

PREVENTION OF  
MRSA SPREADING

2008

Guidelines

## **Prevention of MRSA spreading**

Guidelines

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## Preface

In recent years, the incidence of Methicillin-resistant *Staphylococcus aureus* (MRSA) infections has increased in Denmark. Formerly, MRSA was mainly found among in-patients who had acquired the infection abroad. Recently, MRSA has started spreading in non-hospital settings e.g. in nursing homes.

The incidence is currently low compared with a number of other European countries. To maintain a low incidence, the National Board of Health has prepared national guidelines on the prevention of MRSA spreading in hospital as well as non-hospital settings.

It is essential to maintain a low prevalence and incidence to prevent serious disease, but also to allow Denmark to continue a prudent antibiotic strategy.

The guidelines are directed at any employee of the health and nursing sector responsible for the care (including sanitation, patient transport etc.), nursing, examination and treatment of patients.

The two main principles of prevention are: 1) to identify and eradicate MRSA in the patients concerned, and 2) to ensure that health care workers adhere strictly to stipulated hygiene measures. To detect the bacterium, a number of risk situations have been listed which physicians, in particular, should be aware of when deciding who should be tested. The hygiene guidelines build on previously existing general or procedure-related guidelines to which the MRSA rules have been added.

A spin-off effect of the hygiene improvement is that it is expected to reduce the spread of other infections as well.

To facilitate close surveillance of any developments and implementation of more rigorous measures in connection with outbreaks, MRSA notification is made mandatory for physicians for cases without a history of previous MRSA infection or carriage.

A considerable number of people have contributed to this work by participating in the steering group and in a number of working groups set up as part of the process. The National Board of Health would like to extend its gratitude to the many contributors.

National Board of Health, October 2006

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# 1 Summary

Infection with methicillin-resistant *Staphylococcus aureus* (MRSA) may lead to serious disease, particularly in persons with underlying illness. As the bacterium is resistant, such infections may be difficult to treat.

In recent years, the incidence of MRSA infections has increased in Denmark. Formerly, MRSA was mainly found among in-patients who had acquired the infection abroad. Recently, MRSA has been observed to spread outside hospitals, e.g. nursing homes.

The incidence and prevalence is currently low compared with a number of other European countries. To maintain a low incidence, the National Board of Health has prepared national guidelines on the prevention of MRSA spreading in hospital as well as non-hospital settings.

The guidelines are directed at any employee of the health and nursing sector responsible for the care (including sanitation, patient transport etc.), nursing, examination and treatment of patients.

The overarching assumption is that MRSA patients should receive treatment and care and participate in social activities regardless of the infection or carriage.

The two main principles of prevention are: 1) to identify and eradicate the bacterium in the patients concerned, and 2) to ensure that health care workers adhere strictly to stipulated hygiene measures.

To detect MRSA, a number of risk situations have been listed which physicians, in particular, should be aware of when deciding who should be tested.

Otherwise healthy persons who test positive for the bacterium are not at substantial risk of becoming seriously ill. In such cases, however, it is recommended that the entire household receive therapy to remove the bacterium. The aims are to prevent less serious, but nevertheless troublesome infections, such as abscesses and impetigo, and to prevent spread to previously ill and ailing persons who are at risk of becoming seriously ill if infected with MRSA.

The hygiene guidelines build on previously existing general or procedure-related guidelines to which the MRSA rules have been added, e.g. that MRSA patients should be assigned single-patient rooms. It is essential to upgrade hospital hygiene and concurrently focus more intensely on hygiene in non-hospital settings, e.g. in nursing homes and other institutions. A spin-off effect of an overall hygiene improvement is envisaged to be a corresponding reduction of the spread of other health care associated infections.

To facilitate careful surveillance and implementation of more rigorous measures in connection with outbreaks, MRSA notification is made mandatory for physicians for cases with no history of previous MRSA infections/carriage. Notification should be made to the Medical Officer of Health and to Statens Serum Institut.

To facilitate the testing of relevant personnel in connection with outbreaks in hospitals, nursing homes and similar institutions, the National Board of Health has obtained an exemption on behalf of several appointing authorities as provided by the

Act on the use of health information etc. in the labour market, no. 286 of 26 April 1996 (Health Act). Such exemption was in force previously but has been updated to correspond with the guidelines prepared by the National Board of Health.

As efforts should be co-ordinated in areas of some magnitude among hospitals and between hospitals and primary health care, the formation of regional MRSA units and institution of local hygiene agreements should be encouraged.

## 2 Making of the guidelines

In 2004, the National Board of Health set up a steering group and an expert group. The expert group, which was chaired by Statens Serum Institut, submitted its draft recommendation to the National Board of Health in June 2005.

The draft has subsequently been adapted by the National Board of Health and a range of legal and economic issues has been considered. In this connection, the steering group set up an economy group. Finally, the National Board of Health established a small working group to prepare appendices directed at each target group.

The guidelines were submitted to the steering group and the expert group for consultation.

The members of the steering group and the working groups are listed in Appendix 7.

## 3 Introduction

### 3.1 Objective, overall principles and assumptions

The objective of the guidelines is to maintain a low level incidence of disease caused by Methicillin-resistant *Staphylococcus aureus* (MRSA) in Denmark.

Persons with underlying illness constitute the primary high risk group with regards to serious MRSA-associated disease. However, to limit infection spread, it is necessary to intensify efforts to detect and eradicate MRSA in affected individuals in hospitals as well as non-hospital settings.

Furthermore, it is essential to upgrade hospital hygiene in connection with MRSA and concurrently focus more intensely on hygiene in non-hospital settings, e.g. in nursing homes and other institutions. A spin-off effect of an overall hygiene improvement is envisaged to be a corresponding reduction of the spread of other infections.

**The fundamental assumptions concerning persons with MRSA are that they:**

- are entitled to receive health services exactly the same as any other person. Consequently, health care staff and other professionals carry the primary responsibility for preventing spreading from any citizen who is hospitalized, living at a nursing home or receiving home care, by adhering to hygiene measures;
- may be admitted to any hospital ward. MRSA patients should not be refused admission or transferral to another ward or department if such action would have an impact on the treatment of the patient's underlying condition;
- may participate in social activities, rehabilitation, etc. if they live at a nursing home or receive primary health care services, regardless of the infection;
- may attend schools and day-care centres unless they present with symptoms of acute disease such as infection of the respiratory tract, sores or abscesses.

The guidelines have been prepared according to Article 26 of Act no. 114 of 21 March 1979 on Measures to Control Communicable Diseases. Other provisions are mentioned where relevant.

## 3.2 Target group

The guidelines are targeted at any employee of the health and nursing sector, including student interns. The guidelines include the hospital sector, the nursing sector, the municipal health services and any hospital-external clinics, including general practitioners, dentists and medical officers of health. In the present guidelines, primary health care include the hospital outpatient activities and community nursing settings.

Health personnel play a pivotal role as they come into close contact with the patients and those at risk and because they may transfer the infection and become infected themselves.

Wherever the guideline refers to health personnel, the reference is to any employee responsible for the care (including sanitation, patient transport etc.), nursing, examination and treatment of patients.

## 4 Background

### 4.1 On MRSA

In the abbreviation MRSA, M stands for Methicillin, which was the first anti-staphylococcal penicillin, R for resistant and SA for *Staphylococcus aureus*. All humans are carriers of commensal staphylococci (*Staphylococcus albus*) that only rarely cause disease. Many are also periodic carriers of *S. aureus* without becoming ill. However, these may cause infections; most often less serious conditions such as impetigo and abscesses. *S. aureus*, may also - in particular in patients of ill-health - cause more serious infections such as pneumonia and sepsis, which require antibiotic therapy.

Previously, a specific type of penicillin, called penicillinase-stable penicillin, such as dicloxacillin or methicillin, could be used to treat staphylococcus infections. MRSA are resistant to those antibiotics. MRSA are also resistant to all other  $\beta$ -lactam antibiotics (penicillins, cephalosporines and carbapenems). Therefore, when a staphylococcus is resistant to methicillin, it is resistant to penicillin and the majority of other staphylococcus antibiotics.

Since 2003, Denmark has seen an increase in the number of MRSA cases following many years with a low MRSA incidence. Formerly, MRSA was almost exclusively found in hospitals, but the current increase has primarily occurred in non-hospital settings, however, major outbreaks have also occurred in hospitals.

The increased incidence is caused by changes within the staphylococcus genome leading to MRSA being carried for longer periods of time also in non-hospital settings, and spreading more efficiently than previously.

Compared with non-resistant staphylococcus infections, MRSA infections are associated with increased morbidity, prolonged admission and convalescence periods, and elevated mortality. Furthermore, if the MRSA proportion of staphylococcus infections exceeds a certain level, such as 10%, it may be necessary to change the standard antibiotic treatment from inexpensive narrow spectrum antibiotics to expensive broad spectrum drugs. MRSA infections, therefore, have profound consequences at the individual as well as at the socioeconomic level.

Previously, precautions such as prudent use of antibiotics, good hospital hygiene and contact tracing of patients who introduced MRSA from abroad, were sufficient to maintain a low number of Danish MRSA infections. It is essential that these precautions be maintained, but further measures are needed in the areas of hygiene and detection and eradication of the bacterium from the affected persons.

### 4.2 On infection and hygiene

MRSA spreads as other staphylococci. The primary source of infection is the human body, but the bacterium can survive extensively (for months) in the environment (e.g. in bed-linen, on furniture, floors and other objects). In asymptomatic carriers the bacterium is almost always present in the nose but can also be found in certain areas of the skin (groins and armpits), in the throat and in perineum. The

bacterium is transmitted by direct contact and by indirect contact, e.g. via fomites. In both situations transmission via the hands is the most frequent mode of infection. The infection risk is associated with the number of bacteria on the skin. Staphylococci will bind to skin cells, which may end up in dust, which can, in turn, become whirled up. Cleaning, including dust removal, is therefore significant to limiting the number of bacteria in the environment. Staphylococci may colonize the throat and may be coughed into the environment. However it is not an “airborne infection” in the sense where micro-organisms remain in the air for longer periods of time or can be transported by air over long distances.

Personnel may transmit MRSA from one patient to another, from contaminated objects to a patient or from themselves to a patient. The infection risk may be minimized by consistent adherence to hand hygiene practices.

Since 1998, the National Board of Health has recommended the use of general (procedure-related) infection hygiene measures in primary health care as well as in hospitals. The general measures are based on the prerequisite that it is not always possible to determine whether a patient constitutes a specific infection risk. Consequently, general infection hygiene measures should be used in connection with all patients. The National Board of Health sees a need to specify and in some situations supplement the general hygiene measures concerning prevention of MRSA spreading. The hope is that such a measure may improve the general hygiene level – especially in primary health care – ensuring that specific measures will only need to be employed in exceptional cases.

For day care institutions the National Board of Health has published: Hygiene in day care institutions – on health, prevention, safety and environment.

### 4.3 Organisational matters

The guidelines are directed at the personnel of the entire health care and nursing sector.

The managements of the concerned units (e.g. hospital wards and departments, nursing homes, home care services) are responsible for adhering to the preventive precautions.

The groups of staff who have specific professional competencies in the field of hygiene and prevention of infectious diseases are primarily clinical microbiologists, infectious disease specialists, hygiene nurses and medical officers of health.

The medical officers of health are responsible for the management of infectious disease outbreaks, mainly in primary health care. This task is solved in cooperation with relevant counterparts in e.g. the municipalities. The medical officers of health have legal title to implement preventive measures, primarily in connection with individually notifiable diseases.

All Danish counties have at their disposal a hygiene organisation, including infection hygiene experts (clinical microbiologists and hygiene nurses), who are in charge of matters in relation to hospital hygiene. Furthermore, they have guidelines on the prevention of MRSA spreading (local guidelines adapted from the current guidelines from Statens Serum Institut). A corresponding setup is not available to

the municipalities which will therefore face a considerable challenge to gain access to hygiene assistance for specific advice and personnel training. Hygiene nurses are a key component of these efforts. A considerable number of patients will be in contact with hospitals as well as with primary health care, and therefore it is essential that hospitals and primary health care cooperate.

National and international experience indicates that the efforts made in an area should include inter-hospital coordination as well as coordination between hospitals and primary health care. In view of the new Danish regional structure, the obvious choice is to establish regional MRSA units which may organize such coordination and collect knowledge and experience at the regional level in co-operation with the medical officers of health. Such MRSA units could employ, among others, hygiene nurses to assist municipalities in connection with management of household outbreaks or training of the key municipal personnel responsible for these tasks (or both). Such a joint hygiene organisation would not only be beneficial in the MRSA area but also in other contexts, and we therefore recommend that the relevant parties establish agreements to further such hygiene-related cooperation.

To assist the parties' solution of financial and organizational issues, the National Board of Health has undertaken a financial analysis of the guideline's recommendations.

