Methicillin-resistant
*Staphylococcus aureus* (MRSA)
an Unclear and Untoward Issue

*Patient-Professional Interactions, Experiences, Attitudes and Responsibility*

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Abstract

The overall aim of the present thesis was to investigate experiences of living with multidrug-resistant bacteria (MDRB), using methicillin-resistant Staphylococcus aureus (MRSA) colonization as an illustration, and to develop and validate a tool to describe healthcare personnel’s attitudes towards patients with MDRB. A further objective was to study MRSA-colonized persons’ and healthcare personnel’s experiences of patient-professional interactions and responsibilities for infection prevention.

Four empirical studies were conducted. A total of 18 MRSA-colonized persons and 20 healthcare personnel were interviewed regarding their experiences, and a total of 726 RNs responded the MDRB Attitude Questionnaire.

The findings revealed the difficulties associated with living with MRSA colonization, which was described as something uncertain, and as an undefinable threat that has to be managed in both everyday life and in contacts with healthcare. Interactions with healthcare personnel were described as unprofessional owing to personnel’s inappropriate behaviour and insufficient information provision. According to the personnel, achieving adequate patient-professional interactions required having knowledge and experiences of MRSA. They also experienced difficulties in providing tailored information to patients. The MRSA-colonized persons described their unwanted responsibility to inform healthcare personnel about the colonization, but also felt responsible for limiting the spread of infection to others. Furthermore, responsibility for infection control was regarded as shared between healthcare personnel and patients. The personnel described such responsibility as a natural part of their daily work, although it was not always easy to adhere to hygiene precautions. The MRSA-colonized persons felt that healthcare personnel have insufficient knowledge of the bacteria and of hygiene precautions. The MDRB Attitude Questionnaire showed that registered nurses do have knowledge deficiencies. The MDRB Attitude Questionnaire has adequate psychometric properties.

In conclusion, MRSA colonization constitutes a psychological strain for carriers, and interactions with healthcare personnel resulted in feelings of stigmatization. The present thesis indicates that there is a need to improve healthcare personnel’s knowledge, behaviour and emotional response in relation to patients with MDRB, in order to ensure patient safety and address patients’ needs. The heads of department is responsible for such improvements, and the MDRB Attitude Questionnaire is useful in identifying areas in need for improvement.

Keywords: Attitudes of health personnel, colonization, hygiene, infection control, mixed-methods approach, MRSA, nursing care, patient-professional interaction, quality of healthcare, responsibility, The MDRB Attitude Questionnaire

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urn:nbn:se:uu:diva-168319 (http://urn.kb.se/resolve?urn=nbn:se:uu:diva-168319)
To my family
Stefan, Casper & Emilia
List of Papers

This thesis is based on the following papers and manuscript, which are referred to in the text by their Roman numerals.


Reprints of paper I-III were made with permission from the respective publishers.

Back cover photograph, the author. Photo by Inga-Lill Stenlund, 2010
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Abbreviations

ESBL  Extended spectrum beta lactamase
FLMs  First-line managers
HAIs  Healthcare-associated infections
MDRB Multidrug-resistant bacteria
MRSA Methicillin-resistant Staphylococcus aureus
RNs  Registered nurses
In my clinical work as a registered nurse at an infection ward, I provide nursing care to patients with, for instance, infected wounds, pneumonia, and bacteraemia as well as healthcare-associated infections. During recent years, colonization or infection caused by bacteria that has developed resistance to antibiotics usually used for treatment, i.e. multidrug-resistant bacteria, has become more common within healthcare settings as well as in the community.

Some years ago, I met a man with an abscess and a fistula containing such bacteria, more specifically methicillin-resistant *Staphylococcus aureus*. This man was hospitalized for some time and when discharged, the wound still needed to be cleaned and bandaged twice a day. Assistance from the primary healthcare centre was shown to be impractical in this case due to the needed certain procedures and fear of contagion. Thus, the man had to carry out the bandaging himself and visited the infection clinic for regular follow-ups.

This case got me thinking about how the patient perceived the situation, and whether healthcare personnel’s attitudes towards and interactions with patients with multidrug-resistant bacteria affect the way patients experience their daily life situation. Furthermore, I wondered about what knowledge we as healthcare personnel have concerning the infection control precautions required in such care.

This area of interest could be explored, described and analysed in many ways. In the present thesis, a patient perspective and a healthcare personnel perspective were perceived to be central. The patients’ experiences help us understand their daily life situation and their views about contacts with healthcare. This is a useful source of information in efforts to improve patient safety and address patients’ needs. Additionally, the healthcare personnel’s perspective is of equal importance, given our obligation, as medical and nursing professionals, to provide safe care of high quality; here registered nurses have a central role. The managers’ view, linked to the perspective of healthcare personnel, was regarded as important owing to their role as leaders and their responsibility for developing healthcare.

In this thesis, I focus on methicillin-resistant *Staphylococcus aureus* as an example of colonization with multidrug-resistant bacteria, although concerns about extended spectrum beta lactamase-producing bacteria also are brought up. The starting point is a description of problems and experiences
associated with having an MRSA colonization, followed by an overview of infection prevention and patient safety issues. Subsequently aspects of patient-professional interactions and registered nurses’ role in such interactions are introduced, followed by the theoretical attitude model applied in the questionnaire development. The development of a questionnaire was necessary in order to study healthcare personnel’s attitudes towards patients with multidrug-resistant bacteria. However, the present focus was on registered nurses’ attitudes.

I hope that this thesis will increase healthcare personnel’s awareness of what it is like to live with multidrug-resistant bacteria as well as of the necessary infection control precautions. Additionally, I hope that the thesis will contribute to and inspire continuing improvement of patient-professional interactions when caring for patients with multidrug-resistant bacteria.
Introduction

Patients with a communicable disease caused by a multidrug-resistant bacterium (MDRB) such as methicillin-resistant Staphylococcus aureus (MRSA) should be source isolated during hospitalization whenever possible. Source isolation typically involves placing the patient in a private room and restricting his/her movement outside that room to prevent spread of infection to other patients (The Swedish strategic programme against antibiotic resistance 2010, Zastrow 2011). Furthermore, the physician responsible for the patient’s treatment must inform the patient how to avoid transmission of the bacteria and provide tailored hygiene restrictions (Ministry of Health and Social affairs 2004) based on personal risk factors such as wounds, skin lesions or catheters. MRSA-colonized persons without risk factors or clinical infection constitute a limited risk for spreading the bacteria. However, within healthcare they are to be handled in the same way as persons with high risk for transmitting the organism (The Swedish strategic programme against antibiotic resistance 2010).

In contacts with healthcare, MRSA-colonized persons are obliged to declare their colonization verbally or by showing an MRSA card. Such a declaration is essential to the person’s own safety owing to the potential risk of developing an infection caused by the bacteria that may be difficult to treat. Furthermore, the declaration of MRSA colonization is important in optimizing hygiene precautions owing to the increased risk for transmission of organisms within healthcare settings (The Swedish strategic programme against antibiotic resistance 2010).

MRSA-colonized persons who are source isolated due to infection control precautions experience preventable adverse events to a higher degree than do non-isolated patients. Their vital signs are less likely to be recorded as ordered and they have fewer interactions with healthcare personnel (Stelfox et al. 2003). Additionally, they describe negative feelings of being “shut-in” (Criddle & Potter 2006, Skyman et al. 2010), which might have negative psychological consequences (Jones 2010). Both patients and visitors are affected during source isolation because the patient’s privacy, freedom of movement and contacts with others are restricted (Millar 2009, Skyman et al. 2010, Stelfox et al. 2003). Additionally, MRSA-colonized persons are more dissatisfied with their care compared to non-isolated patients (Stelfox et al. 2003) and appear to have limited understanding of the organism.
(Criddle & Potter 2006, Newton et al. 2001). This could be a result of healthcare personnel’s inadequate informational skills (Bellamy 2008, Criddle & Potter 2006, Gould et al. 2009, Newton et al. 2001, Skyman et al. 2010). However, infection control nurses provide reassuring information (Bellamy 2008). Several papers have revealed a lack of knowledge about MRSA and the required hygiene precautions among healthcare personnel (Afif et al. 2002, Easton et al. 2007, Paudyal et al. 2008, Phillips et al. 2010). MRSA-colonized persons, however, request information regarding how and where MRSA was acquired, how it is transmitted and the risks of family members and friends contracting the bacteria (Criddle & Potter 2006).

