Turnaround time for testing. (Target = 24 hours as set in the screening protocol).
4. Time between swab taken and isolation/cohorting of patient (Set by protocol).
5. Proportion of patients consented to the screening (%).

6. Proportion of patients found to be colonised who develop infection (%).
7. Proportion of patients isolated (%).
8. Proportion of patients cohorted (%).
9. Proportion of patients decolonised (%).
10. Proportion of patients found positive after decolonisation (%).
11. Proportion of patients whose treatment/care pathway is altered as a result of screening results (%).

All pilot performance indicators are captured using audit forms and are reviewed in monthly programme progress reporting. The effectiveness and suitability of these indicators will be evaluated by the programme board and technical group throughout the lifetime of the project.

19.5 Data Collection, processing and control

Data collection systems for the Pathfinder project have been designed to ensure data integrity is maintained during collection and transfer to HPS.

- The HPS MRSA Screening Team provides on-site and in-house training, for project staff and teams in clinical settings responsible for data collection. This is a one-off bespoke training session designed by the programme team for data collection staff at the pilot sites. Training feedback is captured using standard HPS training evaluation forms and used to inform programme strategy.
- Board Laboratory Standard Operating Procedures (SOPs), approved by HPS, will be used on site to test swab samples taken as part of the programme. All screening laboratories are Clinical Pathology Accredited (UK) and subject to local clinical governance arrangements.
- Data receipt and handling protocols developed by the programme board will be used to ensure consistency of sampling across pilot sites. The protocol is informed by WHO methodology and from input from the participating pilot boards.
- Programme protocols developed by the programme team to ensure that submitted data undergoes rigorous quality control checks for accuracy and completeness.
- Random data sampling checks are carried out on Pathfinder raw data at the pilot sites to ensure accuracy and completeness prior to submission to HPS. Individual Project Managers, Data Collectors and Screeners are responsible for the data they provide to HPS.

- A Teleform scanner system is used to identify errors in the data upon submission to HPS. The scanner is validated and secure. Data are cross checked against patient details by the programme team data manager and administrator who report anomalous data to the programme manager and ensure these are resolved with the submitting pilot sites.

All programme data is stored on secure systems at HPS subject to NSS data protection regulations.

19.6 Patient and staff attitudes survey

Glasgow Caledonian University have been selected to carry out a survey patient and staff following a tendering process facilitated by National Procurement Scotland (NPS). Survey monkey, paper questionnaires and focus groups will be used to obtain subjective evidence of the impact of the MRSA Screening Pilot Programme on staff and patient attitudes.

19.7 Equality and diversity

An NSS impact assessment has been carried out at the programme planning stage to anticipate any equality and diversity risks associated with the programme. Patient information in support of the programme has been produced in 10 languages to maximise understanding in representative demographics.

Glasgow Caledonian University have been ethically approved to conduct the staff patient survey.

19.8 Reporting

All programme reports are issued as per HPS in-house procedures.

The programme board and technical group will review and approve all programme reports prior to release.

19.9 Programme Management

The programme manager will ensure the quality of projects and the overall programme by:

- Using recognised quality methodology and current evidence to inform the design of the screening programme and data collection systems.
- Identifying and reporting project limitations.
- Controlling risks, issues, progress monitoring and closure for all projects using PRINCE2 based methodology.

- Keeping the project board, steering group and stakeholders informed of progress and developments.
- Reviewing progress against original programme expectations.
- Maintaining a lessons learned log throughout the programme lifetime and reviewing project deliverables in a post-closure reflective exercise.

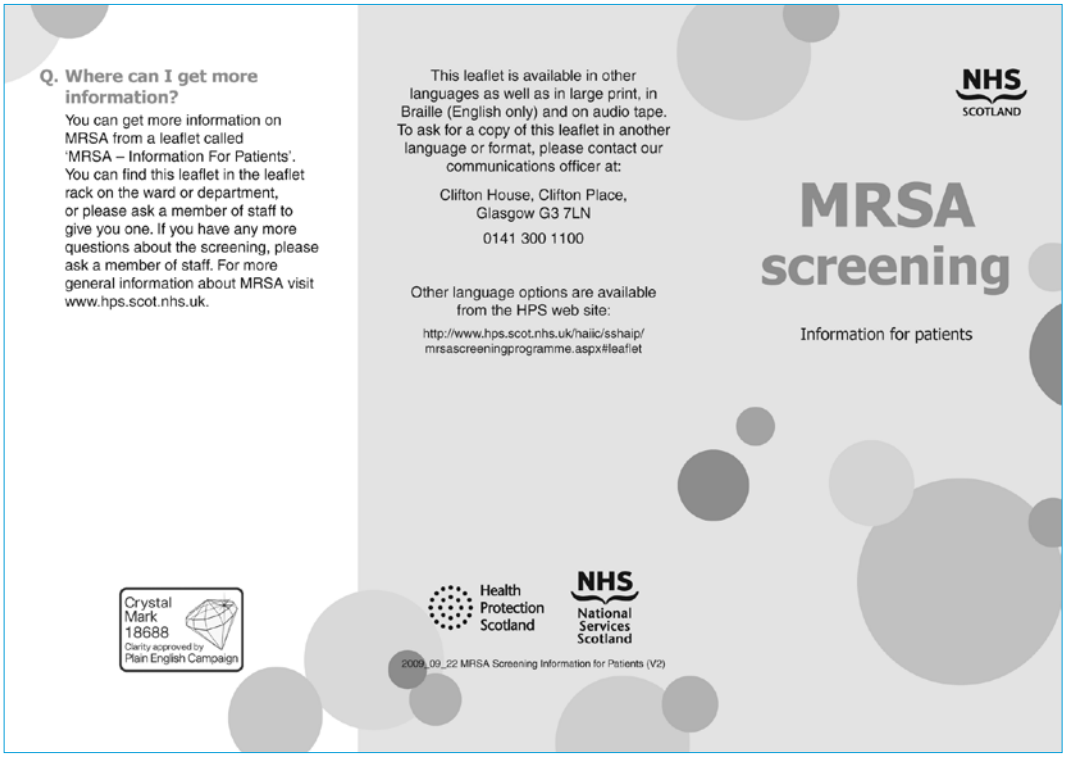
19.10 Standards, guidelines and evidence base