Whenever the guidelines refer to a clinical microbiology department, the unit concerned in the local area may be a hygiene unit or a dedicated MRSA unit.

## 5 Notification

Guidelines for notification of MRSA have been prepared in pursuance of executive order no. 1002 of 6 October 2006 on physicians' notification of Methicillin-resistant *Staphylococcus aureus* (MRSA) found in persons, see Appendix 1. Mandatory notification takes effect as from 1 November 2006.

### 5.1 Notification criteria

The mandatory notification includes all cases where MRSA is initially diagnosed and cases where an MRSA subtype, not previously found in the person ("a new subtype"), is detected.

Notification is mandatory in symptomatic and as well as asymptomatic cases. This means that cases of clinical infection as well as asymptomatic carriers are subject to notification.

### 5.2 Notification procedures

MRSA may only be diagnosed by laboratory tests. The notification procedure and laboratory diagnostics are therefore integrated, which is reflected in the National Board of Health's form no. 5001, which should be used for MRSA notification. The front page of the notification form is shown in Appendix 2.

#### 5.2.1 Laboratory

Any laboratory that detects MRSA in a person with no MRSA history or no history of the detected subtype shall:

- Fill-in the upper part of the integrated form
- Send the form (pages 1-3) to the physician who has submitted the specimen for completion\*
- send page 4 of the form to the Staphylococcus Laboratory at Statens Serum Institut

\* including a personal card stamped by the laboratory and an information letter from the National Board of Health, both of which the physician should pass on to the patient.

When a person initially tests positive for MRSA, the laboratory shall immediately submit an isolate to Statens Serum Institut for subtype determination (enclosing page 4 of the notification form). Whenever a person is found MRSA positive at repeated examinations, a new MRSA isolate shall be sent for another subtype determination at least annually.

### 5.2.2 Notifying physician

Any physician who tests a person for MRSA shall, whenever the test is positive for the first time or shows a subtype not previously found in the patient, fill in the remaining sections of the form received from the laboratory, and:

- send page 1 to the Department of Epidemiology at Statens Serum Institut;
- send page 2 to the Medical Officer of Health covering the patient's place of residence;
- file page 3.

## 6 MRSA testing, treatment and follow-up

A person with MRSA may either have an MRSA-associated disease (be infected) or be an asymptomatic carrier (be colonised).

Asymptomatic carriers may suffer from other medical conditions, which increases the risk of MRSA infection and also adds to the risk of transferring the bacterium to others. Furthermore, some asymptomatic carriers can be difficult to treat e.g. asymptomatic throat carriers.

It is assumed that the risk of MRSA colonisation or infection is at the highest in the first two months after exposure, but remains elevated for as long as 12 months after exposure to the infection.

Checklists and an admission procedure overview related to the below subjects are included in Appendices 5 and 6.

### 6.1 Increased MRSA risk

A number of situations, medical conditions and exposures predispose to MRSA infection. These are characterised as risk situations and individual risk factors, respectively:

#### 6.1.1 Risk situations

- Has previously been diagnosed with MRSA
- MRSA positive person in household or other person in the immediate surroundings
- Lives in or visits daily at a nursing home department (or similar, e.g. institution servicing the disabled) with an MRSA outbreak
- Admitted to a room with an MRSA positive patient
- Admitted to a ward or department during an MRSA outbreak
- Has been admitted to or has received invasive outpatient treatment (e.g. placement of iv-line, drain, indwelling catheter, dialysis, surgery) at a foreign hospital (for the remaining Scandinavian countries and the Netherlands, precautions are as for admission in Denmark)
- Stays in poor hygienic conditions, e.g. war zones, refugee camps, orphanages (foreign adoption of children).

#### Work (incl. study and intern stays with patient contact):

- at a hospital, nursing home or institution with MRSA outbreak in Denmark, the remaining parts of Scandinavia or the Netherlands
- at a foreign hospital (for Scandinavia and the Netherlands only in connection with outbreaks)
- stays in poor hygienic conditions, e.g. in war zones, refugee camps, orphanages

#### 6.1.2 Individual risk factors

- Sores
- Chronic skin infections
- Chronic respiratory infections, including sinusitis
- Foreign invasive objects (e.g. urinary catheters/drains/intravenous catheters)
- Intravenous drug abuse

### 6.2 Who should be tested?

#### 6.2.1 On admission

On admission to hospitals in Denmark, all patients who have experienced a risk situation within the previous twelve month period should be tested for MRSA.

In connection with scheduled admission, the referring physician should ask the patient about risk situations and individual risk factors, and swab whenever indicated, to ensure that swab results may be known prior to admission. This may also be expedient in connection with referral to primary health care services.

#### 6.2.2 Health personnel in general

Health personnel who have been in a risk situation within the past 12 months should be tested. The test should be performed as quickly as possible after the recognition of the risk situation.

For health personnel who regularly participate in transfer of patients with an increased MRSA infection risk, or who regularly work abroad (commuter personnel), an individual agreement concerning the testing frequency should be made with the microbiology department.

Also, see the following sections on outbreaks.

In pursuance of an exemption from the Act on the use of health information, etc. in the labour market (Health Act), health personnel may be required to undergo tests for MRSA if they have been in a risk situation within the past 12 months.

The health personnel shall receive advance information in writing and verbally. Furthermore, all regulations concerning the passing on of health information shall be observed.

### 6.2.3 Outbreaks/unexpected detection at hospitals

In connection with unexpected detection in a patient, other patients who have shared a room with the concerned patient during the current admission should be tested.

If the MRSA spreads beyond the room, all of the ward's patients and all ward personnel who have been in contact with patients (including cleaning personnel) should be tested. Personnel is tested prior to initiating the next working day to avoid that personnel, who were only temporarily contaminated in connection with a work task, should be seen as MRSA carriers. As a general rule, personnel may continue their work until swab results are known.

All wards should keep room lists facilitating the identification of patients who have been admitted to a room with a patient who subsequently is identified as MRSA positive.

### 6.2.4 Non-hospital settings in general

In non-hospital settings, patients are tested as part of standard clinical investigation (abscess etc.). Particular attention is required in connection with infections which do not resolve as expected. Healthy household members need only to be tested if they are employed in the health care sector, or if they present with clinical signs or symptoms, or have individual risk factors, even though treatment is planned as part of the household therapy for MRSA carriers, cf. the section on treatment of the carrier state in the MRSA positive person and his or her household. Additional treatment should be agreed with the microbiology department.

### 6.2.5 Outbreaks in non-hospital settings

In connection with outbreaks (two or more cases within a group of persons) in e.g. a nursing home or any other institution or group of persons, it is essential that the group be swabbed, treated and that follow-up be performed concurrently for the entire group in order to avoid cross-infection. Such group tests should be implemented in agreement with the Medical Officer of Health and the clinical Microbiology Department.

The involved parties shall be informed of the test in writing and the regular confidentiality rules concerning the passing on of health information shall be observed cf. Chapter 9 of the Health Care Act.

## 6.3 What should the test include?

The following places are swabbed with cotton or carbon swabs:

- nose
- throat (tonsils)
- perineum (for in-patients)

Furthermore from any:

- sores
- skin affections such as eczema or psoriasis
- IV entry or drainage sites
- probes
- urine, provided the patient has an indwelling catheter
- tracheal secretion, provided the patient is intubated

One swab should be used at each of the following sites: Nose, throat, perineum. Additionally, one swab from any additional sites.

After swabbing, the stick is placed in Stuart's transport medium and the specimens stored in a cool place for as short a period of time as possible before being sent to the Microbiology Department. The specimen label should clearly indicate that an MRSA test is required.

Self-swabbing increases the risk of false negatives and should therefore be avoided.

Concurrent treatment with antibiotics or natural products with antibiotic-like effects (e.g. tea tree oil) may increase the risk of false negatives; therefore, any negative results are invalid in such cases.

### Laboratory

When a person tests MRSA positive for the first time, the laboratory shall immediately submit an isolate to Statens Serum Institut for subtype determination (including page 4 of the notification form). Whenever a person is found MRSA positive, a new MRSA isolate shall be sent for another subtype determination at least annually, cf. the section on notification.

### Protective equipment for swabbing presumably MRSA positive persons

When swabbing a presumably MRSA positive person, health care personnel should protect themselves against contact and droplet infection, e.g. by wearing a coat and gloves and by subsequent hand disinfection. In connection with risk of splashes and sprays, health care personnel should wear a mask, protective glasses and cap.

## 6.4 Treatment of MRSA positives

### 6.4.1 Instruction

**The treating physician should inform the patient of:**

- The management strategy (i.e. eradication therapy for all household members, home sanitation, follow-up)
- How to avoid infecting others. The treating physician receives a personal card and an MRSA information letter, which the physician should hand over to the patient. The physician receives this material from the Clinical Microbiology Department with the notification form, see appendix. The patient's name and the date of the first positive test should be written on the card before handing it over to the patient. The MRSA positive patient should show the card when coming into contact with the health care system.

It is important to note that otherwise healthy persons who test positive for MRSA are not at substantial risk of becoming seriously ill. Nonetheless, it is recommended that the entire household receive therapy to eradicate the bacterium. The aim is to prevent less serious, but nevertheless troublesome infections, such as abscess and impetigo, and to prevent spread to previously ill and ailing persons who are at risk of becoming seriously ill if infected with MRSA.

Health care personnel may generally report for work once they have received written and verbal instruction from the Clinical Microbiology Department (e.g. from the hygiene nurse) and have initiated carrier state treatment. They may, however, not return to work when presenting with symptoms of acute disease such as respiratory infection, sores or abscesses. In particularly sensitive work situations, e.g. in connection with the care of premature neonates, or if the employee in question has individual risk factors or has experienced treatment failure, occupational relocation in agreement with the work place may be an option until the employee has tested negative for MRSA.

### 6.4.2 Passing on information

Persons who have been diagnosed with MRSA are encouraged to inform health personnel they come into contact with of the diagnosis e.g. by presenting the MRSA card.

When referring patients, doctors shall pass on the patient's MRSA status to any health care personnel if relevant to the continued treatment or to the precautions which should be taken by the staff to avoid infecting others. The patient's consent hereto shall be solicited, particularly in situations in which the patient's current condition is not caused by MRSA, cf. the Healthcare Act, no. 546 of 24 June 2005, Section III, Confidentiality and Passing on of Health Information.

### 6.4.3 Treatment of MRSA carrier state in MRSA positive persons

The treatment includes both the index person, who has tested MRSA positive, and any remaining household members, regardless of whether they have been tested, and regardless of any such test outcomes.

Before the actual eradication therapy may be initiated, the treatment of any clinical MRSA infections or individual risk factors in the infected person and others in the immediate surroundings shall be concluded, e.g. by:

- Referring to dermatologist for eczema treatment
- Intensive sore treatment
- Treatment of respiratory infection
- Avoiding the use of permanent indwelling urinary catheters while MRSA is found in the urine (substitute with uridome, intermittent catheterisation or diapers).

If the above conditions cannot be remedied, treatment of carrier state should be attempted regardless of the outcome. In the period preceding treatment of the carrier state, the risk of spreading the bacterium from the infection and skin may be limited by starting the person on full-body washes with chlorhexidine hydrochloride soap. This should be done twice weekly and before e.g. clinic visits, appointments with the hairdresser, etc.

During this period mupirocin treatment of nasal carriage should not be administered, as prolonged/repeated treatment is associated with considerable risk of developing resistance.

### **Eradication treatment**

All members of a household should be treated simultaneously to avoid cross infection.

**The treatment has a minimum duration of 5 days and includes the following:**

- Application of mupirocin nasal ointment in both nostrils 3 x daily.
- Daily full-body wash including shampooing of the hair with chlorhexidine hydrochloride soap 4 %.
  - During the treatment period, no other soaps should be used. Soaps containing anionic compounds reduce the effect of chlorhexidine.
  - Each family member should use a clean towel after each wash.
  - Use of a moisturizer after washing is recommended to prevent dehydration of the skin. The moisturizer used should not contain anionic compounds as these reduce the effect of chlorhexidine (further information at [www.ssi.dk](http://www.ssi.dk) and the pharmacies). Use of conditioner, deodorant, after shave etc. is permitted.

For asymptomatic throat carriers, additional systemic antibiotics treatment may be needed. Systemic treatment should only be initiated after consulting the Clinical Microbiology Department and after resistance determination.

#### 6.4.4 Follow-up after carrier state treatment

At each examination, specimens should, as a minimum, be taken from the nose, throat, sores and if possible from the locations where MRSA has previously been detected; for in-patients also from the perineum.

The following number of examinations is the recommended minimum required for suspension of special measures in hospital and nursing settings:

- Specimens should be taken on day 7, 14 and 21 (minimum intervals) after conclusion of the treatment. Three batches of negative swabs are required.
- Personnel are subject to one additional examination on day 1 (after conclusion of the treatment) with a view to rapidly identifying treatment failure. This day 1 testing is not included in the three negative swab batches required.

