

Comparison of recommendations in national/regional Guidelines for prevention and control of MRSA in thirteen European countries

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Abstract

A comparison of methicillin-resistant *Staphylococcus aureus* (MRSA) prevention and control recommendations, as stated in national/regional guidelines of 13 European countries was performed based on a structured questionnaire filled by representatives of professional societies or institutions. The aim of this study was to be a source of guidelines, references and views which can inform discussions at national/regional/local levels. Countries were divided in two groups based on proportion of MRSA in blood cultures positive with *Staphylococcus aureus* retrieved from EARSS 2008: low proportion (4 countries) and higher proportion (9 countries). Guidelines from all respective countries have several common general recommendations: MRSA-positive patients have to have the same care as those that are not carrying MRSA, hand hygiene measures including the use of alcohol hand rubs are identified as important in the prevention of MRSA spread, environmental cleaning and/or disinfection has to be performed routinely, and personal protective equipment has to be used whilst working with MRSA positive patients. Surveillance and screening is also a part of all guidelines. Major differences among low and higher MRSA proportion countries, identified as successful practices, were: have guidelines and update it regularly, have guidelines not only for hospitals, but also for nursing homes and home practice, isolate MRSA positive patients in single room, perform MRSA screening based on risk categories in hospitals and nursing homes, and perform decolonisation of MRSA carriers.

Key Words

MRSA, prevention recommendations, guidelines

Introduction

In November 2008 representatives of 12 European scientific and professional societies involved in Healthcare Associated Infection (HCAI) prevention and control met in Berlin to initiate a discussion on possible collaboration in the field of HCAI prevention and control at European level. Two more countries have since joined the group in June 2009. One of the particular topics of the discussion was prevention and control of MRSA in the Societies' respective countries, as members identified this as a current and major issue in infection prevention and control. National representatives presented an outline of their MRSA prevention and control measures and other data in a short presentation at the meeting. As the incidence and prevalence of MRSA is very different amongst European countries, the decision was made to compare different recommendations for prevention and control of MRSA as stated in national/regional guidelines, with the aim to be a source of guidelines, references and views which can inform discussions at national/regional/local levels.

Methods

National guidelines were defined as those that were implemented throughout the country, while regional ones were defined as those implemented in a specific county. A tabular questionnaire based on topics presented during the meeting was sent to every country representative and they were asked to fill in additional data from their national/regional guidelines on MRSA prevention and control. New members from these 13 countries joined the group thereafter and added to the dataset and the writing of the paper. Thirteen of the 14 country representatives responded. One country was unable to provide details of national/regional guidelines, and although local guidelines (i.e. those produced and used by a particular hospital in a country) were identified they were excluded on this occasion.

Data from thirteen countries have therefore been included, based on national/regional guidelines on prevention and control of MRSA.¹⁻²² MRSA bloodstream infection incidence was retrieved from EARSS 2008.²³

Results

Basic Guideline and MRSA incidence data

Basic guideline and MRSA incidence data are shown in Table I. Two countries (Austria and Czech Republic) have no national but regional guidelines. In Austria, most of the nine federal states have guidelines that are similar in very many parts. Czech Republic has only a national recommendation and local guidelines (in some hospitals), so data were used solely from the national recommendation.

Guidelines from all respective countries have several common general recommendations:

- MRSA-positive patients have to have the same care as those that are not carrying MRSA
- Hand hygiene measures including the use of alcohol hand rubs are identified as important in the prevention of MRSA spread
- Environmental cleaning and/or disinfection has to be performed routinely
- Personal Protective Equipment has to be used whilst working with MRSA positive patients