Programme objectives will be delivered in compliance with:

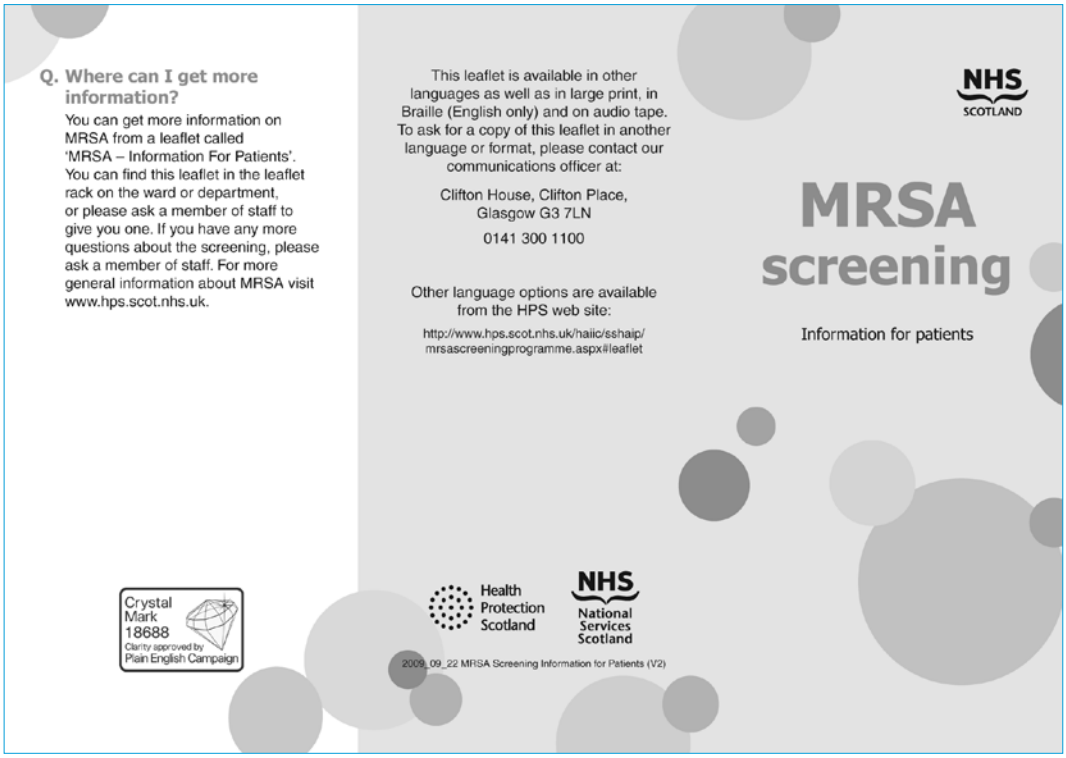
- UK National Screening Committee screening criteria.
- Public Health Principles:
- Paper from Public Health Principles
- Scottish Government Health Department requirements:
- Business Case Document
- Local HPS policies, protocols and SOPs:
- Laboratory SOP for screening samples
- SOP for Obtaining Nasal Swabs
- SOP for sending sensitive information
- Pathfinder Protocol Document version 4.2
- SOP for Laboratory Testing
- NSS Corporate Programme Office project management system (PRINCE2 based project management methodology)
- NSS Data protection regulations:
- SOP for HPS Confidentiality Guidelines 2008
- Use of Microsoft Reference Manager to maintain a current evidence base for the programme.