For any other person, one examination will suffice; it should be performed no earlier than 21 days after treatment conclusion unless special circumstances prevail.

Test results should be recorded meticulously and it should clearly be stated when special measures such as isolation may be suspended.

Healthy members of the household, who have been treated concurrently with the index person, do generally not need to be control swabbed.

The probability that a person still carries MRSA after three negative swab batches from relevant localizations is reduced considerably. However, MRSA testing is a spot test, and false negatives may occur, particularly during the first 21 days after treatment. Specimens taken during the first 6 days after treatment conclusion should therefore be ignored. Follow-up visits after 3-12 months provide additional assurance that the person is MRSA free.

#### 6.4.5 Treatment failure

If a person remains MRSA positive after treatment, the following should be assessed:

- Is the isolate mupirocin-resistant?
- Individual risk factors?
- Throat carrier state? (pay attention to dentures and tooth-brushing)
- Lack of motivation or ability to comply with treatment requirements?
- Are any animals in the close vicinity MRSA carriers?
- Recolonizing from the environment?
- Contamination of cosmetics, creams and similar articles?
- Does the person wear or carry any foreign objects such as piercing trinkets or hearing aids?

Any causes that the initial treatment failed are countered. If possible, it may be recommended to let a hygiene nurse visit the home to perform a hygiene survey, give advice and in some cases take swabs. If the carrier state persists after two treatment attempts, the treating physician should contact the Clinical Microbiology Department for advice, as repeated use of mupirocin entails considerable risk of inducing resistance. The Clinical Microbiology Department should also be contacted if the isolate is mupirocin resistant.

If a clinical microbiologist assesses that eradication is not possible within the prescribed treatments, the risk of spreading the bacterium from infection and skin may be limited by starting the person on full-body washes with chlorhexidine hydrochloride soap. This should be done at least once weekly and before e.g. clinic visits, appointments with the hairdresser, etc. This procedure is identical to the procedure required before actual eradication treatment may be initiated.

In cases where health personnel remain MRSA positive, management should arrange to relocate the employees in question to a less exposed work area. Such an arrangement is an issue to be resolved between the person in question and his or her employer. Experience from other countries indicates that unsuccessful MRSA decolonization is extremely infrequent.

## 7 Infection control precautions

Spreading via contact, droplets or dust may occur in connection with procedures forming part of care and treatment within the health care system. Therefore, all procedures should be planned and implemented with maximum consideration of the infection risk.

The general guidelines are based on safe working procedures and technical as well as organisational precautions suited to prevent unfortunate occurrences to the extent possible and on the use of personal protection equipment (PPE).

### The general guidelines include:

- Hand hygiene
- Use of PPE (gloves, gown, mask, glasses/face shields)
- Handling of equipment
- Handling of soiled linen and waste
- Cleaning

The general (procedure-related) guidelines are found in the National Board of Health's Guidelines on Human Deficiency Virus HIV and the prevention of blood borne infection.

Measures should be taken to ensure that all personnel working with the examination, care or treatment of patients are aware of these precautions. This also applies to cleaners, etc.

The planning of the work and the organisation of the work environment should be adapted to further compliance with the measures.

Personnel responsible for the care (including sanitation, patient transport, etc.), nursing, examination and treatment of MRSA patients should be instructed in the additional precautions to prevent MRSA spreading.

### 7.1 Separate hygiene appendices

The separate hygiene appendices detail the general as well as the additional hygiene precautions. Separate hygiene appendices have been prepared for hospitals, nursing homes and similar institutions, home care services and clinics.

Hospital precautions are more restrictive, but it should be stressed that strict adherence to the outlined rules also in non-hospital settings is considered an essential prerequisite to the overall success of the entire initiative.

Instructions have been divided into the following topics:

- Patient placement, etc.
- Hand hygiene
- Protective equipment in general
  - Gloves
  - Uniform, plastic apron and gown
  - Mask, protective glasses, face shields
- Patient secretions and excretions
- Laboratory specimens, handling
- Equipment/utensils
- Waste
- Clothes and linen
- Cleaning, waste removal
- Examination and treatment outside parent ward or home (patient transport)

Initially, it should be underlined that hand hygiene is the most important precaution to prevent MRSA spreading whether one is providing care or treatment to patients or citizens in hospitals or in non-hospital settings. In the following sections, some general aspects will be discussed.

Furthermore, please refer to the separate hygiene appendices.

## 7.2 Hospitals

As stated in the introduction, the fundamental principle is that any patient may be admitted to any hospital ward. Consequently, MRSA patients should not be refused admission or transferral to another ward or department if such action would be beneficial to the treatment of the patient's underlying condition.

With reference to the separate hygiene appendices and procedure overview for admission, the following should be emphasized:

### Isolation

To reduce the risk of MRSA spreading to other patients, isolation should be maintained:

- For all MRSA positive patients
- Until a negative test result is produced:
  - Any patients who have been in a risk situation within the past 2 months
  - Any patients who have been in a risk situation within the past 12 months and who have individual risk factors

As a rule, single-patient rooms of any hospital ward can be used. Only patients who secrete or excrete large amounts of MRSA, e.g. in connection with MRSA pneumonia, may need to be transferred to an isolation room.

When MRSA is found in a patient admitted to a multiple-bed ward, the patient should be isolated. Any fellow patients should be cohort isolated in a separate room until negative swab results can be obtained.

### **Treatment outside the parent ward and in out-patient clinics**

The need to keep the patient in a single-patient room should not defer the care provided (examination, treatment, mobilization etc.) even though some activities may not be restricted to the room. The hygiene appendix presents the detailed precautions that should be observed when transporting patients. These precautions include the duty to inform the receiving department and the obligation of treatment section and out-patient clinic personnel to abide by the rules followed by the ward to which the patient is admitted.

### **Hand hygiene and personal protection equipment**

The rules stated in the hygiene appendix concerning use of PPE in connection with treatment of isolated patients may only be deviated from in cases where an employee simply needs to convey a short message without having any contact with the patient or the furniture and equipment of the room.

Cleaning personnel should be protected like the care personnel.

The patient should be informed of the importance of hand hygiene (hand disinfection) and be instructed; if needed receive assistance with the execution hereof.

In case of respiratory infection, the patient should wear a mask during transport to other parts of the hospital.

Visitors should be informed of the importance of hand hygiene (hand disinfection) and be instructed in the execution hereof. If visitors participate in the care, it is furthermore recommended that they use PPE. Visitors should be advised not to see other patients at the hospital. Anyone leaving the room should first disinfect their hands.

We furthermore refer to the guideline's section on MRSA carrier state, to the National Board of Health's letter on the subject, and to the separate hygiene appendix.

## 7.3 Nursing homes (assisted living facilities) and similar 24-hour care centres

As stated in the introduction, it is a fundamental principle that residents with MRSA should be able to participate in social activities, rehabilitation etc. regardless of the infection, if they live at a nursing home. Hence, a resident may participate in communal social activities and is not restricted to his or her room. However, residents with MRSA in the respiratory system and acute respiratory infection should not participate in joint activities during the acute course of the disease. If the acute course of the disease exceeds a few days (a cold), the patient should be assessed by a physician.

Residents with MRSA should be given single-person rooms; however, cohabiting couples may continue to share housing. All treatment and care tasks should take place at the resident's room. The hygiene appendix presents the precautions that should be observed when transporting patients, including the previous notification of the health professional who will treat the patient.

The personnel responsible for the treatment and care for the resident should observe the same precautions regarding hand hygiene and use of PPE as the hospital personnel.

It is recommended that the personnel wear a uniform (not private clothing) due to the contamination risk and subsequent risk of spreading the bacterium within the institution or in private contexts.

At nursing homes and other 24-hour care centres where persons in need of care live, it is essential that the personnel receive adequate instruction on hygiene precautions to avoid that they become infected or transfer the infection to others. It should be emphasized that the most important precaution is correctly performed hand hygiene.

The resident and any visitors should be informed of the importance of hand hygiene (hand disinfection) and be instructed in the execution hereof. If visitors participate in the care, it is furthermore recommended that they use PPE. Anyone leaving the room should first disinfect their hands.

We furthermore refer to the guidelines section and to the National Board of Health's letter on the MRSA carrier state, and to the separate hygiene appendix.

## 7.4 Home care

As stated in the introduction, the fundamental principle is that individuals with MRSA may participate in social activities, rehabilitation, etc. regardless of the infection while receiving primary health care. The hygiene appendix presents the precautions that should be observed when transporting patients, including the previous notification of the health professional who will treat the patient.

The personnel responsible for the treatment and care for the resident should observe the same precautions regarding hand hygiene and use of PPE as the hospital personnel.

It is recommended that the personnel wear a uniform (not private clothing) due to the contamination risk and subsequent risk of infection within the institution or in private contexts.

It is essential that the personnel receive adequate instruction on hygiene precautions to avoid becoming infected or transferring the infection to others. It should be emphasized that the most important precaution is correctly performed hand hygiene.

The person with MRSA and (to the extent possible) visitors should be informed of the hygiene precautions including that they should disinfect their hands before leaving the home.

The work should be planned to ensure that as few members as possible come into contact with the client.

We furthermore refer to the guidelines section and to the National Board of Health's letter on the MRSA carrier state, and to the separate hygiene appendices.

## 7.5 Other parts of primary health care

### 7.5.1 Clinics

As stated in the introduction to the guidelines, the fundamental principle is that MRSA patients are entitled to receive health services exactly as anyone else. Consequently, the personnel carry the primary responsibility to prevent the infection from spreading by adhering to hygiene precautions. It may, however, be considered whether visits e.g. to the GP, dentist, physiotherapist, chiropodist, chiropractor, etc. could be postponed until the 1<sup>st</sup> negative control swab result has been received. Such postponement should not lead to deferment of necessary examination, care, or treatment.

In connection with scheduled admission, the referring physician should ask the patient about risk situations and individual risk factors, and swab whenever indicated to ensure that swab results may be known prior to admission, cf. the section on examination. This is also recommended in connection with referral to primary health care services.

In clinics, the hospital rules on hand hygiene and PPE apply as well. Clinics should be organised (including access to PPE) and the personnel receive adequate instruction to avoid becoming infected or transferring the infection to others. Passing time in the waiting room should be avoided. It should be emphasized that the most important precaution is correctly performed hand hygiene.

Persons who have been diagnosed with MRSA are encouraged to inform health personnel they come into contact with about the diagnosis e.g. by showing the MRSA card, cf. the section on passing on of personal information.

We furthermore refer to the guidelines section and to the National Board of Health's letter on the MRSA carrier state, and to the separate hygiene appendices.

### 7.5.2 Ambulance transport, etc.

Referring to the material on hygiene precautions prepared for ambulance personnel (www.ssi.dk), the following is emphasized:

- When ordering an ambulance, notification should be given that the patient has been diagnosed with MRSA
- The patient should be transferred directly to or picked up directly from the bed ward or treatment room according to personnel instructions.

MRSA patients should not use joint transportation (with other patients) to and from hospitals.

However, MRSA patients may be transported in a normal taxi or by other means of transportation provided the following precautions are observed:

- Any sores should be covered by a close-fitting dry dressing
- The patient should wear clean clothes
- The patient should disinfect his or her hands before transportation

## 7.6 Schools and day-care centres, etc.

As stated in the introduction, the fundamental principle is that children may attend schools and day-care centres unless they present with symptoms of acute disease such as respiratory infection, sores or abscesses. This also applies to personnel; cf. The National Board of Health's guidelines on precautions against infectious diseases in schools and day-care centres for children and adolescents. If a child above school age has a single infected sore which is being treated and is covered by a dry and close-fitting dressing, he or she may attend the mentioned institutions.

A high and consistent level of everyday hygiene may contribute to prevent spreading of the infection. It is important that the preconditions for good hand hygiene among children and personnel are sufficient and that the cleaning standard is good. For further information, please see: Hygiene in day care institutions – on health, prevention, safety and environment, National Board of Health.

In boarding schools and similar institutions, those sharing a room should be considered as members of the household.

Specialised institutions for the physically and mentally handicapped comprise a separate problem area as many of the children/clients are frequently in contact with a number of hospital departments and because MRSA probably spreads more easily in such environments. If a person in such an institution is diagnosed with MRSA, it may be appropriate to offer examination and treatment of him or her within the institution or among some of the children/clients and personnel of the institution. Such measures will be implemented in co-operation between the Medical Officer of Health and the Clinical Microbiology Department.

In institutions, the Medical Officer of Health may implement extraordinary measures in co-operation with the Microbiology Department after informing in writing of such measures.