**MRSA colonization**

Common sites for MRSA colonization are in the nose, perineum and the throat (The Swedish strategic programme against antibiotic resistance 2010). The colonization could either be 1) persistent, 2) intermittent or 3) a clinical infection. 1) Persistent colonization refers to chronic colonization with the same strain, usually in multiple sites, that has not caused clinical disease (Albrich & Harbarth 2008). Persistent colonization generally does not have to be treated, although sometimes eradication is performed, but not necessarily successfully, on uncomplicated variants, such as nasal colonization (Bradley 2007, Tacconelli & Johnson 2011). Healthcare personnel, for instance, can become sporadically colonized by MRSA in the nose or on the skin during work. 2) Such intermittent colonization indicates that the healthcare personnel are colonized with varying strains for short time periods (Albrich & Harbarth 2008). Healthcare personnel with intermittent as well as persistent MRSA colonization are thought to constitute an increased risk for spread of the bacteria to patients and other healthcare personnel (Albrich & Harbarth 2008, Ben-David et al. 2008, Vonberg et al. 2006). 3) When MRSA is the cause of clinical disease, the colonization has developed into an MRSA infection. This could involve, for instance, skin and soft tissues, intravenous or implanted devices, bones or joints. Treatment of such infection requires expensive and potentially toxic antibiotics (Diederen & Kluytmans 2006). Patients with colonization or infection with MDRB have been shown to be more prevalent in some care specialities, for instance, within haemodialysis care (Parker & Doebbeling 2012, Pop-Vicas et al. 2008) owing to chronic immunosuppression, within haematology care due to neutropenia (Arnan et al. 2011) and in intensive care units due to the patients being critically ill and the use of invasive procedures (Brusselaers et al. 2011).
Transmission of MRSA

MRSA is transmitted via direct or indirect skin contact. Three main components are needed for such transmission: 1) a source of the infecting microorganism, 2) a vulnerable host, and 3) a way to transmit the microorganism to the host (Stirling et al. 2004). Within healthcare settings, transmission is usually caused by a combination of patient, healthcare personnel and systemic factors (Gardam et al. 2009), which may occur in environments that are insufficiently disinfected (Yamamoto & Marten 2008) or via healthcare personnel’s attire (Gaspard et al. 2009, Wiener-Well et al. 2011). However, MRSA is undoubtedly mainly transmitted by the hands of healthcare personnel as a result of non-adherence to hand hygiene precautions (Camins & Fraser 2005, Henderson 2006, Nicol et al. 2009, Pittet et al. 2006). Thus, it is necessary that healthcare personnel understand the importance of infection prevention and contact precautions to limit the spread of infection as well as improve patient safety in healthcare settings.

Infection prevention as a patient safety issue

Infection prevention is an important part of quality of care and patient safety in healthcare settings (Pittet et al. 2008) owing to the high prevalence of avoidable adverse events (Gardam et al. 2009), such as healthcare-associated infections (HAIs) (Lazzari et al. 2004). Approximately, one in ten hospital admissions worldwide results in an HAI (Gravel et al. 2007, Humphreys et al. 2008, Lujan et al. 2009, Pittet et al. 2008). Of those, MRSA is estimated to be isolated in about 8% (Hidron et al. 2008). This high risk of contracting HAIs, caused by both antibiotic resistant and non-resistant organisms, and its potential consequences have contributed to a global concern among professionals as well as the general public (Burke 2003, Gould et al. 2009, Lazzari et al. 2004, Pittet et al. 2008). Encouraging management at all levels as well as having stable teams of healthcare personnel facilitates infection prevention works (Gardam et al. 2009, Griffiths et al. 2009). In Sweden, some county councils have implemented an MRSA team, usually comprising infection specialists and RNs, at the infection unit to improve patient safety and address patients’ needs. Team members act as consultants for healthcare personnel who have questions concerning such bacteria; they are also involved in MRSA management in individual patients.

To ensure patient safety, infection prevention should be considered a priority and integrated at all organizational levels within healthcare (Brannigan et al. 2009), including the care provider (the political level in the county councils), the head of department, and the individual healthcare personnel, e.g. RNs.
and physicians (Falk & Nilsson 1999). The organizational culture within healthcare settings involves all employed personnel in the organization and incorporates a sense of identity and belonging based on shared beliefs, meanings and values. Furthermore, organizational culture encourages loyalty and presents a rationale for appropriate and inappropriate workplace behaviour. Healthcare organizations, however, are complex and consist of several subcultures with their own specific set of values and beliefs (Boyle et al. 2001). In a learning organization perspective, the organization, in this case a healthcare setting, is regarded as a group of personnel who learn together to improve and develop the organization. Such learning and development are generally dependent on feedback regarding results and performances to improve the groups’ ability to reach established goals (Senge 2004). Thus, open communication about potential causes of errors and organizational commitment to learning from them when they occur are important to facilitate patient safety.

During 2010, responsibility for patient safety within Swedish healthcare organizations has been strengthened. The law directing patient safety declares that care providers have a distinct responsibility to conduct patient safety work to prevent adverse events in healthcare, such as HAIs caused by MDRB. Furthermore, the law declares that the involvement of patients and relatives should be encouraged in patient safety work. Care providers also have a legal responsibility to evaluate whether healthcare personnel constitute a risk for patient safety, and if so to report them to The National Board of Health and Welfare (Ministry of Health and Social affairs 2010). In addition to the law directing patient safety, all healthcare personnel have to act in accordance with established preventive measures aimed at infection control (The National Board of Health and Welfare 2007).

Ignaz Semmelweis’ and Florence Nightingale’s models for infection prevention are considered to be the foundations of current infection control practices. Semmelweis reduced cross-transmission of infectious agents by using disinfectants, and Nightingale decreased the spread of infection associated with sanitary conditions and postoperative complications by implementing standards of cleanliness in the care environment (Hegge 2011, Pittet 2005). Restricted antibiotic prescriptions (Björkman et al. 2010, Björkman et al. 2011, Mölstad et al. 2008), adherence to hand hygiene, targeted screening, and eradication and isolation of hospitalized patients with MDRB, such as MRSA, are all interventions that promote infection prevention (Reynolds 2009, Struelens & Monnet 2010). Factors such as isolation facilities (Randle & Clarke 2011), bed occupancy, patient turnover, staffing levels and workload, on the other hand, need to be handled when improving infection prevention as well as safety for patients within healthcare settings (Griffiths et al. 2009).
Infection control measures

The basic need to prevent and control for spread of organisms within healthcare settings requires that healthcare personnel as well as managers have knowledge about and adhere to infection control measures (Gardam et al. 2009, Stirling et al. 2004). Guidelines for such practices need to be updated, at both local and national levels (Reynolds 2009). Despite substantial evidence that hand antisepsis reduces the rate of HAIs caused by both non-resistant and antibiotic resistant bacteria (Camins & Fraser 2005, Grayson et al. 2008, Henderson 2006, Pittet et al. 2008), non-adherence to hand hygiene practice is a significant problem worldwide (Pittet et al. 2008, Scheithauer et al. 2010). About one in five HAIs would probably be avoidable (Harbarth et al. 2003) if healthcare personnel adhered to infection control measures and environmental hygiene (Lazzari et al. 2004, Storr et al. 2005, Talon et al. 2008). Thus, adherence to hand hygiene precautions is a central action for ensuring one kind of patient safety. Infection control measures should occur in a timely and effective way in care procedures (Boyce 2008, Pittet 2005). This includes hand disinfection before and after patient contact complemented with gloves and aprons (The National Board of Health and Welfare 2007). Hand disinfection is necessary because the protective clothing becomes contaminated with organisms (Wiener-Well et al. 2011). Healthcare personnel appear to realize the importance of hand hygiene, although they overestimate their own adherence to such precautions (Boyce 2008, Harris et al. 2000, Jenner et al. 2006, Larson et al. 2004, O'Boyle et al. 2001).

MRSA-colonized persons believe there is a need to improve the use of infection control measures among healthcare personnel (Newton et al. 2001). Adherence to hand hygiene precautions is a multifactorial problem that involves aspects of healthcare personnel’s knowledge and behaviour (Fitzpatrick et al. 2011). Multimodal interventions (Allegranzi & Pittet 2009) including involvement of patients (Duncan & Dealey 2007), accessible hand disinfectants (Creedon 2005), detailed culture change in the healthcare setting (Grayson et al. 2008, Johnson et al. 2005, Whitby et al. 2008) and behavioural change among healthcare personnel (Whitby et al. 2007) have been shown to be effective in bringing about sustained improvement of hand hygiene adherence among healthcare personnel.

ownership is of importance to enhancing patient safety by limiting the risk of contracting infections within healthcare settings, especially infections caused by MDRB, such as MRSA and extended spectrum beta lactamase (ESBL)-producing bacteria.

MRSA and ESBL-producing bacteria

Prevention of infections caused by MDRB is an essential patient safety issue, because MDRB causes clinical infections that are difficult to cure (Reynolds 2009) and increases healthcare costs (de Kraker et al. 2011, Reynolds 2009) as well as mortality rates (Cosgrove 2006, de Kraker et al. 2011). MDRB is designated as the most important disease threat globally (European Centre for Disease and Control 2009), and is commonly acquired in both community and healthcare settings (Woodford & Livermore 2009). The use and misuse of antibiotics contributes to its progress (Cars et al. 2008). Patients (Brooks et al. 2008) and the public (Hawkings et al. 2007), however, feel that the causes of and responsibilities for antibiotic resistance are greater than what can be dealt with at the personal, individual level. Two of the most common MDRB within healthcare settings worldwide are ESBL-producing bacteria and MRSA (Falagas & Karageorgopoulos 2009, Struelens & Monnet 2010, Woodford & Livermore 2009).