20 Appendix 4: Patient Information Leaflet

Outside

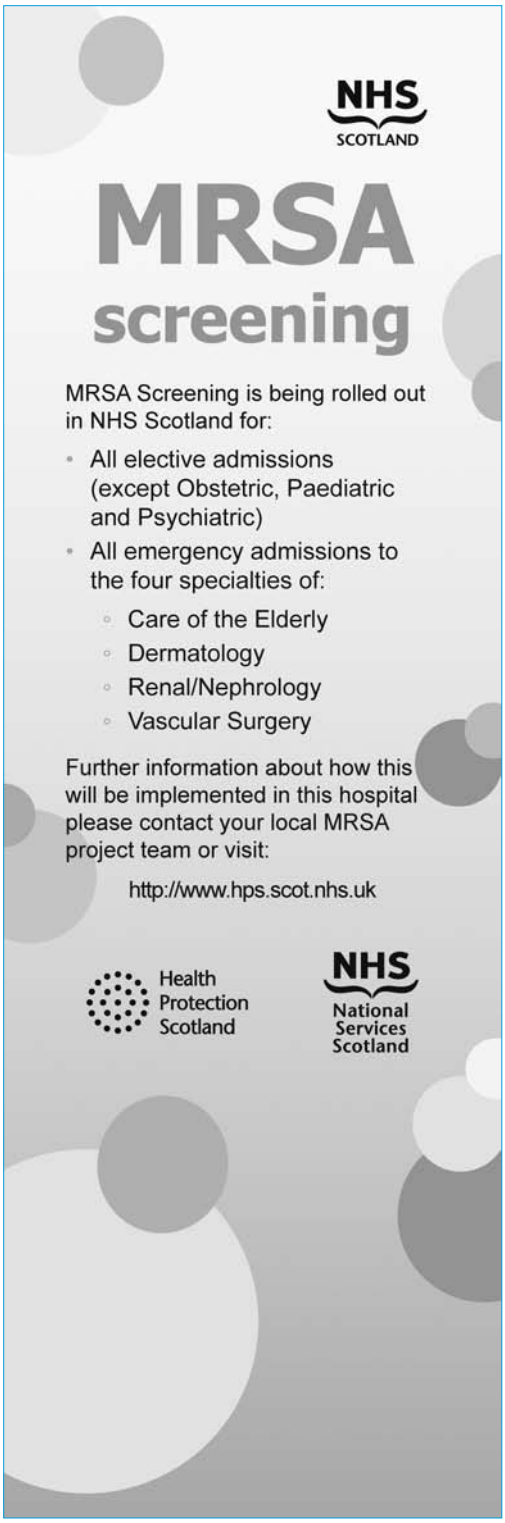


Inside



This leaflet can be downloaded from:
http://www.hps.scot.nhs.uk/haiic/sshaip/mrsascreeningprogramme.aspx

21 Appendix 5: Pop-up Banner (for staff, patients and visitors)



22 Appendix 6: Screenshot of Patient Information Film

The this film is available to view at;
http://www.hps.scot.nhs.uk/haiic/sshaip/mrsascreeningprogramme.aspx

23 Appendix 7: Rollout Boards Project Teams

23.1 NHS Borders

Name	Title
Adam Wood	ICM
Peter Machell	Chief BMS;
Penny Willson	HAI Surveillance Co-ordinator
Judith Machell	HAI Surveillance Co-ordinator

23.2 NHS Dumfries & Galloway

Name	Title
Natalie Oakes	Infection Control Nurse / MRSA Project Manager
Sam Whiting	ICM

MRSA Steering Group Members

Name	Title
Allan Flower	Charge Nurse, Medical Admissions
Leigh Fitzpatrick	Deputy Charge Nurse, Surgical
Elaine Mclemon	Charge Nurse, Pre-Operative Assessment
Martin Connor	Consultant Microbiologist
Christine Lyon	LHP Nithsdale, Annandale and Eskdale
Denise Crosbie	Bed Manager
Dave Hamilton	Consultant Microbiologist
Diane Robertson	Charge Nurse, Out Patients
Ian Mottram	Staff Nurse, Medical Admissions
Louise Marshall	Charge Nurse, Pre-Operative Assessment
Susan Roberts	Lead Antimicrobial Pharmacist
John Knox	General Manager of Acute Services
Val Thurston	Nurse Manager (Peri-Op)
Jacqueline Southern-Leigh	Nurse Manager (Surgical and Out-Patients)

23.3 NHS Fife

Name	Title
John Steel	Project Manager
David Livingstone ICM	Team Manager
Yvonne Bernard	Project Nurse
Fern Archibald	Project Admin
Dr. Gordon Birnie, Medical Director	Project Executive
Mr Edward Dunstan, Orthopaedic Surgeon	Project Senior User
Dr Emma Reynish, Consultant Geriatric Medicine	Project Senior User
Ms Olga Greenan, Labs Service Manager	Project Senior Supplier

23.4 NHS Forth Valley

Name	Title
Eliza Jenkins	Project Manager
Jonathan Horwood	Infection Control Manager .
Graeme Inglis	Microbiology Manager.

23.5 NHS Grampian

Name	Title
Pamela Harrison	Interim Infection Control Manager/Project Manager - MRSA Screening
Sue Harrison	Interim Project Manager/Team Leader
Hazel Whyte	Senior Nurse

23.6 NHS Greater Glasgow & Clyde

Team Contacts

Name	Position
Debbie Forsyth	MRSA Screening Project Manager
Shona Meldrum	Clinical Implementation Lead
Mary Nolan	Clinical Implementation Support
Owen Herity	Clinical Implementation Support
David Sharkey	Data Manager
Shona Macleod	Team Administrator

NHS GG&C Steering Group Meeting Attendees

Name	Designation
Tom Walsh	Board Infection Control Manager
Dr Craig Williams	Consultant Microbiologist
Linda Bagrade	Infection Control Doctor
Bernadette Findlay	Assistant General Manager, Laboratories
Ysobel Gourlay	Lead Antimicrobial Pharmacist
Kate Hamilton	Lead Nurse Infection Control
Joan Higgins	Lead Nurse Infection Control
Joyce Brown	Head of Nursing, Emergency Care and Medical Services
Angela McGurk	Lead Nurse, Rehabilitation and Assessment Directorate
Sandra McNamee	Assistant Director of Nursing, Infection Control
Lesley Meikle	Head of Nursing, Surgery and Anaesthetics
Jim O'Neil	General Practitioner and LMC Representative
John Stuart	Head of Nursing, Regional Services
Hugh Gibb	Senior Management Accountant