## 8 Appendices

Appendix 1: The National Board of Health's Executive order no. 1002 of 6 October 2006 on Physicians' notification of MRSA found in persons, see [www.sst.dk/MRSA](http://www.sst.dk/MRSA) or <http://www.retsinfo.dk/DELFIN/HTML/B2006/0100205.htm>

Appendix 2: Copy of front page of notification form, see [www.sst.dk/MRSA](http://www.sst.dk/MRSA)

Appendix 3: Copy of personal MRSA card (for MRSA positive persons), see [www.sst.dk/MRSA](http://www.sst.dk/MRSA)

Appendix 4: Treatment of carrier state (for MRSA positive person and household), see [www.sst.dk/MRSA](http://www.sst.dk/MRSA)

Appendix 5: MRSA checklist, see [www.sst.dk/MRSA](http://www.sst.dk/MRSA)

Appendix 6: Procedure overview at admission, see [www.sst.dk/MRSA](http://www.sst.dk/MRSA)

Appendix 7: Members of the steering group and working groups

Separate hygiene appendices, see <http://www.ssi.dk/sw44966.asp> or [www.ssi.dk/mrsa](http://www.ssi.dk/mrsa)

- Hygiene precautions, hospitals
- Hygiene precautions, nursing homes, assisted living facilities and similar institutions
- Hygiene precautions, home care
- Hygiene precautions, hospital external clinics

## Appendix 1:

### The National Board of Health's executive order on physicians' MRSA notification

#### Executive order no. 1002 of 6 October 2006 on Physicians' Notification of Methicillin-Resistant Staphylococcus aureus (MRSA) Found in Persons

In pursuance of Section 11 of Act on the Practice of Medicine, cf. executive order no. 272 of 19 April 2001 and Section 26 of Act no. 114 of 21 March 1979 on Measures to Control Communicable Diseases, the following is stipulated:

**Section 1.** Any physician who tests a person for MRSA shall, whenever the test is positive for the first time or shows a subtype not previously found in the person, notify in writing hereof.

*Subsection 2.* Such written notification shall be made to Statens Serum Institut, Department of Epidemiology and to the Medical Officer of Health in the region (until 1 January 2007 in the county) where the person resides.

*Subsection 3.* Notification shall be effected on Form 5001 of the National Board of Health, which is sent from the laboratory, cf. Section 2.

*Subsection 4.* Each form shall be used to notify one case only.

*Subsection 5.* Cases of clinical infection as well as asymptomatic carrier cases are subject to notification.

**Section 2.** If a test result is positive for the first time or a subtype which is new to the person concerned is detected, the laboratory shall, after filling in the laboratory section, send form 5001 of the National Board of Health to the physician who submitted the specimen.

*Subsection 2.* The laboratory shall simultaneously send a copy of the form filled in by the laboratory to Statens Serum Institut.

**Section 3.** This executive order takes effect as from 1 November 2006.

*National Board of Health, 6 October 2006*

Jens Kristian Gøtrik

/Else Smith

Translation from the home page of Retsinformation:

<http://www.retsinfo.dk/DELFIN/HTML/B2006/0100205.htm>

## Appendix 2:

### Front page of notification form

Original form which is submitted by the Clinical Microbiology Department and which shall be used for notification

(See the following page and [www.sst.dk/MRSA](http://www.sst.dk/MRSA))




## Appendix 3:

### Personal MRSA card (for MRSA positive persons)

Original card, which is sent to the treating physician by the  
Clinical Microbiology Department

(See the following page and [www.sst.dk/MRSA](http://www.sst.dk/MRSA))

#### Front:



The front of the card features the logo of Sundhedsstyrelsen (National Board of Health) at the top left. Below the logo, there are two horizontal lines for 'Name:' and 'Date:'. The text 'has been diagnosed with the MRSA bacterium (resistant staphylococcus) for the first time' is positioned between the name and date lines. A large, semi-transparent 'COPY' watermark is overlaid across the center. At the bottom, there is a blue bar with the website address 'www.sst.dk'.

**Sundhedsstyrelsen**  
National Board of Health

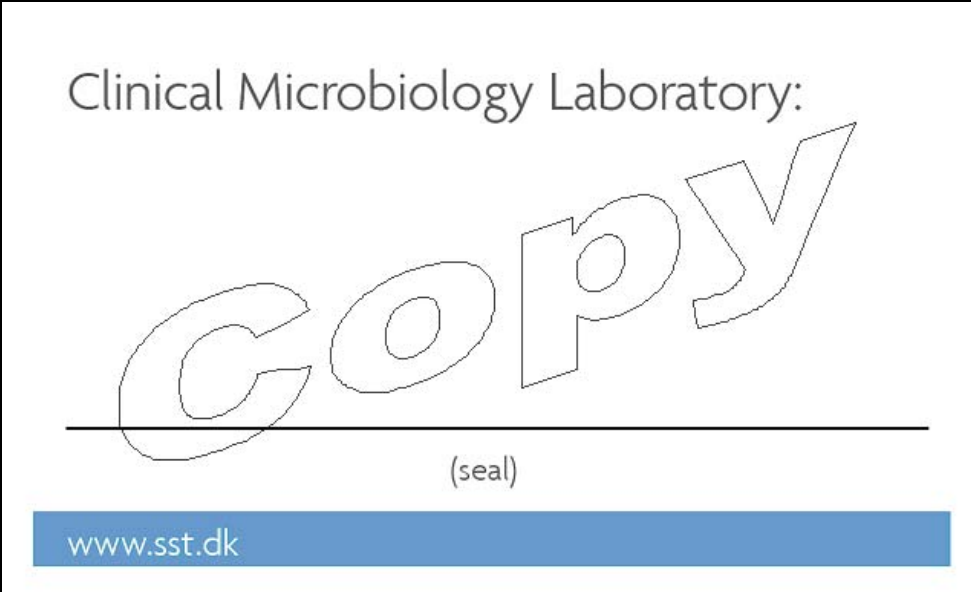
Name: \_\_\_\_\_  
has been diagnosed with the MRSA bacterium  
(resistant staphylococcus) for the first time

Date: \_\_\_\_\_

Show this card at any contact with a health care service, e.g. at the  
hospital, medical specislist, dentist or physiotherapist etc.

[www.sst.dk](http://www.sst.dk)

#### Everse:



The reverse of the card is mostly blank, with the text 'Clinical Microbiology Laboratory:' at the top. Below this text is a large, semi-transparent 'COPY' watermark. A horizontal line is drawn across the page, with the word '(seal)' centered below it. At the bottom, there is a blue bar with the website address 'www.sst.dk'.

Clinical Microbiology Laboratory:

\_\_\_\_\_

(seal)

[www.sst.dk](http://www.sst.dk)

## Appendix 4:

### Treatment of MRSA carrier state (for MRSA positive person and household)

Shall be sent to the treating physician by the clinical microbiology department

(See the following two pages and [www.sst.dk/MRSA](http://www.sst.dk/MRSA))

# Treatment of MRSA carrier state

If you or someone in your household has tested positive for MRSA, the National Board of Health recommends that the entire household attends 5 days of therapy to eradicate the bacterium.

MRSA is a bacterium (staphylococcus) which is resistant to treatment with standard antibiotics. The bacterium may be present on the skin or in the nose without causing signs of infection. This is called carrier state. The bacterium is transmitted by direct contact between humans or by touching objects such as door knobs.

Healthy persons who test positive for the bacteria are not at considerable risk of becoming seriously ill. However, the National Board of Health recommends that the entire household undergo treatment to eradicate the bacterium and thus prevent less serious but nevertheless troublesome infections, such as abscess and impetigo, and to prevent transference to previously ill and ailing persons who are at risk of becoming seriously ill if infected with MRSA.

## The period leading up to carrier state treatment

Any other infections should be treated before initiating the therapy. Sores or eczemas should heal up before the therapy if at all possible. It is essential that all members of the household be treated concurrently – agree with your doctor on a time at which treatment of the entire household may start.

Until the treatment is initiated, you may reduce the risk of spreading the infection considerably by washing with chlorhexidine hydrochloride soap 4 % twice weekly – the procedure is described on page 2 – and by covering any sores with close-fitting dressings.

It is important to wash your hands carefully before any contact with other persons. When washing your hands during the day, you may use an alcohol-based hand disinfectant with glycerol instead of the chlorhexidine hydrochloride soap if this is more convenient.

## During and after therapy

The risk of spreading the infection is reduced considerably once the treatment has been initiated. After the treatment you may be swabbed in the nose, throat and other places where MRSA was found before the treatment was initiated. However, this should not be done until at least three weeks after the treatment ends.

Normally, healthy members of the household do not need to have swabs performed, neither before nor after treatment. However, special rules apply for health care workers. Arrange the details with your doctor.

## MRSA card

The first time MRSA is found, a small card will be handed out. The card states that you have tested positive for MRSA and when this was verified. Please show the card when visiting at hospitals, doctors, dentists and any similar contact with the health care system during the first year after which MRSA could no longer be detected.

## Institutions

Children and personnel with MRSA may attend to schools and day-care centres unless they present with symptoms of acute disease such as respiratory infection, sores or abscesses.

In connection with outbreaks e.g. in childcare institutions you should notify the Medical Officers of Health.

## Further information

At the homepage of the National Board of Health you will find additional information and the Board's guideline on prevention of MRSA spreading – see [www.sst/MRSA](http://www.sst/MRSA). Homepage of Statens Serum Institut: [www.ssi.dk](http://www.ssi.dk)

On how to perform the treatment – see page 2

# Treatment instructions

The treatment takes five days and includes MRSA removal from the nose with a special nasal ointment, from the skin and hair by rinsing with a bactericidal soap, and from the home by washing articles of clothes and cleaning.

## 1. Removal of the bacterium from the nose

- Apply the nasal ointment (mupirocin 2 %, available on prescription) 3 times daily to both nostrils. Use a separate cotton swab for each nostril. Only apply the ointment inside the nostrils and no further up than you would be able to reach with a finger.
- Next, gently squeeze your nostrils together to distribute the ointment.
- Finally, wash your hands with chlorhexidine hydrochloride soap 4 %.

## 2. Removal of the bacterium from skin and hair

Shower daily (not in the tub) rinsing your body and hair with chlorhexidine hydrochloride soap 4 %:

- Initially shower your body and hair thoroughly.
- Wash your hair and face – be particularly thorough in the area surrounding your nose. Avoid getting the soap into your eyes.

If you use reusable wash cloths, they should be cleaned at boiling temperature, and you should discard any disposable wash cloths immediately after using them.

- Wash your arm pits and then the rest of the body – be particularly thorough in and around the navel, around the genitals, the rectum and the skin in-between.
- Rinse off the soap completely with plenty of water – and dry off with a clean towel.

To stop your skin from drying out, you may use a moisturizer after washing. Some moisturizers reduce the effect of the disinfective soap. You will find a list of suitable moisturizers at the homepage of Statens Serum Institut: [www.ssi.dk](http://www.ssi.dk) – or ask your local pharmacist.

Do not wear jewellery during the therapy, particularly rings, earrings and piercing-jewellery. During the therapy you may use hair balm, deodorant, after shave, etc., but no other soap or shampoo than the chlorhexidine hydrochloride soap. See the treating doctor if the treatment causes major skin irritation.

## 3. Removal of the bacterium from the home

- All members of the household should have personal towels and wash cloths – put on clean underwear and substitute used towels and wash cloths with clean ones daily after showering.
- All members of the household should have clean bed linen on the second day of the therapy and at the end of the therapy.
- Bed linen, towels, wash cloths, underwear, tea towels and dishcloths should be boiled after use. If possible, we recommend that you wash duvets and pillows at the end of the therapy.
- You should air the home daily and also air pillows and duvets.
- All horizontal surfaces should be cleaned with water and soap.
- The home should be vacuumed on the second day and at the end of the therapy. Mattresses and fabric upholstered furniture should also be vacuumed thoroughly.
- Places which are touched frequently, such as door knobs, water taps, toilet seats and toilet flush buttons should be cleaned daily.