ESBL-producing bacteria are frequently spread among *Enterobacteriaceae*, such as *Escherichia coli* and *Klebsiella pneumonia* (Bissett 2007, Falagas & Karageorgopoulos 2009). The prevalence of ESBL-producing *E. coli* varies in Europe; one of the highest rates, 29%, is reported from Bulgaria (European Centre for Disease and Control 2011), whereas the rate in Sweden is below 5% (European Centre for Disease and Control 2011, Mölstad et al. 2008). However, the problem with resistance in gram-negative bacteria is increasing worldwide (Bissett 2007, European Centre for Disease and Control 2011) and such bacteria can be acquired in both community and healthcare settings (Falagas & Karageorgopoulos 2009). Risk factors of importance to contracting healthcare-associated ESBL-producing bacteria are prior admission to a nursing home or acute facility, length of stay prior to infection, and previous use of beta lactam antibiotics (Ofner-Agostini et al. 2009, Skippen et al. 2006). International travel is described as a risk factor for community-acquired ESBL-producing bacteria (Tängden et al. 2010).

The prevalence of MRSA isolates differs across European countries, with one third having a rate above 25% in all invasive cases, such as in Greece and Spain, whereas the proportions in other countries are about 1%, like in The Netherlands and Sweden (European Centre for Disease and Control 2011, Mölstad et al. 2008). The prevalence of MRSA, however, has decreased in many countries such as the UK, Poland and the United States.
during recent years (Struelens & Monnet 2010, Woodford & Livermore 2009). The trend in Sweden is the opposite, however, with one fourth of all cases having been infected in a foreign country (Stenhem et al. 2006). Moreover, two thirds of all domestic MRSA cases in Sweden are community-acquired, where the prevalence is higher among children and young adults (The Swedish strategic programme against antibiotic resistance 2010). Thus, community-acquired MRSA strains have global spread (Struelens & Monnet 2010), and are at present common within healthcare settings as well (Carlet et al. 2011, Matouskova & Janout 2008).

Awareness of the MRSA bacteria is described to be high among the general public (Easton et al. 2009, Gill et al. 2006, McLaughlin et al. 2008) as well as among healthcare personnel (Gill et al. 2006). Patients without MDRB colonization report that they would feel either angry or afraid if they were to acquire MRSA during hospitalization. In general they felt that hospitals failed to protect patients adequately from contagion (Hamour et al. 2003). Hospital visitors and the general public think that MRSA raises strong emotional reactions, like feelings of anger and fear (McLaughlin et al. 2008). Caregivers to MRSA-colonized children describe concerns and worries as well as feelings of social stigma (Sengupta et al. 2011).

In the above section, important aspects of infection prevention have been introduced as patient safety issues. The presented aspects concerning the organization culture, adherence to infection control measures and HAIs caused by MDRB are, however, not enough to ensure safe patient care. Infection prevention and control measures must also be communicated with patients to give them the resources to minimize risk of infection (Storr et al. 2005). Thus, communicating and interacting with patients are factors of importance in delivering safe care.

**Patient-professional interactions**

Interactions between healthcare personnel and patients occur in connection with all aspects of healthcare delivery. Asymmetry is a fact in such interactions due to healthcare personnel’s role as professionals in control and the patient’s vulnerable role of being in need of help (Sundström 1997). Owing to healthcare personnel’s different attitudes and level of professionalism and skill, patients may experience the patient-professional interaction positively or negatively (Orlando 1990). However, in Sweden, all healthcare personnel are responsible for promoting good interactions with patients. Furthermore, patients should be provided information in a way that meets their individual needs (Ministry of Health and Social Affairs 1982).
RNs have a professional responsibility to promote patients’ well-being (Fleischer et al. 2009, Forbes & While 2009, Hagerty & Patusky 2003, Shattell 2004), where information provision is essential to facilitating patients’ understanding of their disease and care (Forbes & While 2009). Orlando’s nurse-patient interaction theory describes the interpersonal relationship as central. In this practical theory, the professional function of nursing is described as to identifying and accommodating a patient’s immediate need for help. In doing this, it is vital that RNs understand patients’ distress. RNs’ perceptions of patients’ behaviours and needs, as well as RNs’ thoughts and emotions in the interaction, play an important role in identifying problems and finding solutions to help patients achieve increased well-being. However, such perceptions must be formed in a dialogue with the patient to achieve adequate interaction and communication (Orlando 1990). Thus, RNs must focus on every individual patient’s conditions and needs in every unique interaction (McCabe 2004), where the words and actions employed affect both the RN and the patient (Orlando 1990).

In patient-professional interactions, also known as care relations, verbal and non-verbal communication are crucial because they influence patient’s satisfaction with care (Fleischer et al. 2009). A leading cause of events that are adverse to patients is communication failures caused by situational or personality-dependent factors (Leonard et al. 2004), or ignorance of the patient’s role in the interaction (Fleischer et al. 2009). However, competent healthcare personnel promote feelings of security among patients (Berg & Danielson 2007). Therefore, healthcare personnel need to have an adequate professional approach, meaning that they must have knowledge, understanding and awareness of their own as well as patients’ reactions (Holm 2009) if they are to form trust (Berg & Danielson 2007) in the care relationship with MRSA-colonized persons. Care relations are described as multifaceted and as integrating the patient’s and healthcare personnel’s role perception, expectations, behaviour and attitudes (Björck & Sandman 2007, Hagerty & Patusky 2003, Shattell 2004). An individual’s attitude is described as his/her tendency to react consistently in response to an object, person or issue in either a positive, negative, or ambivalent way. Such favourable or unfavourable attitudes can be influenced by verbal and non-verbal responses to the object in question (Hogg & Vaughan 2008). As one of the ambitions of the present thesis was to describe healthcare personnel’s attitudes towards patients with MDRB, a theoretical perspective on the construct of attitude is presented below.
Models of the construct of attitude

Attitudes are viewed as learned in a social context and may develop through direct experiences or through interactions with others. In the discipline of social psychology, attitude is described as a general construct that precedes and guides human behaviour (Hogg & Vaughan 2008). However, the intention to behave in a specific manner does not necessarily predict actual behaviour. Furthermore, intentions may be irrelevant when a behaviour has become habitual (Ajzen 2001). Three models of attitude structure and function are presented below, although the focus is on the three-component model (Hogg & Vaughan 2008).

The one-component attitude model, adopted by, e.g., Thurstone in the 1930s, incorporates the simplest construct, where an affect for or against a psychological object is used as the definition of attitude. A bit more advanced is the two-component attitude model, an approach adopted by, e.g., Allport in the 1930s. This model contains an affective and a behavioural component and describes attitude as a hypothetical construct. Thus, attitudes are perceived as unobservable and can only be examined through personal mental processes or by examination of the ways in which humans behave, speak or act (Hogg & Vaughan 2008, Pratkanis et al. 1989).

The three-component attitude model, adopted by, e.g., Breckler in the 1980s, provides a more complex description of an attitude, incorporating a cognitive, behavioural and affective component. Beliefs, actions and feelings are described as basic to human experience and thus are integrated into the model (Hogg & Vaughan 2008, Pratkanis et al. 1989). A cognitive response reflects an individual’s beliefs, whereas a behavioural response represents the way an individual acts with respect to a specific object. Finally, affective responses reveal an individual’s feelings towards the object (Figure 1) (Pratkanis et al. 1989). Each attitude towards an object, event, group or person is described as containing a cluster of feelings, behavioural intentions and thoughts. This indicates that an attitude is learned and not a temporary feeling. Therefore an attitude cannot be related to a single event taking place at one specific occasion (Hogg & Vaughan 2008, Pratkanis et al. 1989). Generally, an attitude can be constructed predominantly on the cognitions, behaviour or emotions that are derived from an individual’s experiences and interactions with others. Criticisms of the three-component attitude model concern the relationship among the three components. Furthermore, the model has demonstrated a weak ability to predict or explain behaviour or attitude change. Despite these limitations the three-component attitude construct is considered reliable with regard to determining individuals’ attitudes (Pratkanis et al. 1989).
Figure 1. Illustration of attitude in the construct of the three-component attitude model.
Aim

The overall aim of the thesis was to investigate experiences of living with MDRB, using MRSA colonization as an illustration, and to develop and validate a tool to describe healthcare personnel’s attitudes towards patients with MDRB. A further objective was to study MRSA-colonized persons’ and healthcare personnel’s experiences of patient-professional interactions and responsibilities for infection prevention.