23.7 NHS Highland

Name	Designation
Kenny Steele	DGM Clinical Services Raigmore Hospital (Project Lead)
Linda Brady	Project Manager
Dr Andrew Hay	Consultant Microbiologist/Lead Technical Advisor Raigmore Hospital
Marilyn Davidson	Consultant Clinical Scientist, Microbiology, Raigmore Hospital
Glen Widdows	Head Biomedical Scientist, Microbiology, Raigmore Hospital
Alison MacDonald	Area Antimicrobial Pharmacist
Una Lyon	Lead Nurse, Raigmore Hospital
Alison MacLean	Senior Infection Control Nurse, Raigmore Hospital
Doreen Bell	Lead Nurse, North Highland CHP
Marie Stewart	Infection Control Nurse, North Highland CHP
Alison Hudson	Lead Nurse, Mid Highland CHP
Jo Watte	Infection Control Nurse, Mid Highland CHP
Pat Tyrrell	Lead Nurse, Argyll & Bute CHP
Sheila Ogilvie	Infection Control Nurse, Argyll & Bute CHP
Liz McClurg	Infection Control Manager NHS Highland
Heidi May	Board Director of Nursing, NHS Highland
Elspeth Caithness	Staff Nurse/RCN Steward
Dr Rod Harvey	Clinical Representative, Raigmore Hospital
Michael Roberts	Patient Council Representative
Katy Murray	Patient Partnership Forum Rep, Argyll & Bute
Susan Hussey	General Practitioner, Cromarty Medical Practice
Paul McAleer	Management Accounting Assistant

23.8 NHS Lanarkshire

MRSA Project Implementation Group

Name	Title
Margaret Barbour	Surgical Nurse Manager
Julie Burns	MRSA Surveillance Nurse
Jan Clarkson	HAI Nurse Consultant
Laura Drummond	Clinical Effectiveness Manager
Tony Fitzpatrick	Change and Innovation Manager
Sharon Higgins	Project Administrator
Lesley MacGregor	MRSA Surveillance Nurse
Geraldine Marsh	Emergency Access Service Improvement Manager
Ian McCormick	Lead Biomedical Scientist
Steve McCormick	Antimicrobial Pharmacist
Kelly Anne McKendrick	Senior Recruitment Advisor
Sharon Murray	Senior Nurse
Claire Nelson	Head of Function-Management Accounts Acute Division
Sandra Taylor	Sister- Pre Assessment Department
Lynn Turner	Project Manager
Liz Young	Surveillance Nurse

MRSA Steering Group

Name	Title
Alison Graham	Medical Director & Executive Lead
Eric Carlyle	Clinical Director Laboratories
Thomas Gillespie	Consultant Microbiologist
Heather Gourlay	HAI Manager
Judith Hope	Interim Divisional Manager Surgical & Critical Care
Joan James	Divisional Nurse Director
Christopher Mackintosh	Associate Medical Director Primary Care
Marion Mark	Interim Divisional General Manager Women's & Diagnostics Division
Laura Morrison	Senior Information Analyst
Gail Richardson	Head of Pharmacy
Ruth Thompson	Associate Director of Nursing Emergency & Medical Services
Shona Welton	Head of Patient Affairs

23.9 NHS Lothian

Name	Title
Fiona Cameron	Head of service - Infection control
Paul McKenna	MRSA screening Project manager
James McWilliams	Lead nurse Screening project

23.10 NHS Orkney

Name	Title
Hasmukh.K.Pankhania	Head of Laboratory and Diagnostics Services

23.11 NHS Shetland

Name	Title
Dr Susan Laidlaw	CPHM (project manager)
Margaret Cooper	Sister, Pre-operative Assessment Unit
Mr Les Phipps	Laboratory Quality Manager
Ms Edna Mary Watson	Assistant Director of Nursing (Community)
Ms Janice McMahon	Assistant Director of Nursing (Hospital)
Ms Nina Fraser	Nurse Director / Infection Control Manager
Ms Tina Bokor Ingram	Infection Control Nurse
Ms Catriona Innes	Antimicrobial Pharmacist (NHS Orkney / Shetland)

23.12 NHS Tayside

Name	Title
Dawn Weir	General Manager
Linda Bissett	ICN
Linda Dalrymple	ICN
Agnes Crighton	ICN

23.13 NHS National Waiting Times Centre

Name	Title
Robert Gray	ICM
Sandra Mcauley	ICN
Drummond McNair	Senior Chief Microbiology
Dr Teresa Inkster	Consultant Microbiologist

24 Appendix 8: HPS Project Team

HPS Project Team

Name	Title
Prof Jacqui Reilly	Programme Director
Sally Stewart	Programme Manager
Sam Fleming	Project Manager – Pathfinder
Paul Chapple	Project Manager – National Rollout
Ann Smith	Epidemiologist
Donald Bunyan	Information Scientist
Andy Moyes	Data Manager
Calida Stock	Administrator
Ryan Johnston	Data Support Officer
Gwen Allardice	Senior Statistician (Strathclyde University)
Traiani Stari	Statistician (Strathclyde University)

25 Appendix 9: National Rollout Working Group Standing Agenda

Health Protection Scotland

agenda

1 Cadogan Square
Cadogan Street
GLASGOW G2 7HF
Telephone 0141 300 1100
Fax 0141 847 0399
www.hps.scot.nhs.uk

NHS National Services Scotland

MRSA Screening National Rollout Group

Date & Time: 8th December 2009 1.30 pm until 4.00 pm (lunch available from 12.30 pm)
Venue:

Items	Discussion	Paper (if required)
1	Welcome & Apologies	
2	Update of SGHD position	
3	Review of Actions	
4	RAG Status Report (Red/Amber Risks and Issues)	
5	Supply of Decolonisation Therapy – Update from Association of Scottish Antimicrobial Pharmacists	
6	Communications - 6a. Leaflets - 6b. Pop-Up Banners	
7	Education - 7a. Resource Proposal	
8	Patient Involvement	
9	Next Steps	
10	AOCB	
11	Date and Venue of next meeting	