These instructions were prepared by a working group under the National Board of Health, October 2006. It is available in an electronic format at the home page of the National Board of Health: [www.sst.dk/MRSA](http://www.sst.dk/MRSA)

## Appendix 5:

### MRSA checklists

Prepared by a working group under the National Board of Health in accordance with the Board's Guideline on Prevention of MRSA Spreading, October 2006

(See the following page and [www.sst.dk/MRSA](http://www.sst.dk/MRSA))

## MRSA CHECKLISTS

Risk situations (exposure)	Risk factors	Swab sites
<ul style="list-style-type: none"> <li>formerly MRSA positive person</li> <li>MRSA positive person in household or in immediate surroundings</li> <li>lives at a nursing home or institution with an MRSA outbreak or visits daily</li> <li>admitted to a room with an MRSA positive patient</li> <li>admitted to a ward or department with an MRSA outbreak</li> <li>admission or invasive out-patient treatment at foreign hospital (for Scandinavia and the Netherlands, as in connection with outbreaks in Denmark)</li> <li>stays in poor hygienic conditions, e.g. war zones, refugee camps, orphanages etc.</li> </ul> <p>Work incl. study and intern periods:</p> <ul style="list-style-type: none"> <li>hospital, nursing home or other institution with MRSA outbreak</li> <li>foreign hospital (for Scandinavia and the Netherlands, only as in connection with outbreaks in Denmark)</li> <li>stays in poor hygienic conditions, e.g. war zones, refugee camps, orphanages etc.</li> </ul>	<ul style="list-style-type: none"> <li>sores</li> <li>chronic skin conditions</li> <li>chronic respiratory infections, including sinusitis</li> <li>foreign objects, e.g. urinary catheters, drain, intravenous catheters etc.</li> <li>intravenous drug abuse</li> </ul>	<ul style="list-style-type: none"> <li>nose</li> <li>throat (tonsils)</li> <li>perineum at admission</li> </ul> <p>Furthermore, from any:</p> <ul style="list-style-type: none"> <li>sores</li> <li>skin affections such as eczema or psoriasis</li> <li>injection sites by intravenous access and drain</li> <li>probes</li> <li>urine in connection with indwelling catheters</li> <li>tracheal secretion by intubation</li> </ul>

### AT ADMISSION - WHEN TO:

#### 1. Test for MRSA?

- risk situation within **12 months\***

\* if not negative immediately prior to admission.

#### 2. Isolate in single-room?

- MRSA detected
- risk situation within **2 months\***
- risk situation within **12 months**, if concurrent risk factor\*

\* if not negative immediately prior to admission.

#### 3. Suspend isolation?

- MRSA not detected

A minimum of 3 batches of negative specimens after conclusion of eradication treatment: Day 7, 14 og 21\*

\* earlier specimens or specimens taken at shorter intervals do not count. Positive samples reset the count.

## Appendix 6:

### Procedure overview at admission

Prepared by a working group under the National Board of Health in accordance with the Board's Guideline on Prevention of MRSA Spreading, October 2006

(See the following page and [www.sst.dk/MRSA](http://www.sst.dk/MRSA))

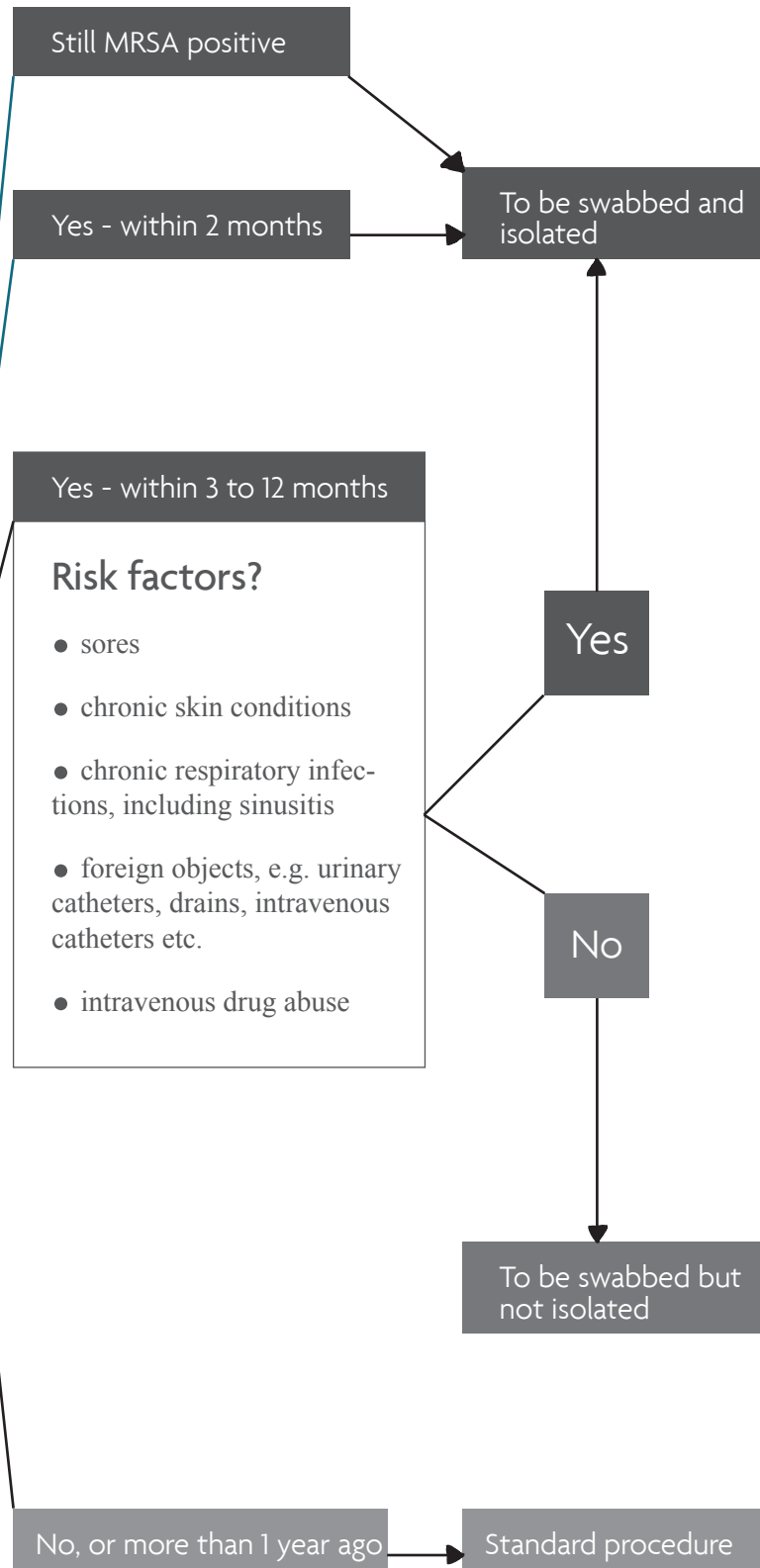
# SWABS - ISOLATION AT ADMISSION?

## Risk situations?

- person formerly MRSA positive
- MRSA positive person in household or in immediate surroundings
- lives at a nursing home or institution with an MRSA outbreak or visits daily
- admitted to a room with an MRSA positive patient
- admitted to a ward or department with an MRSA outbreak
- admission or invasive out-patient treatment at foreign hospital (for Scandinavia and the Netherlands, as in connection with outbreaks in Denmark)
- stays in poor hygienic conditions, e.g. war zones, refugee camps, orphanages etc.

Work incl. study and intern periods:

- hospital, nursing home or other institution with MRSA outbreak
- foreign hospital (for Scandinavia and the Netherlands, only as in connection with outbreaks in Denmark)
- stays in poor hygienic conditions, e.g. war zones, refugee camps, orphanages etc.



## Appendix 7:

# Members of the steering and working groups

### **Steering group (2004-2006):**

#### **Association of Danish Counties:**

- Planning Director Lars Kinnerup
- Hospital Director Bjarne Normark
- Managing Head Nurse Dorthe Bruun Jacobsen

#### **Copenhagen Hospital Cooperation (CHC):**

- Medical Director Jens Jacob Krintel

#### **Local Government Denmark:**

- Managing Head Nurse Karen Dam Hansen

#### **Danish Society for Clinical Microbiology:**

- Staff Physician Lene Nielsen

#### **Statens Serum Institut:**

- Sector Director Frank Espersen

#### **The Medical Officers of Health:**

- Medical Officer of Health Anne-Marie Plesner (from August 2005) Medical Officer of Health Tove Rønne (until August 2005)

#### **Appointed by the National Board of Health**

- Hygiene Nurse Kirsten Kristoffersen
- Nursing Home Director Solveig Hansen
- General Practitioner Per Grindsted
- Professor, Consultant Hans Jørn Kolmos

#### **The National Board of Health:**

- Centre Manager Else Smith (chair)
- Staff Physician Sigrid Poulsen (until August 2005)
- Consultant Tove Rønne (from August 2005)
- Professor, Consultant Jens Ole Nielsen; expert adviser to the National Board of Health on epidemic diseases

### Expert group (2004-2005)

- Thomas Benfield, Registrar, Department of Epidemiology, CHC Copenhagen University Hospital
- Pia Boysen, Nurse, Ballerup
- Lone Carlsson, Hygiene Nurse, The Central Hospital Hygiene Section, Statens Serum Institut
- Kurt Fuursted, Consultant, Clinical Microbiology Department, Aarhus Hospital
- Bente Gahrn-Hansen, Consultant, Clinical Microbiology Department, Odense University Hospital
- Finn Gottrup, Professor, Consultant, University Centre for Wound Healing, Odense University Hospital
- Per Grinsted, General Practitioner, Intern Coordinator, Odense
- Solveig Hansen, Nursing Home Director, Tårnby
- Dorte Harning, Microbiologist, Working Environment Authority
- Ole Heltberg, Consultant, Clinical Microbiology Department, Hospital of Storstrom County, Næstved
- Jens Otto Jarløv, Consultant, Clinical Microbiology Department, Herlev
- Elsebeth Tvenstrup Jensen, Staff Physician, The Central Hospital Hygiene Section, Statens Serum Institut (chair with Robert Skov)
- Lene Junker, Hygiene Nurse, Infection Hygiene Unit, CHC Copenhagen University Hospital
- Ebbe Frank Jørgensen, Medical Officer of Health, MOH Vejle County
- Hans Jørn Kolmos, Professor, Consultant, Clinical Microbiology Department, Odense University Hospital
- Brian Kristensen, Consultant, Clinical Microbiology Department, Aarhus Hospital
- Mathilde S. Larsen, House Officer, The Central Hospital Hygiene Section, Statens Serum Institut
- Alex Laursen, Consultant, Infection Medicine Department, Aarhus Hospital
- Jørgen Meile, General Practitioner, Intern Coordinator, Copenhagen
- Catrin Reese, County Hygiene Nurse, Clinical Microbiology Department, Vejle Hospital
- Tove Rønne, Medical Officer of Health, MOH for Copenhagen and Frederiksberg
- Carsten Sand, Consultant, Dermatology Department, Bispebjerg Hospital
- Robert Skov, Staff Physician, Staphylococcus laboratory, Statens Serum Institut (chair with Elsebeth Tvenstrup Jensen)
- Marie Stangerup, Hygiene Nurse, The Central Hospital Hygiene Section, Statens Serum Institut
- Tinna Urth, Hygiene Nurse, Infection Hygiene Section, Aalborg Hospital
- Niels Henrik Valerius, Consultant, Paediatric Department, CHC Hvidovre Hospital
- Henrik Westh, Consultant, Clinical Microbiology Department, CHC Hvidovre Hospital.

#### **Appendix Group (2006):**

- Elsebeth Tvenstrup Jensen, Staff Physician, The Central Hospital Hygiene Section, Statens Serum Institut
- Robert Skov, Consultant, Staphylococcus Laboratory, Statens Serum Institut
- Marie Stangerup, Hygiene Nurse, The Central Hospital Hygiene Section, Statens Serum Institut
- Lene Junker, Hygiene Nurse, Hygiene Unit, Copenhagen University Hospital
- Tinna Urth, Hygiene Nurse, Infection Hygiene Section, Aalborg Hospital
- Ole Heltberg, Consultant, Clinical Microbiology Department, Hospital of Storstroem County, Næstved
- Dorte Alnor Wandall, Staff Physician, Medical Officer of Health, MOH for the County of Funen
- Tove Rønne, National Board of Health (chair)

#### **Writing Group (2005-2006)**

The guideline was written by Tove Rønne, National Board of Health in close collaboration with Robert Skov and Elsebeth Tvenstrup Jensen, Statens Serum Institut.