The needs and safety of patients constitute an essential aspect of quality of care. Owing to the variation in, for instance, healthcare personnel’s levels of professionalism and skill, patients may perceive their care in different ways. Perceptions of MRSA colonization have been studied among patients in hospital environments, but how do persons experience their daily lives after being colonized with MRSA, and how do they experience their interactions with the Swedish healthcare system? To begin to understand this, the aim of **Study I** was to explore MRSA-colonized persons’ experiences of MRSA colonization in a Swedish context. Furthermore, **Study IV** was conducted to investigate how MRSA-colonized persons and healthcare personnel conceive of and discuss experiences of patient-professional interactions and responsibilities for infection prevention. International papers have shown that healthcare personnel have limited knowledge of MDRB and the precautions necessary to prevent infection, but what is the situation like in Sweden, and what attitudes do personnel have in their professional relation to MRSA-colonized patients? As there was no instrument available, neither in Swedish nor in English, measuring healthcare personnel’s attitudes towards patients with colonization of MDRB, the objective of **Study II** was to empirically develop and psychometrically evaluate a questionnaire designed to measure attitudes according to the three-component attitude model. Finally, the aim of **Study III** was to assess the questionnaire’s validity and to study RNs’ knowledge of, behaviour toward and emotional response to patients with MDRB.
Methods

Design

Four empirical studies (I, II, III, and IV) are included in the thesis. Study I and IV comprise qualitative data and use an exploratory (I and IV) and a descriptive (IV) design. In Study II and III, a cross-sectional survey design was applied for methodological correlational (II) and comparative (III) purposes. An overview of the design of these studies is presented in Table 1.

Table 1. Overview of design, sample and data collection used in Study I-IV.

<table>
<thead>
<tr>
<th>Study</th>
<th>Design level*</th>
<th>Sample</th>
<th>Data collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Exploratory</td>
<td>13 MRSA-colonized persons</td>
<td>October 2007-April 2008 Open-ended one-to-one interviews</td>
</tr>
<tr>
<td>II</td>
<td>Correlational</td>
<td>371 healthcare personnel 64 nursing students</td>
<td>Mars 2007-June 2009 Questionnaire</td>
</tr>
<tr>
<td>III</td>
<td>Comparative</td>
<td>397 RNs</td>
<td>April-October 2010 Questionnaire</td>
</tr>
<tr>
<td>IV</td>
<td>Exploratory, Descriptive</td>
<td>5 RNs 6 physicians 5 first-line managers 4 heads of department</td>
<td>February-Mars 2011 Semi-structured focus group interviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 MRSA-colonized persons</td>
<td>May-June 2011 Open-ended one-to-one interviews</td>
</tr>
</tbody>
</table>

*Design level in accordance with the description by Brink and Wood (2001).
Subjects and procedures

A purposive sampling procedure was used to recruit a total of 18 MRSA-colonized persons (Study I and IV) and 20 healthcare personnel (Study IV) in one county council district in central Sweden. In Study I, four men and nine women with MRSA colonization (aged 29-78 years) were included. In Study IV, two men and three women with MRSA colonization (aged 34-67 years) and four heads of department, five first-line managers (FLMs), six physicians and five RNs working within infection, haematology, haemodialysis or primary care (aged 32-59 years) were included. The healthcare personnel comprised seven men and 13 women. The names of eligible physicians and RNs were provided by the FLMs or colleagues. Inclusion criteria for MRSA-colonized persons were: older than 18 years and living in the county (Study I and IV) and MRSA diagnosis during 2010 (Study IV). Recruitment of informants and scheduling of interviews were accomplished via telephone (Study I and IV) or via e-mail (Study IV).

The construction, development and evaluation (Strainer and Norman 2008) of the MDRB Attitude Questionnaire (Study II) included a total of 435 respondents. A purposive sampling procedure was used to include eligible persons in the construction phase, and a convenience sampling procedure was used in the development phase (Table 2). In the evaluation phase, a quota sampling procedure (Polit & Beck 2012) was used to invite the 19 participating haemodialysis units representing university hospitals, regional hospitals and local hospitals. The heads of respective dialysis units designated a contact person, who distributed the questionnaire during working hours and sent out reminders. The contact persons were informed about the study procedures via telephone, and all necessary material was mailed. The respondents themselves returned the questionnaire (80%) in a prepaid and addressed envelope. The majority, 93 %, of the haemodialysis nurses were women; 86% had worked within healthcare for 3 years or more.

Table 2. Sampling procedure and independent samples (a-h) used in the construction, development and evaluation of the questionnaire (Study II).

<table>
<thead>
<tr>
<th>Phase</th>
<th>Sampling procedure</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Construction</td>
<td>Purposive</td>
<td>a) 8 RNs working in infection care</td>
</tr>
<tr>
<td>Mars-June 2007</td>
<td></td>
<td>b) 2 physicians with expertise in infection prevention and control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) 6 RNs with expertise in infection control</td>
</tr>
<tr>
<td>2. Development</td>
<td>Convenience</td>
<td>d) 13 healthcare personnel</td>
</tr>
<tr>
<td>September 2007-</td>
<td></td>
<td>e) 13 RNs</td>
</tr>
<tr>
<td>November 2008</td>
<td></td>
<td>f) 64 nursing students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>g) 2 physicians with expertise in infection prevention and control (same as above)</td>
</tr>
<tr>
<td>3. Evaluation</td>
<td>Quota</td>
<td>h) 329 haemodialysis nurses</td>
</tr>
<tr>
<td>January-June 2009</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The heads of the Swedish associations for registered district nurses, RNs in haematology care and RNs in infection care approved the use of their membership registers (February 2010) for data collection in Study III. The heads of each of the associations arranged a contact person. Using a systematic sampling procedure (Polit & Beck 2012) and the inclusion criterion that the RNs were to hold a clinical position, the contact persons mailed the coded questionnaire to the RNs’ home addresses, and issued two reminders. The RNs themselves returned the questionnaire (58%) in a prepaid and addressed envelope. The mean age of the total sample was 47 years (21-64), 98% were women, and the average length of work experience was 18 years (0-43). An overview of the sampling strategy of RNs is presented in Table 3.

Table 3. Overview of sampling strategy and sample of RNs from the district, haematology and infection association (Study III).

<table>
<thead>
<tr>
<th></th>
<th>District RNs</th>
<th>Haematology RNs</th>
<th>Infection RNs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of members</td>
<td>3420</td>
<td>174</td>
<td>326</td>
</tr>
<tr>
<td>Sampling procedure</td>
<td>Every 10th member (n=342)</td>
<td>All members (n=174)</td>
<td>Every 2nd member (n=163)</td>
</tr>
<tr>
<td>Sample</td>
<td>160 (47%)</td>
<td>108 (62%)</td>
<td>129 (79%)</td>
</tr>
</tbody>
</table>

Data collection

For an overview of data collection methods in Study I-IV see Table 1. In Study I and IV, open-ended semi-structured one-to-one interviews were performed at one occasion with MRSA-colonized persons. A study-specific interview guide was used to ensure that all participants answered the main questions. The questions concerned how MRSA colonization influenced their daily life (Study I), their experiences of encounters with healthcare personnel and information provision (Study I and IV), and their experiences of healthcare personnel’s responsibility for infection prevention (Study IV). Follow-up questions like “What do you mean” or “Can you explore that” were applied when needed. The majority of the interviews were between 35 and 60 minutes (Study I) or approximately 30 minutes (Study IV). The interview setting was chosen by the MRSA-colonized persons (Study I) or interviews were conducted at the unit for infectious diseases at the local hospital (Study IV). Furthermore, four focus group interviews were conducted to collect data from heads of department, FLMs, physicians and RNs, respectively (Study IV). A facilitator was used to introduce the topic, encourage questions and discussions between the participants, and to ensure that each informant participated in the conversation. An assistant was used to make field notes documenting non-verbal expressions. Each focus group interview lasted between 45 and 60 minutes (Study IV).
An interview session was conducted at the unit for infectious diseases at the local hospital and lasted about 60 minutes. The facilitator and the assistant discussed the interview session directly after the session ended. The interviewer/facilitator and the assistant both had experience from qualitative data collection methods, such as individual and group interviewing, and neither of them was involved in patient care.

In Study II, a multifactorial concept of attitude as consisting of a cognitive, behavioural and affective component (Hogg & Vaughan 2008, Pratkanis et al. 1989) was adopted and used as a theoretical base in constructing the MDRB Attitude Questionnaire. The data collection process was divided into three phases: 1) the construction phase involved deriving items, literature searches, discussions with experts in the field and performing an empirical explorative investigation (Brink & Wood 1998). 2) In the development phase, item adequacy was ensured by using face validity tests and pre-tests (Strainer & Norman 2008). 3) The evaluation phase involved item validity tests and content validity tests on the items. An overview of the data collection process (Study II) is presented in Figure 2 (next page).