MRSA in hospitals

Table II summarises screening and isolation policies in hospitals. MRSA surveillance is mentioned in all national guidelines presented, with significant variation identified: for example, between recommendations for surveillance of MRSA in clinical specimens: from bacteraemia only (UK, Czech Republic) or isolates from any site (Croatia). The date of the first implementation of MRSA surveillance programmes varied widely e.g. UK 1986, Belgium 1994, Germany 2001, France nationally 2002 (but regionally since 1993) and Croatia 2009, and whether surveillance is mandatory (Belgium [since 2006, before the date on a voluntary basis] Germany, Norway, Sweden, The Netherlands, UK, France) or on a voluntary basis (Austria, Croatia, Czech Republic, Italy, Spain). In Denmark, surveillance was voluntary until November 2006, after which it became notifiable for all bacteraemia and other clinical isolates, at the time of their first detection. Since 2006 Austrian hospitals are obliged by a Federal act to participate in any nosocomial infection surveillance network based on scientifically accepted standards - which

Table I: General country data relating to guidelines and proportion of MRSA/total S.aureus causing bloodstream infections

Country	NO*	SW [“]	NL	DEN	AU	CZ	GER#	BE	FR	ESP	UK	IT	HR
First issue	1999- 2004	1970	1980	1994 2006	1999 2003	2006	1999 2004 2005 (NH)	1993 2003 2005 (NH)	1999	2008	1995	2005	2008
Last revision	2008	2006	2008	2008	2006 2007		2008	Ongoing: Hospitals and NHs	2009 -		2006 -		-
Proportion of MRSA (EARSS 2008)	0.6	0.7	0.7	2.3	8.2	14.2	19.5	20.6	24.5	26.6	30.7	33.5	35.4

NO=Norway, SW=Sweden, NL=The Netherlands, DEN=Denmark, AU=Austria, CZ=Czech Republic, GER=Germany, BE=Belgium, FR=France, ESP=Spain, UK=United Kingdom, IT=Italy, HR=Croatia

+ Yes; -No; empty NO DATA; *infection notifiable since 1995, colnozation since 2005; [“]notifiable since 2000; #notifiable since 2005

indirectly also implies surveillance of MRSA-cases. In France, surveillance of both specific infections and all primoisolates is mandatory from 2005, and indicators were publically reported for the first time in 2009 (data for 2005-2007).

Screening for carriers is also a part of all guidelines (Table II). Risk categories for patient screening in all guidelines are: patient with previous MRSA infection/colonization, patients with previous hospitalization or admitted from nursing homes; some countries screen also patients admitted from abroad (Croatia) or outside Scandinavia (Denmark, Norway, The Netherlands); furthermore, patients before high risk procedures or admitted to intensive care units. Besides general risk factors, in Spain every hospital sets own risk factors. Austria, Denmark, Norway and The Netherlands have additional risk categories specific for patients: chronic skin conditions, indwelling medical devices. The Netherlands and Germany have another additional risk factor: patients living in pig farms. Dutch guidelines have very detailed risk categories (Category 1 to category 4) that is helpful in everyday patient care. France has targeted approach advised by hospital HCAI Committee. Positive patients are cared for as shown in table II.

All guidelines recommend isolation of MRSA positive patients.

MRSA in nursing homes

Belgium (2005), Germany (2005), France (2004, revised 2006), Norway (2002), The Netherlands and UK (1995) have separate guidelines for MRSA in nursing homes, while Austria, Croatia, Denmark, and Sweden have nursing homes included in general MRSA guidelines. Other countries have no specific recommendations for nursing homes. Out of these ten countries, only Norway and Sweden recommend tracking of cases, Denmark recommended surveillance in 2006 (at time of first clinical detection), Norway and Croatia also recommend MRSA surveillance. Austria, Belgium, Norway and Sweden recommend MRSA screening (Norway - same as for hospitals) based on risk categories, and Germany, Denmark and The Netherlands screen only in outbreak situations. In England screening of nursing home residents is mandatory and occurs prior to elective admissions to hospitals or at the time of non-elective admissions is recommended. The isolation policy for MRSA positive residents differs in different guidelines, and most guidelines recommend isolation of MRSA positive residents only in situation of some clinical conditions