Separate hygiene appendices:

Hospitals, nursing homes, home care, clinics

(See the following pages and [www.sst.dk/sw44966.asp](http://www.sst.dk/sw44966.asp)) or [www.ssi.dk/mrsa](http://www.ssi.dk/mrsa))

- Hygiene precautions, hospitals
- Hygiene precautions, nursing homes, assisted living facilities and similar institutions
- Hygiene precautions, home care
- Hygiene precautions, hospital external clinics

# Appendix: Hygiene precautions, hospitals

Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)



**STATENS  
SERUM  
INSTITUT**

Subject	General hygiene precautions	Additional MRSA precautions
<b>Patient placement etc.</b>	No requirements/precautions	<ul style="list-style-type: none"> <li>➤ Isolation at ward of admission in single-person room with separate bath/toilet (or chair-mounted bed-pan)</li> <li>➤ Keep the door closed</li> <li>➤ Place notice on the door concerning isolation</li> <li>➤ Perform all treatment and care tasks in the room</li> <li>➤ Examination and treatment outside ward of admission or home (see below sections)</li> </ul> <p>Only patients who spread large amounts of MRSA e.g. in connection with MRSA pneumonia, should be transferred to an isolation room (single room with anteroom, confer with microbiologist/infection specialist)</p>
<b>Hand hygiene*</b> <i>*See: Everything you need to know about hand hygiene</i> <a href="http://www.ssi.dk/sw9345.asp">www.ssi.dk/sw9345.asp</a>	Hand disinfection or hand washing: <ul style="list-style-type: none"> <li>• before and after patient contact</li> <li>• before clean tasks</li> <li>• after unclean tasks</li> <li>• after using/changing gloves and other PPE (personal protection equipment)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Hand hygiene is the most important precaution</li> <li>➤ Hand disinfection is first option</li> <li>➤ Visibly contaminated hands are first washed then disinfected</li> <li>➤ Always disinfect hands when leaving the room and after removing any PPE</li> </ul> <p>The patient and any visitors should be informed of the importance of hand hygiene (hand disinfection) and be instructed/assisted in the execution hereof.</p>
<b>Protection equipment in general</b>	Protection equipment comprise the gear worn by personnel to: <ul style="list-style-type: none"> <li>• protect personnel against infection by microorganisms</li> <li>• prevent personnel from transferring infection</li> </ul>	<p>Always wear protection equipment when entering the room.</p> <p>Only when the room is entered exclusively to deliver a short message may personnel deviate from this procedure.</p>
<b>Gloves</b>	Wear gloves for all tasks comprising a risk of contaminating the hands with blood, pus, secretions (e.g. from sores, drains, nose, mouth, throat, lower respiratory system, gastrointestinal system, genitals, semen) and excretions (faeces, urine). <p><b>NOTE.</b> Gloves are disposable and should therefore not be washed or dis-</p>	<ul style="list-style-type: none"> <li>➤ Wear gloves in connection with any contact with the patient, equipment, inventory, soiled linen and waste.</li> </ul> <p>Visitors should use gloves when participating in the care</p>

# Appendix: Hygiene precautions, hospitals

Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)



Subject	General hygiene precautions	Additional MRSA precautions
	<p>infected. Contaminated gloves may cause the infection to spread. Gloves must therefore be changed between procedures and when contaminated.</p>	
<p><b>Uniform, plastic apron and gown</b></p>	<ul style="list-style-type: none"> <li>• Uniform/overall should be used</li> <li>• Wear a plastic apron/gown when at risk of becoming contaminated with blood, pus, secretion, and excretion; The plastic apron provides superior protection when there is a risk of soaking.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Use a disposable liquid proof gown that covers the uniform/overall in connection with any direct contact with the patient, equipment, inventory, soiled linen and waste</li> <li>➤ Make sure that the sleeves close tightly at the wrists</li> </ul> <p>Visitors should wear a disposable liquid proof gown when participating in the care.</p>
<p><b>Surgical mask, protective glasses, face shields</b></p>	<p>Should be used whenever there is a risk of splashes or sprays of blood, pus, secretion or excretion. Face shields may be preferable in some situations.</p>	<p>Use a surgical mask:</p> <ul style="list-style-type: none"> <li>➤ during contact with patients with respiratory MRSA infection</li> </ul> <p>Consider using a surgical mask:</p> <ul style="list-style-type: none"> <li>➤ to avoid inhalation of whirled-up dust, e.g. when making beds or changing dressings</li> <li>➤ during contact with patients with a highly epidemic MRSA strain</li> </ul> <p>In the above situations, visitors should wear a surgical mask when participating in the care.</p>
<p><b>Patient secretions and excretions</b></p>	<ul style="list-style-type: none"> <li>• Avoid touching (wear gloves)</li> <li>• Urine, faeces and other liquid substances (blood, pus, secretion) should be flushed directly into the toilet or bedpan boiler</li> </ul>	<ul style="list-style-type: none"> <li>➤ MRSA infected sores should be covered by a close-fitting dressing</li> <li>➤ Change the dressing if any liquid soaks through</li> </ul>
<p><b>Laboratory specimens</b></p>	<ul style="list-style-type: none"> <li>• Should be securely packaged</li> <li>• All specimens should be considered potentially infectious</li> <li>• Consignment of specimens must take place in accordance with post service regulations.</li> </ul>	<p>Furthermore, follow any local guidelines concerning MRSA specimens.</p>
<p><b>Equipment/utensils*</b> *Also read: <i>Advice and instructions on disinfection in the health care sector, the Central Hospital Hygiene Section, SSI</i></p>	<ul style="list-style-type: none"> <li>• Wash immediately in dishwasher or decontaminator, previous rinsing or disinfection is normally not needed</li> <li>• Use dishwasher for heat disinfection if possible</li> <li>• Where heat disinfection is not an option, use a suitable chemical disinfection agent.</li> </ul>	<p>Equipment/utensils and aids*</p> <ul style="list-style-type: none"> <li>➤ should only be brought into the room if they can be cleaned and disinfected, use disposable equipment if not</li> <li>➤ should stay with the patient, if possible</li> <li>➤ should be disinfected after cleaning</li> <li>➤ limit any storage in the room</li> </ul>

# Appendix: Hygiene precautions, hospitals

Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)



Subject	General hygiene precautions	Additional MRSA precautions
<p><b>Waste*</b> *Also read: <i>Guideline from the Environmental Protection Agency: Handling of clinical risk waste</i></p>	<p>Waste should be disposed of via standard refuse collection unless categorized as clinical risk waste, which includes:</p> <ul style="list-style-type: none"> <li>• sharp and pointed waste</li> <li>• disposable material containing blood, pus or tissue liquids which drip when compressed</li> </ul>	<p>No additional requirements/precautions.</p>
<p><b>Clothes and linen</b></p>	<ul style="list-style-type: none"> <li>• Handle soiled linen as little as possible</li> <li>• Items of clothing which are very bloody or contaminated with e.g. faeces or urine should be placed in a plastic bag before being sent to the laundry</li> <li>• due to the subsequent handling of the laundry, it is essential that it is free of sharp and pointed objects; this is important to ensure the safety of laundry personnel</li> </ul>	<ul style="list-style-type: none"> <li>➤ change patient clothing and bed linen daily</li> <li>➤ avoid shaking patient clothes and bed linen as this will whirl up dust</li> </ul>
<p><b>Cleaning, waste removal*</b> *Also read: <i>Advice and instructions on disinfection in the health care sector, the Central Hospital Hygiene Section, SSI</i></p>	<ul style="list-style-type: none"> <li>• any spill of blood, secretion, excretion and pus must be wiped up immediately and all visible contamination removed, wear gloves</li> <li>• after wiping up substantial quantities of blood or other tissue liquids, the site may be wiped off with a suitable disinfection agent</li> <li>• Surfaces such as walls and floors rarely cause transmission of infectious diseases, and generally disinfection of such surfaces will not be needed as standard cleaning is sufficient</li> <li>• Broken glass should never be left behind. It should be carefully removed and disposed of as other sharp or pointy waste</li> </ul>	<p>Cleaning personnel should use protective equipment in line with the care personnel.</p> <p><i>Daily cleaning:</i></p> <ul style="list-style-type: none"> <li>➤ the room should be cleaned after all other programmed activities</li> <li>➤ contact points (e.g. door knobs, bed guards, water taps, toilet seats, toilet flush buttons, bell cord, and light and equipment switches) should be disinfected using a suitable disinfectant*</li> <li>➤ other horizontal surfaces in the room (bed, bedside table, chairs, tables, equipment) and the bath/toilet should be cleaned using standard cleaning agents</li> <li>➤ floors should be washed</li> <li>➤ the cleaning utensils should be left in the room and any cloths used should be sent to the laundry or discarded</li> </ul> <p><i>Final cleaning (suspension of isolation):</i></p> <ul style="list-style-type: none"> <li>➤ clean room and any inventory and equipment and the bath/toilet with standard cleaning agents</li> <li>➤ subsequently disinfect the bed, bed table, chairs/tables, equipment,</li> </ul>

# Appendix: Hygiene precautions, hospitals

Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)



Subject	General hygiene precautions	Additional MRSA precautions
		<p>horizontal surfaces and the contact points mentioned above</p> <ul style="list-style-type: none"> <li>➤ wash the floors</li> <li>➤ disinfect/wash pillow and duvet</li> <li>➤ mattress covers should be cleaned and disinfected; alternatively the mattress may be sent for low-pressure autoclave sterilization or be discarded</li> <li>➤ any other fabric should be sent to the laundry</li> </ul>
<p><b>Examination and treatment outside parent ward</b></p>	<p>No requirements/precautions.</p>	<ul style="list-style-type: none"> <li>➤ notify the receiving department</li> <li>➤ make sure that examination and treatment take place late in the day and with no other patients present</li> <li>➤ transport the patient directly to the examination or treatment room avoiding stop-overs in waiting facilities</li> <li>➤ make sure that the patient wears clean clothes and that the bed is newly made before transport</li> <li>➤ ensure that any dressings are tight-fitting and show no signs of soaking through</li> <li>➤ the patient should disinfect his or her hands when leaving the room</li> <li>➤ in case of respiratory infection the patient should wear a surgical mask</li> <li>➤ immediately before the transport wipe down any bed guards and ends with a suitable disinfection agent because this is done, the porter (ambulance personnel) and any other accompanying personnel do not need to wear PPE during transport, but must disinfect their hands after the transport; in case of direct patient contact (e.g. lifts) protective equipment should be worn as stipulated</li> <li>➤ the treatment section should abide by the same guidelines as the bed ward</li> <li>➤ remove all unnecessary equipment and inventory from the examination or treatment room: equipment that cannot be removed should be covered</li> </ul>

# Appendix: Hygiene precautions, hospitals

Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)



Subject	General hygiene precautions	Additional MRSA precautions
		After treating the patient: <ul style="list-style-type: none"><li>➤ clean all horizontal surfaces with ordinary detergents</li><li>➤ disinfect all contact points (e.g. door knobs, examination gurney, chair seats, armrests) that have been touched by the patient or personnel using a suitable disinfectant</li><li>➤ wash the floor</li></ul>

# Appendix: Hygiene precautions, nursing homes (assisted living facilities) and similar institutions

Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)



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Subject	General hygiene precautions	Additional MRSA precautions
<b>Patient placement etc.</b>	No requirements/precautions.	<ul style="list-style-type: none"> <li>➤ The resident should be given a single-person room; however, cohabiting couples may continue to share housing.</li> <li>➤ Keep any doors to the room closed</li> <li>➤ Perform all treatment and care tasks in the resident's room</li> <li>➤ Residents may participate in social activities outside their room. However, residents with respiratory MRSA and acute respiratory infection should not participate in joint activities during the acute course of disease, cf. The National Board of Health's guideline</li> </ul>
<b>Hand hygiene*</b> <i>*See: Everything you need to know about hand hygiene</i> <a href="http://www.ssi.dk/sw9345.asp">www.ssi.dk/sw9345.asp</a>	Hand disinfection or hand washing: <ul style="list-style-type: none"> <li>• before and after patient contact</li> <li>• before clean tasks</li> <li>• after unclean tasks</li> <li>• after using/changing gloves and other PPE</li> </ul>	<ul style="list-style-type: none"> <li>➤ Hand hygiene is the most important precaution to prevent MRSA from spreading</li> <li>➤ Hand disinfection is first option</li> <li>➤ Visibly contaminated hands are first washed, then disinfected</li> <li>➤ Always disinfect your hands when leaving the room and after removing any PPE</li> </ul> <p>The resident and any relatives (visitors) should be informed of the importance of hand hygiene (hand disinfection) and be instructed/assisted in the execution hereof.</p>
<b>Protection equipment in general</b>	Protection equipment comprises the gear worn by personnel to: <ul style="list-style-type: none"> <li>• protect personnel against infection by microorganisms</li> <li>• prevent personnel from transferring infection</li> </ul>	Use protection equipment in connection with the nursing and treatment of the resident
<b>Gloves</b>	Wear gloves for all tasks comprising a risk of contaminating the hands with blood, pus, secretions (e.g. from sores, drains, nose, mouth, throat, lower respiratory system, gastrointestinal system, genitals, semen) and excretions (faeces, urine).  NOTE. Gloves are disposable and should therefore not be washed or disinfected. Contaminated gloves may cause the infection to spread.	<ul style="list-style-type: none"> <li>➤ Wear gloves in connection with any contact with the resident, medical equipment and soiled linen</li> </ul> <p>Relatives should use gloves when participating in the care</p>

# Appendix: Hygiene precautions, nursing homes (assisted living facilities) and similar institutions



Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)