In Study III, data were collected using the MDRB Attitude Questionnaire (developed in Study II) for discriminative and content validity purposes. The MDRB Attitude Questionnaire consisted of 42 items on knowledge of spread of infection, treatment, microbiological characteristics and hygiene precautions, behaviour towards and emotional responses to patients with MDRB, as well as 12 background questions on demographics and a question on different healthcare actors’ responsibility for infection prevention. Response alternatives were either dichotomous, multiple-choice or left on a semantic differential scale, where high scores are more desirable. An English version of the MDRB Attitude Questionnaire (enclosed as an appendix to Study III) was created using the stages 1-4 of the forward-back translation process described by Beaton et al. (2000).
Figure 2. Data collection process for the questionnaire construction, development and evaluation (Study II). n = number of respondents, k = number of items
Data management and analytical procedures

All interviews (Study I and IV) were digitally recorded and transcribed verbatim. The analysis was conducted in Swedish using manifest and latent (Study I) qualitative content analysis (Krippendorff 2004) or an interpretative model (Study IV) of qualitative content analysis (Morgan 1997). Concepts used in the analysis process were in accordance with those suggested by Graneheim and Lundman (2004). The field notes generated from the focus group interviews (Study IV) were used to process the respective interactions (Kitzinger 2005). Each interview transcript was read several times to ensure familiarity with the text and to identify meaning units (words, sentences or paragraphs) that corresponded to the respective study aims. Thereafter, the interviews were analysed by making notes about similarities; annotations were made in the margins and key findings as well as potential excerpts were highlighted. Codes were given to the condensed key findings, and the codes were interpreted and compared for differences and similarities resulting in abstracted categories (Study I) or sub-themes (Study IV). To identify the underlying content of the text all transcripts were reread, and a theme (Study I) or themes (Study IV) that integrated the content of the interviews was formulated and named. A selection of excerpts was made to illustrate the findings (Krueger 1998). The analysis process in both Study I and IV was continually discussed and involved moving back and forth between the whole and the parts of the text.

Psychometric properties of the MDRB Attitude Questionnaire were tested in Study II and III. Item difficulty and plausibility of incorrect response alternatives (Strainer & Norman 2008) were calculated for items in the knowledge and behaviour components. Items in the knowledge component were also analysed for possible discrimination using the top and bottom 27% of the distribution (Aiken 1996, Kline 2005). Frequencies and cross-tabulation were used for examination of the data (Study II). A principal component analysis (PCA) with varimax rotation (Tabachnick & Fidell 2007) was performed on items in the emotional response component. Bartlett’s test of sphericity and Kaiser-Meyer-Olkin’s measure of sampling sufficiency were used to consider the factorability of the correlation matrix. The results from Kaiser 1 and a scree test were taken into account in determining the number of obtained factors (Tabachnick & Fidell 2007). The internal consistency reliability of the factors was calculated using Cronbach’s alpha, with the criteria of alpha above 0.70 and below 0.90 (Strainer & Norman 2008) for interpretation of the results (Study II and III). Guided by the PCA results (Study II), rejection of items was based on the following criteria: 1) indistinct difference of vocabulary, 2) high inter-item
correlation in the correlation matrix, and 3) factor loadings less than 0.55 in the rotated factor loading matrix. Discriminant validity was calculated for the three components knowledge, behaviour and emotional response (Study III).

In **Study III**, the respective items in the knowledge and behaviour components were considered in terms of their clinical relevance to infection prevention. In the knowledge component 13 of the 18 items and in the behaviour component five of seven items were regarded as having high relevance to infection prevention. These items were therefore classified as “red items” that must be answered correctly. Thus, a lack of knowledge about or non-adherence to these “red items” was regarded as inappropriate, although for the rest of the items lacking knowledge or non-adherence would not jeopardize patient safety.

Responses to items in the knowledge and behaviour components were recoded into a dichotomous variable (correct/incorrect). Responses to items in the emotional response component were transformed into a numerical scale from one to seven, after restructuring so that all negative connotations correspond to one, and all positive connotations to seven. The “don’t know” option and missing data were recoded as an incorrect answer for items in the knowledge component (Study II and III). Occasional missing values on items in the behaviour component (Study II) were handled using the last-value-carried forward method (Tabachnick & Fidell 2007) when appropriate. This means that when a hygiene precaution activity was marked as (correctly) not performed before nursing care, it was plausible to assume that the precaution activity was (correctly) not performed afterwards as well, even though the mark was missing. This occurred in 9% of all cases (Study II). Occasional random missing data on items in the emotional response component (Study III) were handled by inserting the group mean (Tabachnick & Fidell 2007); this occurred in 0.2% of all cases.

The gained points in the respective components were transformed to make them comparable. Values between 0-100 in the knowledge and behaviour components and 14-100 in the emotional response component were established by dividing the summarized points by the maximum number of points and then multiplying by 100 (Study II and III). Descriptive statistics were used for examination of the data, and Pearson’s correlation coefficient was computed to test independence among the three components knowledge, behaviour and emotional response (Study II). In **Study II and III**, independent t-tests or one-way analysis of variance (Tabachnick & Fidell 2007) were used for comparisons. A significance level of \( \alpha = 0.05 \) (two-tailed) was chosen in most of the statistical analyses (Study II and III). However, to limit the risk of mass-significance due to the relatively large
number of statistical analyses, a significance level of $\alpha=0.01$ (two-tailed) was applied in some of the analyses (Study III). Bonferroni corrections were used to protect from type I error, i.e. rejecting a null hypothesis that is in fact true, thus making a false-positive conclusion (Polit & Beck 2012). Statistical analyses were conducted using PASW Statistics 18 (Study II) and 19 (Study III) for Windows (SPSS Inc. an IBM Company, Chicago, IL, USA).

Ethical considerations

The research in the present thesis conformed to the ethical principles defined in the Declaration of Helsinki (World Medical Association 2008). The Regional Ethical Review Board in Uppsala approved the study protocols in Study I and IV (Reg. no. 2007:067 and 2010:215, respectively). Formal approval of ethics committee was not required, according to the Swedish Act on the Ethical Review of Research Involving Humans (Ministry of Education and research 2003), as no physical or psychological intervention was performed and no handling of sensitive personal data occurred in Study II and III. The integrity and autonomy of participants were considered by ensuring confidentiality and voluntary participation (Study I-IV). Written informed consent was received from the MRSA-colonized persons, and the personnel agreed to secrecy within the respective focus group sessions (Study IV). Completion and return of the questionnaire were judged to imply informed consent on the part of the RNs (Study II and III).

In the present thesis, the main ethical question was whether the MRSA-colonized persons may be harmed when asked deeply personal questions about their experiences of living with MRSA colonization (Study I), of patient-professional interactions as well as about their responsibility for infection prevention (Study IV) in a vulnerable situation. In contrast to patient-professional interactions where patients’ integrity is restricted (Sundström 1997), the participants were not in a role of dependence during the interviews because the interviewer was not involved in their regular care. However, the questions posed during the interview could be emotionally distressing for the participants. To counteract such distress, the participants were invited to contact the interviewer if they had any questions and were offered referral to further professional help, such as an infection specialist or a welfare officer at the infection reception, if necessary. Furthermore, the participants were informed that they did not have to answer a question if they did not wish to. Regarding individual autonomy and integrity (Beauchamp & Cildress 2009), the use of open-ended questions allowed participants to freely choose what and how they wanted to talk about their experiences during the interview. However, research in other fields, e.g. cancer care (Barnett 2001), has revealed that patients appreciate the
opportunity to share their experiences, even if it is burdensome. Data collection in Study IV was initially planned to use focus group interviews with the MRSA-colonized persons as well. However, their request for individual interviews was granted; they viewed MRSA as a sensitive topic to talk about, particularly in a group and when discussing one’s own experiences (Study IV). Another issue of importance is the Swedish Communicable Diseases Act (Ministry of Health and Social affairs 2004), which leads to an ethical conflict between the public and the individual MRSA-colonized person. The goal of the Act is to secure the public’s interests by protecting them from communicable diseases, such as MRSA. Consequently, MRSA-colonized persons’ autonomy is restricted in order to protect others from harm (Beauchamp & Childress 2009). MRSA-colonized persons may also be subject to restrictions affecting their integrity and autonomy -restrictions imposed by healthcare personnel who may have limited experience or knowledge of MRSA.

For healthcare personnel, one ethical issue concerned the possible negative effect of self-awareness on inadequate knowledge, behavioural or emotional response to patients with MDRB or responsibility for infection control. Furthermore, the participants may feel uncomfortable about being evaluated in their work. To protect the participating RNs (Study II and III), the results were only presented at the group level to limit the possibility of strain between individual healthcare personnel and the organization or managers. Considering the opportunity to gain knowledge about the potential consequences of living with MRSA colonization and about patient-professional interactions, the benefits of the present project outweighed the possible risks for the individual participants.
Summary of findings

The findings in the four empirical studies are presented below and reflect the perspective of MRSA-colonized persons (Study I and IV) and the perspective of personnel (Study II, III and IV). The MRSA-colonized persons’ perspective includes experiences and understandings as described by the informants. The personnel perspective comprises attitudes and understandings as represented in the responses of RNs, physicians, FLMs and heads of department. Finally, results from the questionnaire development, evaluation and the translation process (Study II and III) are summarized and linked to the personnel perspective, i.e. attitudes.