Table II: Screening and isolation policies in hospitals

Country	NO	SW	NL	DEN	AU	CZ	GER	BE	FR	ESP	UK	IT	HR
Screening	Risk categories	Risk categories	Four risk categories	Defined risk groups	Defined risk groups	Risk categories	Specific patients	Defined risk groups	Targeted approach	Voluntary	Risk groups*	Risk groups	Defined risk groups
Isolation: Single room	+	+	+	+									
Single room or cohorting					+	+	+	+	+	+	+	+	+
Gloves	+	+	+	+	+	+	+	+	+	+	+	+	+
Gowns	+	+	+	+	+	+	+	+	+	+	+	+	+
Masks	+**	+#	+**	+	+	+#	+	+	+##	+**	+#	+#	+
Proportion of MRSA (EARSS 2008)	0.6	0.7	0.7	2.3	8.2	14.2	19.5	20.6	24.5	26.6	30.7	33.5	35.4

See Table One for country names

+ Yes; -No; empty NO DATA; *All elective surgical pts by 1/4/09, **surgical masks, #risk assessment

(pneumonia, secreting wounds) or other risk factors, while in all other situation residents are allowed to have social contacts.

Hand hygiene is emphasised in all guidelines. Other details are presented in Table III.

MRSA in general practice and home care

Czech Republic, Italy and Spain do not include general practice or home care in their guidelines. Austria has only general recommendations for general

practice and home care. Germany does not include any regulation concerning general practice and home care, but hand hygiene is emphasised. Since 2009, in Germany regional networks recommend improving communication, information sharing and cooperation between the healthcare sectors. Sweden recommends only basic precautions for general practice and home care, as well as France; all other countries emphasise hand hygiene while working with MRSA positive patients. Other details are presented in Table IV.

Table III: MRSA in Nursing Home

Country	NO*	SW**	NL	DEN#	AU	CZ	GER	BE	FR	ESP	UK	IT	HR*
Guideline: None						None				None		None	
Separate	+		+				+	+	+		+		
In general guideline		+		+	+								+
Screening	+	+	+(outbreak)	+(outbreak)	+		+(outbreak)	+	-		+(prior el.hosp ad.)		-
Isolation: Yes/No	+	+	+***	+&	+		+***	+***	-		NS		+***
Single room	+	+	+		+				+if possible				+
Single room or cohorting				+			+	+			+		
Gloves	+	+	+		+		+	+	+##		+		+
Gowns	+	+	+	-	+		+	+	+##		+		+
Masks	+	-	+(surgical) Daily	Daily and discharge	+		Only high risk	+	+##		-		+
Cleaning/ disinfection	Daily	Point dis.	Daily	Daily and discharge	+			+	Not Specific		+		+
Proportion of MRSA (EARSS 2008)	0.6	0.7	0.7	2.3	8.2	14.2	19.5	20.6	24.5	26.6	30.7	33.5	35.4

See Table One for country names

+ Yes; -No; empty NO DATA; * Surveillance recommended, **Tracking of cases; #Surveillance recommended since 2006; ***if risk factor identified; & if clinical infection can not be contained; ## for close contact; NS not stated

Table IV: MRSA in General practice and Home care

Country	NO	SW	NL	DEN	AU	CZ	GER	BE	FR	ESP	UK	IT	HR
Patient visit	Standard precautions	Basic precautions	Standard precautions	At the end of the day				Guidelines actually developing	National guidelines (2004, revised 2006)		End of day for dressing advised		Standard precautions
Home care	Standard precautions	Track cases	Single room	Treatment and care in patient bedroom					Standard precautions		End of day if possible, use of protective clothing		Standard precautions
Proportion of MRSA (EARSS 2008)	0.6	0.7	0.7	2.3	8.2	14.2	19.5	20.6	24.5	26.6	30.7	33.5	35.4

See Table One for country names

+ Yes; -No; empty NO DATA

MRSA carriers

All Guidelines include the management of MRSA carriers and have an approach to the screening of staff members in outbreak situations. Sweden and The Netherlands advise screening if staff have been working abroad, and Norway does the same as for their patients. France advises screening staff only if staff carriage could be associated with an outbreak amongst patients.