26 Appendix 10: National Rollout Working Group Members

Name	Initials	Job Title	Organisation
Paul Chapple (Chair)	PC	Project Manager	HPS
Sally Stewart (Chair)	SS	Programme Manager MRSA Screening	HPS
Olga Greenan	OG	Service Manager	Fife
Ian Gould	IG	Consultant Microbiologist	Scottish Microbiology Forum
Fiona MacKenzie	FMacK	Clinical Scientist	Grampian
Bob Wilson	BW	Lead Infection Control Nurse	Ayrshire & Arran
Carol Fraser	CF	Nurse Advisor for HAI and the Government	Scottish Government
Mary Nolan	MN	RAD/ Medical Implementation	Greater Glasgow & Clyde
Denise Wilson	DW	Infection Control Manager	Western Isles
John Steel	JS	Project Manager	Fife
Yvonne Bernard	YB	MRSA Surveillance Nurse	Fife
Linda Brady	LB	Project Manager	Highland
Graeme Inglis	GI	Microbiology	Forth Valley
Eliza Jenkins	EJ	Project Manager	Forth Valley
Debbie Forsyth	DF	Project Manager	Greater Glasgow & Clyde
Lynn Turner	LT	Project Manager	Lanarkshire
Heather Gourlay	HG	Infection Control Manager	Lanarkshire
Paul McKenna	PMcK	Project Manager	Lothian
Sam Whiting	SW	Infection Control Manager	Dumfries & Galloway
Helen Maitland	HM	Programme Director HAI	NHS Education for Scotland
Sarah Freeman	SF	Educational Project Manager (HAI)	NHS Education for Scotland
Gillian Hawkins	GH	Registrar of Public Health	HPS
Jacqui Reilly	JR	Project Director	HPS
Ann Smith	AS	Epidemiologist MRSA Screening	HPS
Sam Fleming	SF	Project Manager MRSA Screening	HPS
Barbara Gemmell	BG	Project Manager	Ayrshire & Arran
Natalie Oakes	NO	Infection Control Nurse	Dumfries & Galloway
Judith Machell	JM	HAI Surveillance Co-ordinator	Borders
Peter Machell	PM	Microbiology Department	Borders
Kevin Hanlon	KH	Healthcare Associated Infection Unit	Scottish Government

Name	Initials	Job Title	Organisation
Lorna Willocks	LW	Medical Advisor HAI Taskforce	Scottish Government
Dawn Weir	DW	General Manager	Tayside
Adam Wood	AW	Acting Lead Infection Control	Borders
Robert Gray	RG	Infection Control Manager	National Waiting Times Centre
Jonathan Horwood	JH	Infection Control Manager	Forth Valley
Craig Williams	CW	Coordinating Infection Control Doctor	Greater Glasgow & Clyde
Shona Meldrum	SM	Lead Implementation Nurse	Greater Glasgow & Clyde
Kenny Steele	KS	General Manager Clinical	Highland
Fiona Cameron	FC	Infection Control Manager	Lothian
Andrew Hay	AH	Consultant Microbiologist / ICD	Highland
Alison MacLean	AMacL	Infection Control Nurse	Highland
Mike Gray	MG	Clinical Manager of Microbiology	Lothian
Hasmukh Pankhania	HP	Head of Laboratory and Diagnostic Services	Orkney
Susan Laidlaw	SL	Public Health Consultant	Shetland
Christina Bokor-Ingram	CB	Infection Control Nurse	Shetland
Eileen McKenna	EMcK	Interim Infection Control Manager	Tayside
Pamela Harrison	PH	Project Manager	Grampian
Eunice Muir	EM	Nurse Director	NHS 24
Michele Jamieson	MJ	Associate Director of Nursing	NHS 24
Gillian Stevenson	GS	Nurse Consultant (Healthcare Associated Infection)	Care Commission
Calida Stock	CS	Project Administrator	HPS

27 Appendix 11: Orion Summary Table

Primary and Secondary Preventions Measures in Pathfinder Boards

Project description: The primary aim is to compare the clinical effectiveness of the intervention of universal screening and isolation and decolonisation of MRSA colonised patients against the NHS QIS HTA Strategy 2 predicted clinical effectiveness. The secondary aim is to record the issues associated with implementing the NHS QIS HTA strategy 2 to inform national rollout of MRSA screening.
Setting: Three NHS boards in Scotland; NHS Grampian (Aberdeen Royal Infirmary and Woodend Orthopaedics unit); Ayrshire and Arran (Ayr Hospital and Crosshouse Hospital) and Western Isles (Western Isles Hospital; Uist and Barra Hospital).
Dates: 1 August 2008 – 31 July 2009 MRSA Screening Programme Audits April 2009 and August 2009.
Population characteristics: NHS Grampian including Aberdeen Royal Infirmary, a teaching hospital with 893 beds which admitted 47,543 inpatients in 2007 and Woodend Hospital Aberdeen, a multiple specialty hospital (within Woodend Hospital only Elective Orthopaedics specialty is included within the pathfinder Project – this includes 90 beds, which admitted 4,210 inpatient admissions in 2007). NHS Ayrshire and Arran including two district general hospitals: Ayr Hospital, a district general hospital with 350 beds which received 21,616 adult inpatient admissions in 2007 and Crosshouse Hospital, a district general hospital with 590 beds which receive 38,329 adult inpatients admissions in 2007. NHS Western Isles, an Island Health board, including Western Isles Hospital, a consultant-led rural General Hospital with approx 120 beds which receives 4475 admissions per year and Uist and Barra Hospital, a GP–led community hospital with acute care provision hospital with 31 beds which receives 400 adult admissions per year).
Major infection control changes during the study: Screening of all inpatients on admission or at pre-admission clinics for those admitted electively. A nasal swab sample is taken for all patients and tested for MRSA using chromogenic agar. Patients with skin breaks or invasive devices were also screened at these sites. All patients with a positive MRSA Screen are isolated where possible and if not were cohorted or separated. All patients receive MRSA decolonisation treatment. For patients who are known previously positive were isolated or cohorted pre-emptively until their screening result was confirmed.
MRSA decolonisation policy: Intranasal mupirocin and antiseptic body washes and shampoo for patient with no wounds. Clearance defined as 3 consecutive negative tests with at least 48 hours separating end of treatment and previous swab.
Feedback: Phase: Recording of MRSA colonised patients and new MRSA during study period.