The experiences and understandings of MRSA-colonized persons

The MRSA-colonized persons experienced MRSA colonization as something uncertain and indefinable (Study I and IV). The description of being wrongfully affected by something indefinite that one has to deal with both in everyday life and in contacts with healthcare was identified. The patient-professional interactions differed and were described along a continuum from being easy to offensive (Study I). Furthermore the MRSA-colonized persons described a lack of professionalism and inadequate knowledge among personnel, which were regarded as an obstacle to competent MRSA management (Study IV). The informants colonized by MRSA felt a requirement to take responsibility for infection prevention (Study I and IV), although they felt this responsibility should be shared by all healthcare personnel as well as all patients (Study IV). A summary of the findings in Study I and IV is further presented below as “MRSA colonization; an indefinite threat in daily life”, “Inadequate knowledge and altered patient-professional interactions” and “Mutual responsibility for infection control”.

MRSA colonization; an indefinite threat in daily life

The MRSA-colonized persons described their experiences of MRSA colonization as an indefinite threat. They reported that body image, feelings,
fears and worries were affected by colonisation. None of the included persons had heard about the bacteria prior to colonization, and they all reported not knowing how, when or where they had acquired MRSA. However, some blamed the contagion on healthcare and others on friends or relatives. MRSA colonization was perceived as manifest and negative effects such as wounds that did not heal (Study I and IV), and painful malodorous boils (Study I) were described. Metaphors such as having the plague or Human Immunodeficiency Virus (HIV) were used to describe the emotions associated with having MRSA (Study I and IV), and feelings of distaste and uncertainty were expressed. Some felt life had become difficult, and described feelings of being unclean (Study I) or disgusting (Study IV). The colonization was considered as a psychological strain owing to fear of the bacteria and anxiety about behaving incorrectly. The persons felt guilt and shame, especially because their partner and their own children now had an infected relative. Some persons reported not being able to live a normal life, whereas others adapted their needs to MRSA so they could live as usual (Study I). A fear of reactions from others was mentioned, and especially a fear of isolation for their children. Furthermore, MRSA was claimed to be something you do not talk about (Study I and IV), as it causes anxiety among others. The persons expressed a fear of gossip or for losing their work role, as well as a worry about getting a bad reputation (Study I). The requirement to inform about their MRSA colonization in contacts with healthcare was described as stigmatizing and made them feel they were marked as contagious (Study IV). MRSA was described as affecting the persons themselves, their relatives and friends owing to the limited contact with others. The persons had experiences of relatives/friends who kept their distance out of fear of contracting the organism (Study I and IV).

Inadequate knowledge and altered patient-professional interactions
The MRSA-colonized persons described patient-professional interactions as having changed after the MRSA colonization. They felt that personnel were unprofessional and that they did not do everything they should, such as adhere to hygiene precautions (Study I and IV). Personnel working in infection care, elderly care, at child welfare centres and within dental care, however, were considered to be more professional than personnel they had met at primary healthcare centres (Study IV). According to the MRSA-colonized persons, the information provided by personnel was judged to range from adequate to deficient or superficial (Study I and IV). Infection specialists, however, were perceived as good explainers who gave accurate information (Study IV). The MRSA-colonized persons experienced that healthcare personnel acted differently in similar care situations and this sent
mixed messages to the persons as to the seriousness and contagiousness of MRSA (Study I and IV). The persons felt this variation in actions reflected a lack of knowledge of MRSA and hygiene precautions among personnel. Some personnel were perceived as ignoring the problem of MDRB as well as the need to carry out infection control measures. The persons also felt personnel were sloppy, i.e. they placed things anywhere and did not use protective clothing, especially when they were under stress (Study IV). Some encounters stigmatized the persons, e.g., when the personnel exaggerated the use of protective clothing and looked as if they were ready for a trip into outer space (Study I and IV). In other encounters, the personnel gave the impression that they felt uncomfortable (Study IV). The persons did not think MRSA precautions had to be such a major issue, as personnel are directed to follow hygiene precautions in any case (Study IV). Prepared visits characterized by continuity, i.e. when the MRSA-colonized person met the same personnel at different visits, were considered satisfactory and such patient-professional interactions were appreciated (Study I).

Mutual responsibility for infection control

The MRSA-colonized persons were careful with their hygiene (Study I) and ensured that they had intact hands and bandaged wounds when needed. They followed the restrictions placed on them by the healthcare system, i.e. showed the MRSA card or verbally informed healthcare personnel about the colonization, although they felt forced to do so (Study I and IV). To limit the spread of infection, the persons avoided crowds or isolated themselves and their family (Study I), and only contacted healthcare when absolutely necessary. In contacts with healthcare, the persons said that they sat still and did not touch things. Some persons used gloves or alcohol-based hand disinfectant in their work (Study IV). The persons questioned the unwanted responsibility to inform personnel about the MRSA colonization and the restrictions that were placed them, because personnel are not cultured for MRSA on a regular basis and consequently could be potential MRSA carriers (Study I). The persons felt that greater responsibility for infection control measures was assumed by personnel employed at infection units, child welfare centres or dental services, than by personnel they had met at primary healthcare centres. Cleanliness was perceived as most important to limiting the spread of infection, and the persons stressed that both they themselves and healthcare personnel must adhere to and perform infection control measures. A request for specific rooms for infected patients visiting primary healthcare centres was specified, and the persons expected infection control personnel to assume responsibility for limiting infection spread. Furthermore, healthcare personnel were judged to have great responsibility to inform about infection prevention. The persons thought it was important
to take cultures in order to monitor the prevalence and spread of infection. However, they felt that knowing the real prevalence of MRSA was problematic, as people could be carriers without knowing it (Study IV).

Attitudes and understandings as perceived by personnel

The Multidrug-Resistant Bacteria (MDRB) Attitude Questionnaire was developed (Study II) and evaluated (Study II and III) as a rating measure of personnel’s attitudes, i.e. knowledge of, behaviour towards and emotional response to patients with MDRB. The MDRB Attitude Questionnaire showed satisfactory psychometric properties (Study II and III) and was translated into English (Study III). A need for improvement of the personnel’s attitudes was identified (Study II, III and IV). The personnel perceived that knowledge and experiences of MRSA were important to achieve the best possible patient-professional interactions (Study IV). The responsibility for infection prevention was understood as being incorporated into the daily work among RNs, physicians and managers (Study III and IV).

The findings in Study II, III, and IV are further described below as “Healthcare personnel’s attitudes towards patients with MDRB”, “Pursuing a professional approach and information provision in patient-professional interactions” and “Expressed responsibility for infection control”.

Healthcare personnel’s attitudes towards patients with MDRB

The RNs’ attitudes, i.e. knowledge, behaviour and emotional response, towards caring for patients with MDRB were regarded as inadequate (Figure 3).

![Attitude Chart]

Figure 3. Means and standard deviations in the three components of attitude for the respective groups of RNs. For each component the maximum score is 100. HD=Haemodialysis nurses, D=District RNs, H=Haematology RNs, I=Infection RNs
The RNs level of knowledge was generally higher concerning hygiene precautions and treatment, compared with microbiological characteristics and spread of infection (Study II and III). Figure 4 presents an overview of the cumulative percent of correct answers in the knowledge component for the respective personnel groups (Study II and III).

Figure 4. Overview of the cumulative percent of the number of correct answers for the four groups of RNs.

In the behaviour component, the haemodialysis nurses self-reported that their intention to adhere to needed preventive measures when caring for an MRSA-colonized patient was low (Study II). The district RNs, haematology RNs and infection RNs had a higher level of adherence, although it was regarded as insufficient as well (Study III). Despite the inadequate results regarding knowledge and behaviour, the RNs estimated an overall emotional response (Study II and III) that was interpreted as socially accepted (Figure 3). Heads of department, FLMs and RNs described how infrequently occurring procedures can create distress among personnel, and cause fear and uncertainty about how to handle specific situations, such as caring for MRSA-colonized patients (Study IV).
Pursuing a professional approach and information provision in patient-professional interactions

The heads of department, FLMs, physicians and RNs all discussed, within their interview groups (Study IV), how to achieve patient-professional interactions that are as respectful as possible, and concluded that having knowledge and experiences of MRSA are important to promoting good interactions. Physicians and RNs felt it was their professional duty to assume responsibility for their own professional approach, and they felt they did assume such a responsibility. The RNs described a need to have a holistic view and a sensitive approach in patient-professional interactions, and to show the patient respect in accordance with routines and rules as well as the patient’s own desires. The RNs concluded that it is of great importance that personnel be secure in the measures they take, because they felt this inspired a feeling of security in patients. Furthermore, they talked about how patients seem to find MRSA a sensitive subject, because sometimes they deny they are MRSA carriers. The heads of department concluded that personnel give too much information to patients in situations when the personnel feel threatened. The FLMs concluded that personnel have problems ensuring that patients have understood the information provided. This problem was raised by the RNs as well, as they found it difficult to give individualized information to patients. The physicians, on the other hand, declared that in most cases it is not possible to discover how the patient acquired MRSA, which is something the patients want to know. The heads of department stressed that there had been a focus on patient-professional interactions within the organization during the past year, partly owing to the legislated primary choice system in primary care. It was perceived as essential that the county council have attractive primary healthcare centres, and for this reason personnel cannot have an unprofessional approach (Study IV).

