

Saving Lives: a delivery programme to reduce Healthcare Associated Infection, including MRSA

Screening for Meticillin-resistant *Staphylococcus aureus* (MRSA) colonisation: A strategy for NHS trusts: a summary of best practice



Objective

All trusts should review their screening and decolonisation policies and assess what would be the best and most practical approach for immediate implementation.

Aim

This strategy presents recommendations which, if implemented, will reduce the risk of infection from MRSA through screening patients identified as 'at risk' from MRSA colonisation. All trusts should review their screening and decolonisation policies and implement a decolonisation regimen to reduce the risk of infection for these individuals and the spread of MRSA to other vulnerable patients.

Context

The transmission of MRSA and the risk of MRSA infection (including MRSA bacteraemia) can only be addressed effectively if measures are taken to identify MRSA carriers as potential sources and treating them to reduce the risk of transmission. This requires screening of patient populations for MRSA carriage **either before or on admission** to identify carriers and implement a decolonisation regimen.

There has been little consistent or definitive advice to the NHS on which patients to screen, how to screen them and when. There is also a high degree of variability in practice in NHS trusts and there is no single recommendation with a strong and incontrovertible evidence base that can be recommended uniformly for all NHS trusts. Some trusts have developed screening policies and protocols. It is also clear that reduction in MRSA infections and achievement of local MRSA bacteraemia targets will only be achieved with an increase in the level of screening and decolonisation in many trusts.

The normal habitat of *Staphylococcus aureus*, including MRSA, is human skin, particularly in the anterior nares (nose), axilla (armpit) and perineum (groin). Clinical infection with MRSA (including MRSA bacteraemia) occurs either from the patient's own resident MRSA (if he or she is an asymptomatic carrier) or by cross-infection from another person, who could be an asymptomatic carrier or have a clinical infection. Patients with a clinical infection caused by MRSA should, where feasible, be cared for in single-room isolation to minimise the risk of transmission.

Which patient groups should be screened?

This strategy presents scenarios and recommendations. These are given as options for screening of specific patient groups and are drawn from approaches found to be practicable and effective across various current NHS clinical settings.

Action point

Trusts should review their patient population and their MRSA infection data to identify those groups most at risk of MRSA bacteraemia and implement a screening policy based on these assessments.

There is good evidence and/or strong consensus that screening should be applied to the following groups:

1. Pre-operative patients in certain surgical specialties

Pre-operative patients in surgical specialties where the impact of MRSA infection can be particularly serious – elective orthopaedics, cardiothoracic and neurosurgery are the most frequent targets for this screen. The purpose is to prevent the patient becoming infected by their own MRSA and also prevent the risk of transmission to other vulnerable patients. The incidence of infection is low in these patients, but the effect of MRSA infection when it occurs can be devastating.

Action point: for immediate consideration

All NHS trusts should implement pre-operative screening for these groups of surgical patients. This is often done most conveniently at pre-admission clinics. Those found to be positive can undergo decolonisation before admission.

This can usefully be linked to the designation of the relevant surgical wards, especially orthopaedic wards, as a ring-fenced MRSA-free zone.

2. Emergency orthopaedic and trauma admissions

Many patients in this group are elderly and may be resident in nursing or care homes and/or be in regular contact with hospital or other healthcare services. Therefore, the risk of them being colonised with MRSA is increased. It is not possible to screen this group pre-admission but, in many trusts, they are a group with high rates of infection which may be reduced by screening on admission.

The results of screening tests are unlikely to be available immediately for many of these patients (unless a rapid screening method is used). If a patient within this group is considered to be at risk, there is a good case for instituting decolonisation on admission and discontinuing this when the screening test result is known to be negative for MRSA.

3. Critical care (including intensive care and high-dependency units)

Patients in intensive care units (ICU) and high-dependency units (HDU) have the highest risk of MRSA transmission and developing MRSA bacteraemia. The risk factors are either patients on the units with established MRSA infection (who will be known to staff) or patients admitted to critical care who are colonised asymptomatically with MRSA, which may cause subsequent infection in themselves or be transmitted to other patients.

Action point

All patients should be screened for MRSA carriage on admission to critical care and then at weekly intervals for those whose stay is prolonged. All positive patients should receive a full decolonisation regimen.

However, as the result is unlikely to be available immediately in many instances (unless a rapid screening method is used), there is a reasonable case for considering a system in which all patients are started on the decolonisation regimen on admission to the ICU or HDU. This should be discontinued if their screening test is negative for MRSA.

4. Renal medicine

Patients of renal units on dialysis have a very high risk of bacteraemia, particularly due to MRSA.

Action point

All patients on dialysis should be screened for MRSA on admission to the programme and then at regular intervals, determined by local practice in the light of national guidance. All patients should be screened for MRSA prior to creation of vascular or peritoneal access.

Other specified patient groups

The identification of other patient groups for pre-admission or admission screening should be determined by a local assessment of risk and practicality in individual trusts. These might include:

1. All patients previously known to be MRSA positive

Any patient who has had a positive MRSA culture (diagnostic or screen test) in the past should be screened on admission but also treated as a positive case.

2. All elective surgical patients

Screening this group would extend the approach used generally in orthopaedics, cardiothoracic and neurosurgery. Screening can be done easily and inexpensively at pre-admission clinics. Implementation of such a programme should be determined by local surveillance data on MRSA infections.

3. Oncology/chemotherapy inpatients

These patients are at particular risk of MRSA bacteraemia because of their immunosuppression and the procedures for vascular access that are an essential part of their treatment.

Action point

All trusts that have these groups of patients in their population should consider a screening programme appropriate to their patient groups.