Isolation policy MRSA: All laboratory confirmed cases isolated in side rooms where possible if not possible patients were cohorted or separated with other MRSA positive patients. Standard and Contact precautions are used throughout.

The isolation policies were unaltered for both audit periods in the 3 Health Boards.

Decontamination and Terminal Cleaning Policies: There was no change to Decontamination and Terminal cleaning policies between the audit periods and within the three Health Boards

Hand Hygiene Policies: There was no change to the Hand Hygiene Policies between the audit periods. The audit was a snapshot and therefore limited and unable to detail any improvements. The Hand Hygiene Audits and Scottish Patient Safety Programme hand hygiene audits will provide detail of improvements.

MRSA infections: Were treated according to local hospital antimicrobial prescribing policies.

Isolation details: Isolation was undertaken where possible, where isolation rooms were not available patients were cohorted (MRSA patients nursed together with dedicated nursing staff) or separated (MRSA patients nursed together in a bay with non specific nursing staff). Standard and Contact precautions were used throughout. Isolation policies were unchanged.

MRSA screening policy pre-admission: Nasal, skin break or device swabs taken, when positive, patients were provided with decolonisation treatment to be undertaken before admission. Follow up MRSA tests were undertaken pre-admission.

MRSA screening policy on admission: Nasal, skin break or device swabs taken, when positive, patients were isolated, cohorted or separated and decolonisation treatment undertaken. Follow up MRSA tests were undertaken on completion of decolonisation treatment.

Definition MRSA colonisation on admission: Positive laboratory confirmation of MRSA in nasal, skin break or device swab on admission.

Definition of new MRSA infection: Positive laboratory confirmation of MRSA in clinical specimens taken more than 48 hours after admission where patient was exhibiting signs of infection according to CDC Nosocomial infection criteria.

Potential harms: False positive patients will be cohorted with MRSA colonised patients. A study is being undertaken within the programme to assess the sensitivity and specificity of the test.

Use of mupirocin will be increased there is concern that this may result in an increase in mupirocin resistance

Limitations: The population of the pathfinder boards may not be wholly representative of acute care in NHSScotland. The data collection period of one year may not be sufficient to confirm clinical effectiveness of the intervention. The one year report will review the outcome results.

28 Appendix 12: Pathfinder Project Teams

HPS Programme board

Name	Title
Tim Davison	Chair – Chief Executive
Jacqui Reilly	Programme Director
Sally Stewart	Programme Manager
Samantha Fleming	Project Manager
Joanna Ridley	Administrator
Calida Stock	Administrator
Alistair Leanord	Consultant Microbiologist
Anne Eastaway	Consultant Microbiologist
Barbara West	Medical Secretary of the GP Subcommittee and LMC
Callum Percy	HAI Lead
Carol Fraser	Nurse Advisor for HAI and the Government
Cathleen Holmes	Bed Manager
Chris Robertson	Professor of Statistics
Craig Williams	Infection Control Doctor
Derek Noonan	Procurement Manager
Giles Edwards	Deputy Director
Gwen Allardice	Bio Statistician
Heidi May	Director of Nursing
Jeremy Richardson	Clinical Director
Karen Ritchie	Lead Health Service Researcher
Maggie McCowan	Senior Manager Infection Control
Margaret Tannahill	Lead Nurse Consultant Infection Control
Martin Donaghy	Medical Director
Mary Hanson	Consultant Medical Microbiologist
Mary Morgan	New Director
Paul Kingsmore	Director - HFS
Peter Christie	Senior Medical Officer
Peter Craig	Chief Scientist Officer
Robin Creelman	Chair of the Public Involvement Communication Team
Sandra Mcnamee	Senior IC Nurse
Syed Ahmed	Consultant in Public Health Medicine

HPS Programme Team

Name	Title
Dr Jacqui Reilly	Programme Director
Sally Stewart	Programme Manager
Samantha Fleming	Project Manager
Ann Smith	Nurse Epidemiologist
Andy Moyes	Data Manager
Calida Stock	Programme Support Officer
Joanne Ridley	Administrator
Praveena Oliphant	Interim Project Manger

HPS Technical and pathfinder Group

Name	Title
Technical Group Members	
Jacqui Reilly	Head of Group
Sally Stewart	Programme Manager
Samantha Fleming	Project Manager
Joanne Ridley	Administrator
Calida Stock	Administrator
Gwen Allardice	Bio Statistician
Gillian Stevenson	Healthcare Associated Infection Nurse
Karen Ritchie	Lead Health Service Researcher
Martin Kiernan	Consultant Nurse
Fiona MacKenzie	Clinical Scientist, Scientific Project Manager
Ian Gould	Consultant Microbiologist
Robert Wilson	Infection Control Nurse/Acting Infection Control Manager
Robert Grey	Infection Control Manager
Denise Wilson	Acting Infection Control Manager
Mary Nolan	Project Manager – Western Isles
Olga Greenan	Biomedical Scientist SMF Representative
Carol Fraser	Nurse Advisor for HAI and the Government
Robin Creelman	Chair of the Public Involvement Communication Team
Optional Technical Group Members	
Nick Pace	Lead Clinician in Anaesthesia & Clinical Director SASM.
Ian Bradbury	Senior Statistician
James Frances McCann	Reader in Theoretical Physics
Gopal Rao	Consultant Microbiologist and Lead Clinician for Infection Control