Expressed responsibility for infection control

The participating personnel understood that they have a great responsibility for infection control and for preventing the spread of microorganisms. They also assigned a great responsibility for infection control to politicians, managers, patients, proxies and all healthcare personnel, including cleaning personnel and the infection control team (Study III and IV). Although the personnel reported trying to adhere to hygiene routines, they concluded that there is room for improvement among all healthcare personnel, especially among physicians. FLMs had difficulty maintaining hygiene work owing to other higher priority work tasks, whereas physicians and RNs discussed problems in assuming responsibility for hygiene precautions. Furthermore, the heads of department felt healthcare personnel did not understand why it is important to adhere to infection control measures. The physicians
discussed that adherence to infection control measures may well vary across primary healthcare centres and within hospital units owing to the different patient situations. Thus, they mentioned a need for modified hygiene routines for different care specialities. However, they declared it was a duty to always evaluate whether the resistant bacteria could be treated. The heads of department and FLMs stated that healthcare personnel assume to little responsibility for infection control, as measurements have revealed adherence to hygiene precautions after patient contact, but that healthcare personnel seldom disinfect their hands prior to patient contact. The heads of department described their struggle to discourage use of the white coat, with its long sleeves, primarily used among physicians, and they declared that they still do not have a unified solution to the problem. Physicians and RNs brought up the question of how to keep the low prevalence of MRSA in Sweden, as there probably are a large number of unknown cases (Study IV).
Discussion

The findings from the thesis provided additional knowledge of MRSA-colonized persons’ experiences of the difficulties of living with colonization. The MRSA colonization was described as something uncertain and as an indefinable threat that has to be managed both in everyday life and in contacts with healthcare. Interactions with healthcare personnel differed, but were commonly described as unprofessional owing to personnel’s inappropriate behaviour and insufficient information provision. To achieve adequate patient-professional interactions, the personnel described the need to have knowledge and experiences of MRSA. They also found it difficult to give accurate individualized information to patients. The MRSA-colonized persons expressed their unwanted responsibility to inform healthcare personnel about colonization, but also felt responsible for trying to limit the spread of infection to others. Furthermore, responsibility for infection control was regarded as shared between healthcare personnel and all patients. The personnel described responsibility for infection prevention as a natural part of their daily work, although they felt assuming responsibility for infection control and adhering to hygiene precautions were difficult. The MRSA-colonized persons reported that personnel have inadequate knowledge of the bacteria and hygiene routines. This perception was in accordance with the personnel’s estimations in the MDRB Attitude Questionnaire. This was viewed as an obstacle to competent management of MRSA. The need to improve personnel’s knowledge of, behaviour towards and emotional response to patients with MDRB was described. The development, evaluation and validation of the MDRB Attitude Questionnaire were satisfactory, and the questionnaire was regarded as ready for further use. The MRSA-colonized persons’ and the healthcare personnel’s perspectives are linked and discussed below in an attempt to gain an overall understanding of the main findings in the studied areas.

Living with MRSA colonization

Rich descriptions of what it is like to live with MRSA colonization in everyday life were provided in the present thesis. The results indicated that MRSA colonization resulted in an indefinite threat to the self and others, because it affects body image, feelings, fears and worries in the daily life.
Descriptions of perceptions of MRSA colonization, hospitalization and source isolation due to infection control have been presented in several papers (Criddle & Potter 2006, Newton et al. 2001, Skyman et al. 2010, Stelfox et al. 2003). In the paper by Criddle and Potter (2006), for instance, perceptions of MRSA colonization were mainly related to information provision from healthcare personnel and the patient’s need for information. Furthermore, the patients’ understanding of MRSA and lived experience were described, where the latter was portrayed as complex. These results were in agreement with the present findings, indicating that MRSA colonization affects daily life and not only situations connected with healthcare. To counteract such feelings, fears and worries, MRSA-colonized persons should be offered additional help from healthcare. The level of concern, however, varied from not being able to live a normal life to having adjusted needs in regard to the colonization and consequently lived their life as usual (Study I). Therefore, it is vital to provide individualized care and to identify needs for extra support, as not all individuals are able to manage stressful situations, and MRSA colonization has been shown to be just such a situation. Varying levels of concern for the self and others are described by Criddle and Potter (2006), and some indicate a fear of transmitting the bacteria to children. Such concerns in daily life are in accord with the present results, despite the fact that the prevalence (European Centre for Disease Prevention and Control 2010) and awareness (Gill et al. 2006, McLaughlin et al. 2008) of MRSA are higher in, for instance, the UK than in Sweden. The findings showed that some MRSA-colonized persons perceived their life had become difficult, including a psychological strain owing to fears and worries as well as anxiety about incorrect behaviour. Moreover, feelings such as guilt, shame and being vulnerable were described (Study I), as they were in another Swedish paper (Skyman et al. 2010). However, perceptions of not being affected by MRSA colonization have also been described (Newton et al. 2001). The MRSA-colonized persons reported feeling constrained by adhering to the hygiene precautions they had been informed about (Study I and IV). According to guidelines concerning MRSA precautions and control (The Swedish strategic programme against antibiotic resistance 2010), healthcare personnel, physicians in particular, must give verbal and written information about the bacteria and hygiene precautions. MRSA-colonized persons are also given a MRSA card, which they must show when in contact with healthcare or dental care. Such restrictions and declarations indicate that MRSA-colonized persons do as they are told, although they appear to be uncertain as to why they must do it (Skyman et al. 2010).

The bacteria caused anxiety not only among healthcare personnel, but in some cases even relatives and friends kept their distance (Study I and IV). Reactions of fear on the part of relatives are described as negatively
affecting the MRSA-colonized persons’ self-image and relationships (Skyman et al. 2010). In describing the emotions and feelings associated with living with MRSA colonization, metaphors like having the plague or HIV, as well as being unclean or disgusting, were used (Study I and IV). Such feelings and metaphors have been described previously in reference to interactions with healthcare personnel (Criddle & Potter 2006, Newton et al. 2001, Skyman et al. 2010), but not as a reflection of daily living with MRSA colonization. Furthermore, the MRSA-colonized persons felt stigmatized by the requirement that they must always inform about the colonization in contacts with healthcare (Study IV). The impact of stigma on life experiences has also been described by caregivers to MRSA-colonized children (Sengupta et al. 2011). Feelings of social stigma are also described among HIV-positive individuals. Such stigma is perceived differently by different individuals, as in the case of MRSA-colonized persons, and described as changing during the progression of the HIV disease (Taylor 2001). Experiencing anger and rejection from others, including healthcare personnel, and being viewed as a social ill caused infected persons to hide their illness so as to avoid stigmatization similar to that experienced by persons with HIV (Gaudine et al. 2010). The present results indicate that MRSA-colonized persons’ experiences are similar to HIV-positive persons’ experiences of living with a communicable disease. Consequently, it is necessary to describe experiences of living with MRSA colonization in a larger population to increase our knowledge of the difficulties associated with living with MRSA colonization. Furthermore, it is important to understand the size of this problem and to determine whether there are any regional differences in the frequency of the problem in Sweden, given that we know that the prevalence of MRSA varies across different regions (The Swedish Institute for Communicable Disease Control 2012).

There is scarce evidence, if any, regarding healthcare personnel’s perceptions of patients’ experiences of living with MRSA. The present results indicate that MRSA-colonized persons and healthcare personnel have different ideas about the reality of living with MRSA. The RNs, however, reported experiencing MRSA-colonized patients as vulnerable and noted that some patients deny being carriers (Study IV). The latter could be a result of a poor understanding of the condition of MRSA colonization among patients (Newton et al. 2001) or uncertainty as to whether or not one is colonized (Skyman et al. 2010), as expressed by the MRSA-colonized persons (Study I and IV) who were regarded as colonized even though their cultures had been negative (The Swedish strategic programme against antibiotic resistance 2010).
Attitudes towards patients with MDRB

The MRSA-colonized persons perceived that healthcare personnel were ignorant of the problems associated with MRSA as well as the need for adherence to infection control measures (Study IV). Such attitudes (Hogg & Vaughan 2008) could depend on healthcare personnel’s personal experience (or non-experience) of MRSA. However, the variety of attitudes and behaviours among healthcare personnel caused confusion in MRSA-colonized persons as to the seriousness and contagiousness of MRSA (Study IV). Such confusion is also described by Skyman et al. (2010).