Subject	General hygiene precautions	Additional MRSA precautions
	Gloves shall therefore be changed between procedures and when contaminated.	
<b>Uniform, plastic apron and gown</b>	<ul style="list-style-type: none"> <li>• Uniform/overall should be used</li> <li>• Wear a plastic apron/gown when at risk of becoming contaminated with blood, pus, secretion and excretion; the plastic apron provides superior protection in connection with risk of soaking through</li> </ul>	<p>Use disposable liquid proof gown that covers the uniform/overall in connection with:</p> <ul style="list-style-type: none"> <li>➤ direct contact with the resident, medical equipment and soiled linen</li> <li>➤ contact with inventory when there is considerable risk of contaminating the overall with MRSA (e.g. making of beds)</li> </ul> <p>Make sure that the sleeves close tightly at the wrists.</p> <p>Visitors should wear a disposable liquid proof gown when participating in the care.</p>
<b>Surgical mask, protective glasses, face shields</b>	Should be used in connection with risk of splashes or sprays of blood, pus, secretion or excretion. Face shields may be preferable in some situations.	<p>Use a surgical mask:</p> <ul style="list-style-type: none"> <li>➤ during contact with residents with respiratory MRSA infection</li> </ul> <p>Consider using a surgical mask:</p> <ul style="list-style-type: none"> <li>➤ to avoid inhalation of whirled-up dust, e.g. when making beds or changing dressings</li> <li>➤ during contact with residents with highly epidemic MRSA strains</li> </ul> <p>In the above situations, visitors should wear a surgical mask when participating in the care.</p>
<b>Patient secretions and excretions</b>	<ul style="list-style-type: none"> <li>• Avoid touching (use gloves)</li> <li>• Urine, faeces and other liquid substances (blood, pus, secretion) should be flushed directly into the toilet or bedpan boiler</li> </ul>	<ul style="list-style-type: none"> <li>➤ MRSA infected sores should be covered by a close-fitting dressing</li> <li>➤ Change the dressing if liquid soaks through</li> </ul>
<b>Laboratory specimens</b>	<ul style="list-style-type: none"> <li>• Should be securely packaged</li> <li>• all specimens should be considered potentially infectious</li> </ul> <p>Consignment of specimens should be performed in accordance with post service regulations.</p>	Furthermore, follow any local guidelines concerning MRSA specimens.
<b>Equipment/utensils*</b> *Also read: <i>Advice and instructions on disinfection in the health care sector, the Central Hospital Hygiene</i>	<ul style="list-style-type: none"> <li>• Wash immediately in dishwasher or decontaminator, previous rinsing or disinfection is normally not needed</li> <li>• Use dishwasher for heat disinfection</li> </ul>	<p>Equipment/utensils and aids*</p> <ul style="list-style-type: none"> <li>➤ should only be brought into the resident's room if they can be cleaned and disinfected, use disposable equipment if not</li> </ul>

# Appendix: Hygiene precautions, nursing homes (assisted living facilities) and similar institutions



Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)

Subject	General hygiene precautions	Additional MRSA precautions
<i>Section, SSI</i>	tion if possible <ul style="list-style-type: none"> <li>• If heat disinfection is not an option, use a suitable chemical disinfection agent.</li> </ul>	Equipment/utensils and aids* <ul style="list-style-type: none"> <li>➤ should only be brought into the resident's room if they can be cleaned and disinfected, use disposable equipment if not</li> <li>➤ should stay with the resident, if possible</li> <li>➤ should be disinfected after cleaning</li> <li>➤ limit any storage in the room</li> </ul>
<b>Waste*</b> *Also read: <i>Guideline of the Environmental Protection Agency: Handling of clinical risk waste</i>	Waste should be disposed of via standard refuse collection unless categorized as clinical risk waste, which includes: <ul style="list-style-type: none"> <li>• sharp and pointed waste</li> <li>• disposable material containing blood, pus or tissue liquids which drip when compressed</li> </ul>	No additional requirements/precautions.
<b>Clothes and linen</b>	<ul style="list-style-type: none"> <li>• Handle soiled linen as little as possible</li> <li>• Items of clothing that are very bloody or contaminated with e.g. faeces or urine should be placed in a plastic bag before being sent to the laundry</li> <li>• Due to the subsequent handling of the laundry, it is essential that it is free of sharp and pointed objects; this is important to ensure laundry personnel safety</li> </ul>	<ul style="list-style-type: none"> <li>➤ change the resident's underwear and towels daily</li> <li>➤ bed linen should be changed twice weekly</li> <li>➤ avoid shaking clothes and bed linen as this will whirl up dust</li> <li>➤ to the extent possible, clothes that can be washed at 60°C or above should be preferred</li> <li>➤ Clothes and linen that are shared by the residents of the institution should be washed at 80°C or above</li> <li>➤ Clothes that cannot be washed at 80°C should be washed at the recommended temperature separately from the remaining laundry of the institution</li> </ul>
<b>*Cleaning, waste removal</b> *Also read: <i>Advice and instructions on disinfection in the health care sector, the Central Hospital Hygiene Section, SSI</i>	<ul style="list-style-type: none"> <li>• Any spills of blood, secretion, excretion and pus must be wiped up immediately and all visible contamination removed; wear gloves</li> <li>• After wiping up substantial quantities of blood or other tissue liquids, the site may be wiped off with a suitable disinfection agent</li> <li>• Surfaces such as walls and floors rarely cause transmission of infectious diseases and generally disinfection of such surfaces will not be needed as standard cleaning is suf-</li> </ul>	Cleaning personnel should use protection equipment in line with care personnel.  <i>Daily cleaning (to the extent possible also in weekends):</i> <ul style="list-style-type: none"> <li>➤ cleaning should take place after all other programmed activities</li> <li>➤ contact points (e.g. door knobs, bed guards, water taps, toilet seats, toilet flush buttons, bell cords, light and equipment switches, and bed table contact points) should be dis-</li> </ul>

# Appendix: Hygiene precautions, nursing homes (assisted living facilities) and similar institutions



Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)

	<p>ficient</p> <ul style="list-style-type: none"> <li>• Broken glass should never be left behind. It should be carefully removed and disposed of as other sharp or pointy waste</li> </ul>	<p>infected using a suitable disinfectant*</p> <ul style="list-style-type: none"> <li>➤ other horizontal surfaces in the room (tables/chairs, equipment) and the bath/toilet should be cleaned using standard detergents</li> <li>➤ carpets and furniture with fabric should be vacuumed with a filter equipped vacuum cleaner; replace dust bag and filter according to the manufacturer's instructions</li> <li>➤ wash the floor</li> <li>➤ the cleaning utensils should be left in the room and any cloths used should be discarded or sent to the laundry (washed at 80°C) after use</li> <li>➤ selected contact points in common areas are wiped off with a suitable disinfectant several times daily</li> </ul> <p><i>Final cleaning (when moving out):</i></p> <ul style="list-style-type: none"> <li>➤ the room, any furniture, and equipment and the bath/toilet should be cleaned using standard detergents; subsequently disinfect the bed, bed table, chairs/tables, equipment, horizontal surfaces and the contact points mentioned above</li> <li>➤ carpets and furniture with fabric should be vacuumed with a filter-equipped vacuum cleaner; replace dust bag and filter after finishing</li> <li>➤ wash the floor</li> <li>➤ disinfect/wash pillow and duvet</li> <li>➤ mattress covers should be cleaned and disinfected; alternatively, the mattress may be sent for low-pressure autoclave sterilization or be discarded</li> <li>➤ any other fabric should be sent to the laundry</li> </ul>
<p><b>Examination and treatment outside the nursing home</b>  <i>*See: Ambulance hygiene, <a href="http://www.ssi.dk/sw1377.asp">http://www.ssi.dk/sw1377.asp</a></i></p>	<p>No requirements/precautions.</p>	<p>If the resident needs treatment or examination at a hospital, clinic or physician, comply with the following:</p> <ul style="list-style-type: none"> <li>➤ notify the receiving health professional previously</li> <li>➤ make sure the resident wears clean clothes</li> <li>➤ ensure that any sores are covered by tight-fitting dressings and show no signs of soaking through</li> <li>➤ the resident should disinfect his or</li> </ul>

# Appendix: Hygiene precautions, nursing homes (assisted living facilities) and similar institutions



Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)

Subject	General hygiene precautions	Additional MRSA precautions
		<p>her hands using a disinfectant before leaving the home</p> <ul style="list-style-type: none"><li>➤ in case of respiratory infection, the patient should wear a surgical mask</li><li>➤ ambulance personnel and other personnel should wear PPE in connection with direct patient contact (e.g. when moving the resident from bed to gurney), but not during the actual transportation; hand disinfection should be performed after patient contact and after transportation*</li></ul>

# Appendix: Hygiene precautions, home care

Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)



**STATENS  
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Subject	General hygiene precautions	Additional MRSA precautions
<b>Patient placement etc.</b>	No requirements/precautions.	All care and treatment tasks should be performed in the citizen's bed- or bath room if possible.
<b>Hand hygiene*</b> <i>*See: Everything you need to know about hand hygiene <a href="http://www.ssi.dk/sw9345.asp">www.ssi.dk/sw9345.asp</a></i>	Hand disinfection or hand washing: <ul style="list-style-type: none"> <li>• before and after patient contact</li> <li>• before clean tasks</li> <li>• after unclean tasks</li> <li>• after using/changing gloves (and other protection equipment)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Hand hygiene is the most important precaution to prevent MRSA from spreading</li> <li>➤ Hand disinfection is first option</li> <li>➤ Visibly contaminated hands are first washed then disinfected</li> <li>➤ Always disinfect hands when leaving the room and after removing any PPE</li> </ul> <p>The resident and any relatives (visitors) should be informed of the importance of hand hygiene (hand disinfection) and be instructed/assisted in the execution hereof.</p>
<b>Protection equipment in general</b>	Protection equipment comprises the gear worn by personnel to: <ul style="list-style-type: none"> <li>• protect personnel against infection by microorganisms</li> <li>• prevent personnel from transferring infection</li> </ul>	Use protection equipment in connection with the nursing and treatment of the resident
<b>Gloves</b>	Wear gloves for all tasks comprising a risk of contaminating the hands with blood, pus, secretions (e.g. from sores, drains, nose, mouth, throat, lower respiratory system, gastrointestinal system, genitals, semen) and excretions (faeces, urine).  NOTE. Gloves are disposable and should therefore not be washed or disinfected. Contaminated gloves may cause the infection to spread. Gloves shall therefore be changed between procedures and when contaminated.	<ul style="list-style-type: none"> <li>➤ Wear gloves in connection with any contact with the resident, medical equipment and soiled linen</li> </ul>
<b>Uniform, plastic apron and gown</b>	<ul style="list-style-type: none"> <li>• Uniform/overall should be used</li> <li>• Wear a plastic apron/gown when at risk of becoming contaminated with blood, pus, secretion and excretion; the plastic apron provides superior protection in connection with risk of soaking through</li> </ul>	Use a disposable liquid proof gown that covers the uniform/overall in connection with: <ul style="list-style-type: none"> <li>➤ direct contact with the citizen, medical equipment and soiled linen</li> <li>➤ contact with inventory when there is considerable risk of contaminating the overall with MRSA (e.g. making of beds)</li> </ul>

# Appendix: Hygiene precautions, home care

Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)



Subject	General hygiene precautions	Additional MRSA precautions
		Make sure that the sleeves close tightly at the wrists
<b>Surgical mask, protective glasses, face shields</b>	Should be used in connection with risk of splashes or sprays of blood, pus, secretion or excretion; face shields may be preferable in some situations.	Use a surgical mask: <ul style="list-style-type: none"> <li>➤ during contact with citizens with respiratory MRSA infection</li> </ul> Consider using a surgical mask: <ul style="list-style-type: none"> <li>➤ to avoid inhalation of whirled-up dust, e.g. when making beds or changing dressings</li> <li>➤ during contact with citizens with a highly epidemic MRSA strain</li> </ul>
<b>Patient secretions and excretions</b>	<ul style="list-style-type: none"> <li>• Avoid touching (use gloves)</li> <li>• Urine, faeces and other liquid substances (blood, pus, secretion) should be flushed directly into the toilet or bedpan boiler</li> </ul>	<ul style="list-style-type: none"> <li>➤ MRSA infected sores should be covered by a close-fitting dressing</li> <li>➤ Change the dressing if liquid soaks through; the dressing may be reinforced temporarily until it can be changed</li> </ul>
<b>Laboratory specimens</b>	<ul style="list-style-type: none"> <li>• Should be securely packaged</li> <li>• All specimens should be considered potentially infectious</li> <li>• Consignment of specimens in accordance with post service regulations.</li> </ul>	Furthermore, follow any local guidelines concerning MRSA specimens.
<b>Equipment/utensils*</b> *Also read: <i>Advice and instructions on disinfection in the health care sector, the Central Hospital Hygiene Section, Statens Serum Institut (SSI)</i>	<ul style="list-style-type: none"> <li>• Wash immediately in dishwasher or decontaminator, previous rinsing or disinfection is normally not needed</li> <li>• Use dishwasher for heat disinfection if possible</li> <li>• If heat disinfection is not an option, use a suitable chemical disinfection agent.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Whenever possible, only use medical equipment/utensils and aids that can be cleaned and disinfected; alternatively employ disposable equipment</li> <li>➤ Equipment/utensils and aids that are reused should be cleaned and then disinfected</li> <li>➤ Store as few utensils as possible in the client's home</li> </ul>
<b>Waste*</b> *Also read: <i>Guideline of the Environmental Protection Agency: Handling of clinical risk waste</i>	Waste should be disposed of via standard refuse collection unless categorized as clinical risk waste, which includes: <ul style="list-style-type: none"> <li>• sharp and pointed waste</li> <li>• disposable material containing blood, pus or tissue liquids which drip when compressed</li> </ul>	No additional requirements/precautions.
<b>Clothes and linen</b>	<ul style="list-style-type: none"> <li>• Handle soiled linen as little as possible</li> <li>• Items of clothing that are very bloody or contaminated with e.g. faeces or urine should be placed in a plastic bag before being sent to the laundry</li> <li>• Due to the subsequent handling of the laundry, it is essential that it is</li> </ul>	<ul style="list-style-type: none"> <li>➤ Change the resident's underwear and towels daily if possible</li> <li>➤ Bed linen should be changed twice weekly, if possible</li> <li>➤ Avoid shaking clothes and bed linen as this will whirl up dust</li> <li>➤ If possible, clothes and linen should be washed at 80°C; clothes that cannot be washed at 80°C</li> </ul>