4. Patients admitted from high-risk settings

Patients who have frequent contact with healthcare services and/or are resident in nursing or care homes are at a higher risk of being colonised with MRSA. Many trusts already screen any patients transferred to them from another hospital. If the initial hospital has screened the patient, the result should be notified to the receiving trust.

Some studies have shown that around 20% of nursing and care home residents are colonised with MRSA. These patients are at high risk of developing MRSA bacteraemia or of transmitting MRSA to other patients.

Action point

If they are not being screened as part of other patient groups, trusts should consider how local risk assessment can be done and screening implemented for these groups of patients.

5. All emergency admissions

Many of the MRSA bacteraemias occur in patients admitted as emergencies, predominantly to medical wards. These patients include a high proportion of elderly patients who have frequent contact with hospital/healthcare settings and are often linked to nursing or care homes. Several trusts consider that individual risk assessment (see above) is impractical and places too much reliance and responsibility on admissions staff, with the result that a significant proportion of those who should be screened do not have the tests done. It is simpler, more reliable and better received by staff to include screening as a universal test carried out on all patients admitted through A&E or into medical reception units. Studies in a London hospital found that 7–8% of all admissions were MRSA positive.

Screening all admissions

The logical conclusion of risk factor assessments and the results of modelling studies is that the most appropriate approach to the reduction in MRSA carriage in the population, and resultant MRSA infections, is the universal screening of all admissions to hospital (either at pre-admission clinics for elective admissions or immediately on admission for emergency admissions).

The most recent publication to reach this conclusion in an NHS setting was the draft Scottish Health Technology Assessment report in June 2006. This report recommended screening all admissions by a broth enrichment method on swabs from three sites, and identified a need for three isolation beds per 25-bed ward in order to treat the MRSA-positive patients in isolation (based on the 7–8% rate of MRSA positive admissions). This clearly had major resource implications for initial investment in terms of: the time taken by admissions staff to take samples and submit them to the laboratory; laboratory staff time, equipment and consumables; isolation facilities (if used); and clinical staff time and materials for decolonisation of positive patients. However, this has to be set against the very high costs incurred when treating patients who develop MRSA infection, as well as the ensuing morbidity and mortality.

Screening methods

Sample collection is the responsibility of the staff member admitting emergency patients or running pre-admission clinics. This requires training and a few minutes of extra time for each admission to collect the swabs (or instruct the patient to do this), complete the forms (with pre-printed labels) and place the samples in the despatch box.

Samples: The essential site to sample is the anterior nares (nose). This is the most common carriage site for MRSA and most patients positive at other sites have positive results from nose samples (but a small proportion do not). The secondary sites are the axilla (armpit) and perineum (groin). Any skin lesion should also be sampled. Evaluations of the PCR rapid test (see below) indicate that the nose sample alone would be adequate for a routine test if this method is used.

If broth enrichment methods are being used (see below), it is feasible for admissions staff to place the swab(s) directly into a vial of broth. Staff can easily be trained to swirl the swab(s) in the broth and then discard them before recapping the vial and sending it to the laboratory. This can reduce the time needed to get a result and also save laboratory time.

Testing methods

Three testing methods are in use in laboratories in the UK: direct culture on an MRSA-selective agar; broth enrichment with a sub-culture; and PCR rapid test. Currently, the choice is a matter for local assessment.

Direct plating on MRSA-selective agar (chromogenic agar with cefoxitin): This is a less sensitive test than broth enrichment but has the advantage that positive results (shown as coloured colonies of MRSA) as well as negative results are known after incubation for 24 hours.

Enrichment broth with selective agent and indicator: The sensitive culture result is obtained by broth enrichment culture for 24 hours and then plating on MRSA-selective agar (chromogenic). The inclusion of selective agents in the broth and an indicator of growth (or observation of turbidity) means that a negative result can be reported within 24 hours; a positive broth requires confirmation as MRSA by sub-culture on selective agar, requiring a total time of 48 hours. Initiating broth culture at the earliest opportunity (by the admissions staff placing the swab(s) directly into a vial of broth) provides a culture result in the shortest time.

PCR rapid test. This is licensed only for nose samples; other evaluations are currently under way. A result can be obtained two hours after receipt of the sample in the laboratory. Specialist, dedicated, PCR equipment and reagents are required.

Rapid testing, perhaps even at the point of care, is expected to be the norm in the future, which may not be too distant. In order to get the benefit of a rapid result, the laboratory testing service should be available when needed for the chosen patient groups, and the clinical services need to be able to take immediate action to decolonise a patient on receipt of a positive result.

Evaluations of the currently available PCR test in NHS settings in England are being undertaken at present.

Decolonisation

As soon as a patient is identified as an MRSA carrier, a decolonisation regimen should be started. This comprises the use of an antibacterial shampoo and body wash daily, and the application of an antibacterial nasal cream three times a day for five days. This should be done irrespective of whether facilities are available to isolate the patient.

The purpose of decolonisation is to reduce the risk of:

- the patient developing an MRSA infection with their own MRSA during medical or surgical treatment; and
- transmission of MRSA to another patient.

The decolonisation regimen is only 50–60% effective for long-term clearance, but as soon as the procedure is implemented the presence and shedding of MRSA are reduced significantly and the risk of the patient infecting themselves or transmitting MRSA to another patient is much reduced.

Isolation of patients

When a patient is identified as MRSA positive, either because they have an MRSA infection or because they have been identified as an asymptomatic carrier by screening, they should be isolated, if possible, to reduce the risk of transmission to other patients. If single rooms are not available for individual isolation, consideration should be given to separating MRSA-positive patients from non-carriers in cohort bays or wards. The decolonisation regimen should be applied as soon as a positive result is known, irrespective of the availability of isolation facilities.

Conclusion

All trusts, as a matter of urgency, should review their policies for MRSA screening to determine the most appropriate initial approach to screening for their patient population.

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