Name	Title
Liz Stracham	Project Manager – NHS 24
Margaret Brown	Project leader – HAI
Julie Wilson	Health Protection Scientist
Shona Cairns	HAI Survey Epidemiologist
Fiona Murdoch	Epidemiologist
Gillian Hawkins	Specialist Registrar in Public Health
Eva van Velzen	EPIET Fellow HPS
Pathfinder Group Members	
Jacqui Reilly	Head of Group
Sally Stewart	Programme Manager
Samantha Fleming	Project Manager
Calida Stock	Administrator
Fiona Murdoch	Epidemiologist
Carol Fraser	Nurse Advisor for HAI and the Government
Peter Christie	Senior Medical Officer SGHD
Robert Gray	Infection Control Manager
Robert Wilson	Infection Control Nurse/Acting Infection Control Manager
Robert Masterton	Executive Medical Director
Barbara Gemmell	Project Manger – Aryshire and Arran
Ian Gould	Consultant Microbiologist
Fiona MacKenzie	Clinical Scientist, Scientific Project Manager
Pamela Harrison	Project Manager – Grampian
John S. McKinnon	Infection Control Manager
Craig Williams	Infection Control Doctor
Denise Wilson	Acting Infection Control Manager
Mary Nolan	New Project Manager – Western Isles
Optional Pathfinder Members	
Louise Kelly	Communications Officer – HPS
Madhuri Thakur	Patient Focus & Public Involvement Officer
Laura Gray	Communication Officer – Grampian
May Smith	Communications Manager – Ayrshire and Arran
Maggie Frasier	Communications Manager – Western Isles
Marion Mackay	Scottish Governments Communications Representative

Ayrshire and Arran pathfinder Project team

Name	Title
Robert Masterton	Executive Medical Director & Consultant Microbiologist
Robert Gray	Infection Control Manager (now left NHSAA Jan 09)
Bob Wilson	Infection Control Manager
Babs Gemmell	Project Manager
Katie Fulton	Personal Secretary/ Site Co-ordinator
Sharon Leitch	Project Nurse
Louise Ritchie	Project Nurse
Lesley MacGregor	Project Nurse (now left NHSAA Oct 09)
Gillian McMurtrie	Project Nurse (now left NHSAA July 09)
Lisa McLellan	Site Co-ordinator (now left NHSAA Dec 09)
Claire Douglas	Site Co-ordinator (now left NHSAA Oct 09)
Jane Campbell	Site Co-ordinator (now left NHSAA July 09)
Ross Loughran	Site Co-ordinator (now left NHSAA May 09)
Jennifer Main	Site Co-ordinator (now left NHSAA May 09)
Catherine McCreadie	Site Co-ordinator
Rebecca Armstrong	Site Co-ordinator
Fiona Manning	Site Co-ordinator
Gordon Downie	Consultant Microbiologist
Brian Wilson	Senior Chief Biomedical Scientist
Gordon Fowley	Biomedical Scientist III
Mr Iain Stables	Senior Development Specialist

Grampian pathfinder Project team

Name	Title
Reference Group Members	
Roelf S Dijkhuizen	Medical Director and Responsible Executive board Member
Ken McLay	Medical Lead
Alasdair Chisholm	General Manager
John McKinnon	Infection Control Manager
Pamela Harrison	Project Manager (Operational)
Sue Harrison	Team Leader
Leighanne Bruce	Infection Control Nurse
Tom Reid	Consultant Microbiologist
Ian Gould	Consultant Microbiologist and Clinical Lead
Fiona M MacKenzie	Clinical Scientist and Scientific Project Manager
George King	Laboratories Unit Operational Manager
Robert Nichol	Biomedical Scientist
Gillian Campbell	Finance Manager
Helen Howie	Consultant in Public Health Medicine
Julie Fletcher	Assistant General Manager
Laura Gray	Director of Corporate Communications
Derek Morgan	Estates Manager
Christine Leith	Unit Operational Manager
Noelle Boddie	Unit Nurse Manager
Nicki Nesbitt	Nurse Manager
Fiona C MacKenzie	Lead Nurse
Kate Livock	Unit Operational Manager
Susan Davidson	Antibiotic Pharmacist
Heather Kelman	General Manager
Michal Szygula	Consultant Physician
Sandy MacKenzie	Consultant Physician
Madhuri Thakur	Communications Officer
Peter McDonald	Project Manager
Tim McAdam	General Surgeon
Steering Group Members	
Roelf S Dijkhuizen	Medical Director and Responsible Executive board Member
Alan Gall	Director of Finance
Alasdair Chisholm	General Manager
Ian Gould	Consultant Microbiologist and Clinical Lead
Fiona M MacKenzie	Clinical Scientist and Scientific Project Manager

Name	Title
John McKinnon	Infection Control Manager
Pamela Harrison	Project Manager (Operational)
Sue Harrison	Team Leader
Madhuri Thakur	Communications Officer
MRSA Screening Project Team	
Pamela Harrison	Project Manager
Sue Harrison	Team Leader
Karyn Devalle	Project Secretary/PA
Lisa Kernaghan	Senior Staff Nurse
Julie Moir	Senior Staff Nurse
Lynsey Sievwright	Senior Staff Nurse
Iris Pirie	Senior Staff Nurse
Anne Smith	Senior Staff Nurse
Michelle Christie	Senior Staff Nurse
Emma Black	Senior Staff Nurse
Deepson Shyangdan	Data Collector
Alena Vasianovich	Data Collector
Anna Shankley	Data Collector
Hanne Bruhn	Data Collector
Abimbola Barango	Data Collector
Jyuthica Pendharkar	Data Collector
Borys Cornjo	Data Collector
Sujan Deb	Data Collector
Jade Ross	Screening Technician
Heather O'Hara	Screening Technician
Laura Duncan	Screening Technician
Fleur Tarling	Screening Technician
Nadia Ladha	Screening Technician
Vicky Harrison	Screening Technician
Jayne Wotherspoon	Screening Technician
Aysha Khalid	Screening Technician
Abimbola Ayroinde	Screening Technician
Bhindu Ravi	Screening Technician
Shona McBain	Screening Technician
Kathryn MacIntosh	Health Intelligence Officer
David Stuart	Biomedical Scientist and Data Manager