# Appendix: Hygiene precautions, home care

Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)



Subject	General hygiene precautions	Additional MRSA precautions
<p><b>Clothes and linen</b></p>	<p>free of sharp and pointed objects. This is important to ensure laundry personnel safety.</p>	<ul style="list-style-type: none"> <li>➤ Change the resident's underwear and towels daily if possible</li> <li>➤ Bed linen should be changed twice weekly, if possible</li> <li>➤ Avoid shaking clothes and bed linen as this will whirl up dust</li> <li>➤ If possible, clothes and linen should be washed at 80°C; clothes that cannot be washed at 80°C should be washed at the recommended temperature</li> </ul> <p>In connection with treatment of carrier state, the citizen's underwear and towel should be changed daily. Bed linen should be changed on day two and when the therapy is concluded (day 5). - During this period, clothes that can be washed at 60°C or higher should be preferred</p> <p>Also see the treatment guidelines that are given to the citizen.</p>
<p><b>Cleaning, waste removal*</b> *Also read: <i>Advice and instructions on disinfection in the health care sector, the Central Hospital Hygiene Section, SSI</i></p>	<ul style="list-style-type: none"> <li>• Any spills of blood, secretion, excretion and pus must be wiped up immediately and all visible contamination removed; wear gloves</li> <li>• After wiping up substantial quantities of blood or other tissue liquids, the site may be wiped off with a suitable disinfection agent</li> <li>• Surfaces such as walls and floors rarely cause transmission of infectious diseases and generally disinfection of such surfaces will not be needed as standard cleaning is sufficient</li> <li>• Broken glass should never be left behind. It should be carefully removed and disposed of as other sharp or pointy waste</li> </ul>	<p>Personnel, who participate in cleaning tasks, should use PPE as when performing nursing tasks.</p> <p>Regular, thorough cleaning of the following is recommended:</p> <ul style="list-style-type: none"> <li>➤ contact points (e.g. door knobs, water taps, toilet seats, toilet flush buttons, light switches and any switches on medical equipment )</li> <li>➤ bath/toilet</li> <li>➤ floors</li> <li>➤ other horizontal surfaces</li> </ul> <p>Used cloths should be discarded or boiled after use.</p> <p>Blankets/carpets and furniture with fabric should be vacuumed using a filter-equipped vacuum cleaner. Change the dust bag and filter according to the supplier's instruction.</p> <p>In connection with treatment of carrier state, the cleaning mentioned above should be done on day two and when the therapy is concluded (day 5).</p>

# Appendix: Hygiene precautions, home care

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Subject	General hygiene precautions	Additional MRSA precautions
<p><b>Examination and treatment outside department of admission or home*</b>  <i>*See: Ambulance hygiene, <a href="http://www.ssi.dk/sw1377.asp">http://www.ssi.dk/sw1377.asp</a></i></p>	<p>No requirements/precautions.</p>	<p>Also, see the treatment guidelines that are given to the citizen.</p> <p>If the citizen needs treatment or examination at a hospital, clinic or physician, comply with the following, if possible:</p> <ul style="list-style-type: none"> <li>➤ Notify the receiving health professional previously</li> <li>➤ Make sure the citizen wears clean clothes</li> <li>➤ Ensure that any sores are covered by tight-fitting dressings and show no signs of soaking through</li> <li>➤ The citizen should disinfect his or her hands using a disinfectant before leaving the home</li> <li>➤ In case of respiratory infection, the patient should wear a surgical mask</li> <li>➤ Ambulance personnel and other personnel should wear PPE in connection with direct patient contact (e.g. when moving the resident from bed to gurney), but not during the actual transportation; hand disinfection should be performed after patient contact and after transportation*</li> </ul>

# Appendix: Hygiene precautions, hospital external clinics

Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)



**STATENS  
SERUM  
INSTITUT**

Subject	General hygiene precautions	Additional MRSA precautions
<b>Patient placement etc.</b>	No requirements/precautions.	<ul style="list-style-type: none"> <li>➤ Needed examination, care and treatment should not be postponed</li> <li>➤ Non-acute examinations and treatments may be postponed until treatment has been concluded and the first control swab has been returned negative.</li> <li>➤ Visits should be planned towards the end of the day</li> <li>➤ Avoid staying in waiting facilities</li> <li>➤ In connection with scheduled admission, the referring physician should ask the patient about risk situations, individual risk factors, and swab whenever indicated to ensure that swab results are known prior to admission, cf. The National Board of Health's guideline</li> </ul> <p>For further information on home visits, please see the appendix on home care.</p>
<b>Hand hygiene*</b> <i>*See: Everything you need to know about hand hygiene</i> <a href="http://www.ssi.dk/sw9345.asp">www.ssi.dk/sw9345.asp</a>	Hand disinfection or hand washing: <ul style="list-style-type: none"> <li>• before and after patient contact</li> <li>• before clean tasks</li> <li>• after unclean tasks</li> <li>• after using/changing gloves (and other protection equipment)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Hand hygiene is the most important precaution to prevent MRSA from spreading</li> <li>➤ Hand disinfection is first option</li> <li>➤ Visibly contaminated hands are first washed and then disinfected.</li> <li>➤ Hand disinfection should always be performed after removing any protection equipment and once the patient has left the examination or treatment room</li> </ul>
<b>Protection equipment in general</b>	Protection equipment comprises the gear worn by personnel to: <ul style="list-style-type: none"> <li>• protect personnel against infection by microorganisms</li> <li>• prevent personnel from transferring infection</li> </ul>	Use protection equipment in connection with examination, nursing and treatment
<b>Gloves</b>	Wear gloves for all tasks comprising a risk of contaminating the hands with blood, pus, secretions (e.g. from sores, drains, nose, mouth, throat, lower respiratory system, gastrointestinal system, genitals, semen) and excretions (faeces, urine).	Wear gloves for all direct contact with the patient, any devices and equipment that have come into contact with the patient and any waste from the examination/treatment.

# Appendix: Hygiene precautions, hospital external clinics



Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)

Subject	General hygiene precautions	Additional MRSA precautions
	<p>NOTE. Gloves are disposable and should therefore not be washed or disinfected. Contaminated gloves may cause the infection to spread. Gloves shall therefore be changed between procedures and when contaminated.</p>	
<p><b>Uniform, plastic apron and gown</b></p>	<ul style="list-style-type: none"> <li>• Uniform/overall should be used</li> <li>• Wear a plastic apron/gown when at risk of becoming contaminated with blood, pus, secretion, or excretion; the plastic apron provides superior protection in connection with risk of soaking through</li> </ul>	<ul style="list-style-type: none"> <li>➤ Use a disposable liquid proof gown that covers the uniform/overall in connection with: Direct contact with the patient, any instruments or devices that have come into contact with the patient and any soiled linen and waste from the care, examination and treatment</li> <li>➤ Make sure that the sleeves close tightly at the wrists</li> </ul>
<p><b>Surgical mask, protective glasses, face shields</b></p>	<p>Should be used in connection with risk of splashes or sprays of blood, pus, secretion or excretion. Face shields may be preferable in some situations.</p>	<p>Use a surgical mask:</p> <ul style="list-style-type: none"> <li>➤ during contact with patients with respiratory MRSA infection</li> </ul> <p>Consider using a surgical mask:</p> <ul style="list-style-type: none"> <li>➤ to avoid inhalation of whirled-up dust, e.g. when changing a dressing</li> <li>➤ during contact with patients with a highly epidemic MRSA strain</li> </ul>
<p><b>Patient secretions and excretions</b></p>	<ul style="list-style-type: none"> <li>• Avoid touching (use gloves)</li> <li>• Urine, faeces and other liquid substances (blood, pus, secretion) should be flushed directly into the toilet or bedpan boiler</li> </ul>	<ul style="list-style-type: none"> <li>➤ MRSA infected sores should be covered by a close-fitting dressing</li> <li>➤ Change the dressing if liquid soaks through</li> </ul>
<p><b>Laboratory specimens</b></p>	<ul style="list-style-type: none"> <li>• Should be securely packaged</li> <li>• All specimens should be considered potentially infectious</li> <li>• Consignment of specimens in accordance with post service regulations.</li> </ul>	<p>Furthermore, follow any local guidelines concerning MRSA specimens.</p>
<p><b>Equipment/utensils*</b> *Also read: <i>Advice and instructions on disinfection in the health care sector, the Central Hospital Hygiene Section, Statens Serum Institut (SSI)</i></p>	<ul style="list-style-type: none"> <li>• Wash immediately in dishwasher or decontaminator, previous rinsing or disinfection is normally not needed</li> <li>• Use dishwasher for heat disinfection if possible</li> <li>• If heat disinfection is not an option, use a suitable chemical disinfection agent.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Plan and prepare any examination/treatment to ensure that the necessary equipment and utensils are in place.</li> <li>➤ Aim to have an assistant at hand in case further equipment/utensils are needed</li> <li>➤ Whenever possible, only use instruments equipment/utensils and aids that can be cleaned and disinfected; alternatively, employ disposable equipment</li> </ul>

# Appendix: Hygiene precautions, hospital external clinics



Prepared by a working group under the National Board of Health and based on the Board's "Guidelines on prevention of MRSA spreading", October 2006 (Appendix ver. 1)

Subject	General hygiene precautions	Additional MRSA precautions
		<ul style="list-style-type: none"> <li>➤ Equipment/utensils should be disinfected after use</li> </ul>
<p><b>Waste*</b> *Also read: <i>Guideline of the Environmental Protection Agency: Handling of clinical risk waste</i></p>	<p>Waste should be disposed of via standard refuse collection unless categorized as clinical risk waste, which includes:</p> <ul style="list-style-type: none"> <li>• sharp and pointed waste</li> <li>• disposable material containing blood, pus or tissue liquids that drip when compressed</li> </ul>	<p>No additional requirements/precautions.</p>
<p><b>Clothes and linen</b></p>	<ul style="list-style-type: none"> <li>• Handle soiled linen as little as possible</li> <li>• Items of clothing that are very bloody or contaminated with e.g. faeces or urine should be placed in a plastic bag before being sent to the laundry</li> <li>• Due to the subsequent handling of the laundry it is essential that it is free of sharp and pointed objects; this is important to ensure laundry personnel safety</li> </ul>	<ul style="list-style-type: none"> <li>➤ When employing fabrics that are reused in connection with examination or treatment, these fabrics should be washed at a minimum temperature of 80°C</li> </ul>
<p><b>Cleaning, waste removal*</b> *Also read: <i>Advice and instructions on disinfection in the health care sector, the Central Hospital Hygiene Section, SSI</i></p>	<ul style="list-style-type: none"> <li>• Any spills of blood, secretion, excretion and pus must be wiped up immediately and all visible contamination removed, wear gloves</li> <li>• After wiping up substantial quantities of blood or other tissue liquids, the site may be wiped off with a suitable disinfection agent</li> <li>• Surfaces such as walls and floors rarely cause transmission of infectious diseases and generally disinfection of such surfaces will not be needed as standard cleaning is sufficient</li> <li>• Broken glass should never be left behind. It should be carefully removed and disposed of as other sharp or pointy waste</li> </ul>	<p>Cleaning personnel should use protection equipment in line with care personnel.</p> <p>After treating the patient:</p> <ul style="list-style-type: none"> <li>➤ disinfect all contact points (e.g. door knobs, examination gurney surface, chair seats, armrests) that have been touched by the patient or personnel using a suitable disinfectant*</li> </ul>