If decolonisation is indicated, all countries have the same or a very similar decolonization regime which comprises the use of mupirocin intranasally three times per day for five days and total body washing in chlorhexidine solution. Germany recommends at least three days mupirocin regimen, or some other antiseptic in the nose and does not specify the antiseptic for body washing; Belgium recommends a povidone iodine or chlorhexidine body wash. Other details are shown in Table V.

MRSA in policy, insurance and legal implications

All countries data are shown in Table VI.

Discussion

The comparison between 13 European countries' Guidelines for MRSA prevention was made using a questionnaire sent to national representatives. The advantage of this study design was that the participants did not need to translate the documents and knew how to interpret the statements accurately. A drawback was that we did not compare the guidelines in their totality, but adopted a pragmatic approach focusing on those aspects that our expert group thought were the most important. Another possible drawback was that it was not possible to judge compliance with the guidelines, or judge other factors that are thought to be important for effective implementation such as government and/ or hospital management initiatives. These might include financial incentives or fines and legislation on healthcare associated infection (or MRSA prevention and control) which might underpin guideline implementation, as well as differences in the delivery of health care, such as size and complexity of hospitals, isolation facilities (e.g. availability of single rooms), and staff-patient ratios and bed occupancy. In addition MRSA can vary even within a country and

Table V: MRSA carrier decolonisation

Country	NO	SW	NL	DEN	AU	CZ	GER	BE	FR	ESP	UK	IT	HR
Staff	+	Individual approach	+	+	+	Individual approach	+	+	If possibly associated with an outbreak among patients	Individual approach	+	+	+
Patients	+	Individual approach	+	+	+	Before risk procedure	+	+	+ for targeted at risk situations	+	+	+ in high risk wards	+
NH residents	+	-	+	+				+	-		+		+
At home: patients	+*	-	+	+		-			-		+**		-
At home: Family members	+*	-	+	+		-			-		-		-
Proportion of MRSA (EARSS 2008)	0.6	0.7	0.7	2.3	8.2	14.2	19.5	20.6	24.5	26.6	30.7	33.5	35.4

See Table One for country names

+ Yes; -No; empty NO DATA; *if clinically indicated or working/patient in home care/health care institution; **only if clinically indicated; NH= Nursing home

we could not consider the applicability of the stated guidelines to the local situation and how much these can vary.

Although most of the guidelines had recommendations relating to most of the selected topics, there were nevertheless some differences. If we compare two groups of countries, namely the ones with very low MRSA proportions (Norway, Sweden, The Netherlands and Denmark) with the other countries, we can see several important points: all four low proportion countries had written their initial Guidelines before the year 2000 whilst only 5/9 with higher MRSA proportion had agreed them before that year. Furthermore, these four very low MRSA proportion countries also had recommendations for nursing homes, general practice and home care, whilst only six of the other nine countries had recommendations for nursing homes and three of these for general practice and home care.

Interestingly, all four low proportion countries have MRSA infections (colonisations) as notifiable, while only 4/9 higher proportion countries have the same. This is contextually very interesting, in that MRSA has clearly increased in some countries where there were guidelines in place (e.g. England, Germany). Other factors must be considered to explain the increases in MRSA that are now observed in these countries.