Western Isles pathfinder Project team

Name	Title
Gordon Jamieson	Chief Executive
Denise Wilson	Infection Control Manager
Craig Williams	Consultant Microbiologist
Christina Macaskill	Specialist and Practitioner Infection Control
Chris Anne Campbell	Western Isles Interim Hospital Manager
Mary Nolan	MRSA Project Manager
Kathy Turner	MRSA Tracker
Alison Benson	Biomedical Scientist
Nduri Abah	Medical Laboratory Assistant
Kirsty MacDonald	Ward General Assistants
Sinclair Currie	Ward General Assistants
Shona MacIver	Ward General Assistants
Anne MacLeod	Ward General Assistants
Marion Mitchell	Ward General Assistants
Caroline Martin	Ward General Assistants
Catherine MacDonald	Ward General Assistants (Uist)
Josie Morrison	Ward General Assistants (Start date 19/01/09)
Sheila Scott	Director of Public Health
Ian Gilbert	Laboratory Manager
Ian Pritchard	Microbiology Laboratory Manager

We would like to gratefully acknowledge the assistance of Julie Yates, Consultant in Public Health, (who has now moved on from NHS Western Isles) for her involvement in initiating the project.

Staff Patient Acceptability Project Team. Glasgow Caledonian University.

Name	Title
Kay Currie	Head of Division, Principal Investigator
Christina Knussen	Reader in Psychology
Lesley Price	Nurse Researcher
Margaret Brown	Nurse Researcher
John Smith	Web site developer
To be appointed	Support Researchers
To be appointed	Project administrator
Proposal Advisory Team	
Professor Debbie Tolson	Head of Research, School of Nursing, Midwifery and Community Health, GCU
Professor Tracey Howe	Director of HealthQWest Research Consortium, GCU
Dr Cynthia McVey	Head of Division of Psychology, GCU
Dr Jo Booth	Senior Research Fellow in Nursing, GCU

29 Appendix 13: Stakeholder Matrix

Table 30-1: Stakeholder Matrix

Topic of Interest	Pre-Admission Clinics	Patient Transfer	Screening Protocol	KPIs	Finance	Comms - Staff	Comms - Patient	HR	Procurement	Estates	Staff Training	MRSA surveillance	Bed Management	Emergency Admissions	Elective Admissions	Labs - Equipment	Laboratory management systems	Patient information systems	Medical Records	Prescribing (in and outpatients)	HEAT Targets
Stakeholder																					
Medical Director*																					
Medical Lead*																					
CPHM#																					
GP*																					
Infection Control Doctor*																					
Consultant Microbiologist*																					
HAI Clinical Lead*																					
Consultant Physician#																					
Clinical Scientist#																					
General Manager*																					
Unit Operation Manager#																					
Finance Manager*																					
General Manager#																					
Estates Manager*																					
Project Manager*																					
Team Leader#																					
ICM*																					
Procurement Manager*																					
Corporate Communications*																					
ICN*																					
Lead Nurse*																					
Nurse Manager*																					
Nurse Manager#																					
Bed Manager#																					
Antibiotic Pharmacist*																					
Labs Manager*																					
BMS*																					
Patient representative*																					
HR#																					

Staff Grouping	Colour
Medics	
Nurses	
Managers	
Laboratory Staff	
Pharmacy	

Stakeholders with a * we recommended should be represented on a Steering Board. Stakeholders with a # may be represented, but will be vary on local circumstances. This list of stakeholders is based upon experience in one Pathfinder Board – the terminology used may vary between Boards. With regard to the topics of interest for stakeholders this is an indication only – again this may vary according to local circumstances.

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10a. Abstract : [Maximum 200 words]

The MRSA Screening Pathfinder Project implemented Universal Screening within three Pathfinder Health boards from August 2008 to July 2009. This project reports the clinical effectiveness of implementation of MRSA Screening. The two interventions following screening for MRSA are (i) decolonisation (suppression) of confirmed positive cases, and (ii) isolation of those at high risk of, or confirmed as being, colonised. This large prospective cohort study (pathfinder study) of MRSA screened all admissions in three NHS boards, including six acute hospitals in NHSScotland and 81,438 admissions (one third elective and two thirds emergency), indicated an overall MRSA colonisation prevalence of 3.9%. The starting colonisation prevalence of 5.5% reduced to 3.5% by month twelve of the study. Factors influencing the prevalence of colonisation included: number of admissions per patient, specialty of admission, age and source of admission. Patients who were colonised on admission were 15 times more likely to develop hospital associated MRSA infection. The majority of the public health principles which should underpin a national screening programme have been largely met.

Authorisation *(complete as applicable)*

Role	**Name**
Head of Division/ Delegated owner	Mary Morgan
Lead Consultant	Prof. Jacqui Reilly
Project/Programme Manager	Sally Stewart
Document Business Classification	Active Projects and Programmes, Healthcare Associated Infections and Infection Control, Epidemiology and Statistics