All guidelines recommend screening of patients based on risk categorisations, but when it came to reviewing the patient isolation, the four low incidence countries recommended single rooms, whilst all nine higher incidence countries recommended single room or cohorting of MRSA positive patients. This no doubt relates to their side room capacity often being exceeded.²⁴ The much debated issue of wearing masks when there is contact with MRSA positive patients was reflected in some differences between approaches. In

Table VI: MRSA in policy, insurance and legally

Country	NO	SW	NL	DEN	AU	CZ	GER	BE	FR	ESP	UK	IT	HR
Cost reimbursement	+	+		-	In part	-	In part	+	-		-	+	+
Staff sick leave/medical suspension	Sick leave	Sick leave		Can work after start of decolonisation	Case to case basis		Medical suspension	Sick leave only if infection	Sick leave for treatment of staff connected with patient transmission or in chronic carriage	Medical suspension	Medical suspension		Can work after start of decolonisation
Legal issue		No			possible	possible	possible	possible	possible	possible	possible		possible
Proportion of MRSA (EARSS 2008)	0.6	0.7	0.7	2.3	8.2	14.2	19.5	20.6	24.5	26.6	30.7	33.5	35.4

See Table I for country names

+ Yes; -No; empty NO DATA

the Czech republic, UK, Italy and Sweden masks were recommended only if there was risk of aerosols (e.g. aspiration of patient with pneumonia), whilst all the remaining countries recommended it for any contact.

For usage of gloves, there are also some differences between countries: while in Austria, Croatia, Czech Republic, Germany, The Netherlands and UK, gloves should be worn at entry to the isolation room, in Belgium, Denmark, France, Norway, Spain and Sweden gloves are used in close contact with patients, and Italian (Simpios) Guidelines do not specify this item.

There were also differences seen between recommendations for decolonisation of MRSA carriers. Whilst Norway, The Netherlands and Denmark recommend decolonisation of all carriers, Sweden recommends a risk assessment approach for staff and hospital patients. France recommends staff decolonisation only if possibly associated with an outbreak among patients, and for patients in targeted

at risk situations. Other countries' recommendations are very different for either staff or hospitalized patients although we did not explore the evidence base they used to justify their approach. This would be an interesting area for future work.

Our survey seems to indicate that successful practices would be to include guidelines which are reviewed and updated regularly in line with changing knowledge about the epidemiology, MRSA types and factors that could influence spread of these organisms. Many such factors would need to be considered including skilled staff/patient ratios, intensity of patient care, lengths of hospital stay for the different specialties, numbers and types of inter-ward transfers, ability to close wards and still deliver effective hospital care. Antimicrobial usage has also been found to be associated with a higher MRSA occurrence.²⁵ In addition, we did not explore the mechanisms in place locally or nationally to audit and review MRSA prevention and control practices. In England there has been the interesting approach of using mandatory target setting for reductions of MRSA

bacteraemia, although there are less data on the total MRSA burden in the country.

Some countries, such as France, have added process surveillance performance indicators which, for example, assess alcohol hand rub product usage. National hand hygiene campaigns are implemented in some countries e.g. France, Belgium and England. These recommendations should be not only for hospitals, but also for nursing homes, general practice and home care. This is increasingly important as healthcare delivery now involves the whole healthcare economy and patients are transferred between these components with very short length of hospital stay for many procedures and investigations.

To facilitate a coordinated approach, and recognize the movement of patients between primary care, secondary (acute) facilities, and tertiary (highly skilled specialist) centres, it may help to make MRSA infections notifiable. However, some countries have considered this and do not wish to add to the burden imposed by this reporting system and have used other approaches e.g. mandatory surveillance.

Our survey indicates that the practices of isolating MRSA positive patients in single room, perform MRSA screening based on risk categories in hospitals and nursing homes, and decolonisation of MRSA carriers may well be the most successful, and are commended as best practice. Our recommendations also take into account the findings of the ARPAC study which showed lower MRSA occurrence in European countries was associated in linear regression model with use of alcohol-based solutions for hand hygiene and placement of MRSA patients in single rooms. Hospitals with problems in implementing isolation policies had higher resistance levels. Clearly the levels of MRSA are so high in some countries that the capacity of their side rooms and other isolation facilities is exceeded²⁴. Other interventions such as cohort nursing of patient need to be introduced. Their effectiveness should, however, be monitored together with further research into factors such as nursing establishments, the use of dedicated nurses and impact of skill on potential spread from such facilities as suggested previously.

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