In the present thesis, a multifactorial concept of attitude - consisting of a cognitive, behavioural and affective component (Hogg & Vaughan 2008, Pratkanis et al. 1989) - was adopted and used as a theoretical base in the construction (Phase 1) of the MDRB Attitude Questionnaire. The questionnaire was developed (Phase 2) to measure healthcare personnel’s knowledge of, behaviour toward and emotional response to patients with MDRB (Study II). The evaluation (Phase 3, Study II) and validation (Study II and III) of the questionnaire indicated the appropriateness of using the theoretical three-component model (Hogg & Vaughan 2008) as a construct to measure such attitudes. Although there has been criticism of the three-component attitude model regarding the relationship among the components (Pratkanis et al. 1989), the present findings showed the desired correlation between the variables (Study II), as the assumed independence between the knowledge, behaviour and emotional response components was confirmed. This demonstrated that the questionnaire is appropriate and measures what it was intend to measure (Polit & Beck 2012), i.e. attitude.

The three-component model has also been criticized for demonstrating a weak ability to predict or explain behaviour or attitude change (Pratkanis et al. 1989). Because there was no intention to predict overt behaviour in the present thesis, this was not a concern. The focus was on trying to understand healthcare personnel’s self-estimations, or beliefs, even if their behaviour turned out to be inconsistent with these estimations. Thus, the MDRB Attitude Questionnaire is a tool that can help us describe knowledge, intentional behaviour and emotional response among healthcare personnel in terms of their own opinions. Consequently, forthcoming intervention studies could not base desired behavioural change on the three-component attitude model. Use of the theory of planned behaviour might be more appropriate for such purposes (Ajzen 2001), as it is commonly used as a theoretical framework for understanding (Nicol et al. 2009, O’Boyle et al. 2001) or predicting (McLaws et al. 2011) self-reported as well as observed adherence to hand hygiene practices.
The findings indicated insufficient knowledge and inadequate behaviour and emotional responses on the part of healthcare personnel in relation to care for patients with MDRB (Study II and III). This will be further discussed below. No strong conclusions about the RNs’ attitudes could be drawn, as the main objective here was to validate the questionnaire (Strainer & Norman 2008). Thus, if we are to draw conclusions about RNs’ or other healthcare professionals’ attitudes, the MDRB Attitude Questionnaire should be employed, as it is a valuable tool for acquiring information about other healthcare personnel’s knowledge, intentional behaviour and emotional responses when caring for patients with MDRB.

Knowledge of MRSA

Despite the time span between the recruitment procedures in the present thesis - from winter 2007 (Study I) to summer 2011 (Study IV) - none of the participating MRSA-colonized persons had heard about the bacteria prior to colonization. This indicates that there has not been any change regarding awareness of MRSA in the community, despite the fact that four years passed between the studies and that the prevalence in Sweden is increasing, although only slightly (The Swedish Institute for Communicable Disease Control 2012). MRSA is, however, one of the most common antibiotic resistant organisms worldwide (Struelens & Monnet 2010). Reports from the UK, where the prevalence of MRSA is about 30% of all invasive isolates (European Centre for Disease Prevention and Control 2010), reveal the high level of awareness of the organism in the public (Easton et al. 2009, Gill et al. 2006) as well as among healthcare personnel (Gill et al. 2006). The media and healthcare personnel are perceived as important sources of information. The media, however, were considered to reflect negative aspects of MRSA and blamed for sensational and inaccurate interpretations as well (Gould et al. 2009). Owing to the low prevalence of MRSA in Sweden (Mölstød et al. 2008), the media here have probably not been reporting about MRSA, or super bugs, to the same extent as in the UK (Gill et al. 2006). Consequently, the public or even healthcare personnel in Sweden may not have received as much information about MDRB as in the UK.

The level of knowledge about MRSA, ESBL-producing bacteria and hygiene precautions varied considerably among the RNs (Study II and III), but was overall in need of improvement. Deficient knowledge could contribute to the provision of inaccurate information to patients and increase the risk of transmitting organisms in care situations (Lazzari et al. 2004), thus jeopardizing patient safety. The need to increase Swedish healthcare personnel’s knowledge level regarding MRSA is also highlighted by Skyman et al. (2010). Furthermore, international results on healthcare
personnel’s knowledge of MRSA and necessary precautions when caring for patients with MDRB have revealed similar deficiencies (Brady et al. 2009, Easton et al. 2007, Gill et al. 2006, Phillips et al. 2010).

Adherence to hygiene precautions
Healthcare personnel are required to follow hygiene routines, and must, for example, disinfect their hands before and after patient contacts (The National Board of Health and Welfare 2007). For this reason, the MRSA-colonized persons felt that MRSA precautions should not be such major issue (Study IV). Healthcare personnel, however, are less adherent to hand hygiene prior to patient contact compared to after patient contact (Scheithauer et al. 2010). The MRSA-colonized persons thought that healthcare personnel were non-professional when they behaved differently in similar care situations (Study I and IV). This variable behaviour was associated with a lack of knowledge of MRSA and hygiene routines (Study IV). However, it could also be a consequence of healthcare personnel’s attitudes towards the need for hygiene precautions or how they understand their duties (Sandberg 2000), as adherence to MRSA precautionary measures is not complete (Afif et al. 2002).

The RNs’ intended use of hygiene precautions could be described as inadequate, despite the fact that many of the RNs answered all of the items correctly (Study II and III). All RNs should have answered all the items correctly, as the knowledge underlying them is of importance to patient safety in daily care to prevent the spread of infection of any organism (The National Board of Health and Welfare 2007), not only those that are drug resistant. Self-reported estimations have been described as overestimated compared to actual behaviour (Harris et al. 2000, Jenner et al. 2006), meaning that healthcare personnel are probably not adherent to all procedures in reality. Even so, we could conclude that healthcare personnel with 100% correct answers at least know how they should behave and what precautions are necessary when caring for MRSA-colonized patients. Furthermore, self-reported intention to behave in a specific way is regarded to accurately predict actual behaviour (Ajzen 2001). Thus, a 100% correct response rate would be desirable in these kinds of self-reports.

Modified hygiene precautions in different care situations were requested by the personnel, although they expressed the need for improved adherence to infection control measures (Study IV). This kind of improvement is exactly what is needed, because adherence to hand hygiene precautions is the most effective way to limit spread of infection (Camins & Fraser 2005, Grayson et al. 2008, Henderson 2006, Pittet et al. 2008). The personnel felt that healthcare personnel have little understanding of the importance of
adherence to hygiene precautions (Study IV). This, however, is in disagreement with the findings of Harris et al. (2000). To improve such adherence, managers must be encouraging (Griffiths et al. 2009) and ensure that hygiene guidelines are kept updated (Reynolds 2009). Furthermore, to achieve successful change, healthcare organizations must offer practical training for healthcare personnel (Griffiths et al. 2009, Nicol et al. 2009) as well as give adequate feedback (Senge 2004) regarding results on adherence to hygiene routines. However, adherence to hygiene procedures was not easy to uphold all the time due to other high priority work tasks or due to stress (Study IV). Work-related stress, for instance, has a negative effect on RNs’ hand washing behaviour (Hanna et al. 2009). Managers are responsible for supporting their organization’s patient safety culture, and they must manage stress factors for healthcare personnel in order to protect patients from adverse events (Flin et al. 2009).

Emotional response
MRSA has been reported to arouse strong emotional responses among the general public and hospital visitors (McLaughlin et al. 2008). Despite the inadequate knowledge and behaviour among the RNs, their overall emotional response was considered adequate (Study II and III). Besides the actual point of the respective factors - i.e. competence, professional approach and mood in the emotional response component - it is important to take into account how the respondents estimate the combined items in the respective factors. Theoretically, it is feasible to expect that healthcare personnel with low estimations on the factor “mood” would have a limited ability to communicate and interact appropriately with patients. Moreover, an inadequate professional approach or competence could lead to negative perceptions among patients resulting from poorer patient-professional interactions. Thus, healthcare personnel must be attentive to their own and patients’ reactions (Holm 2009). Furthermore, competent healthcare personnel contribute to patient safety (Storr et al. 2005) and patients’ feelings of security (Berg & Danielson 2007). The estimations of emotional response were considered an important issue regarding RNs’ ability to ensure appropriate patient-professional interactions, which are a central part of RNs’ professional role (Hagerty & Patusky 2003, Orlando 1990).

The care relationship
During the past years, managers at the primary healthcare centres had focused on patient-professional interactions (Study IV) in the studied setting. Encounters with healthcare personnel, however, were described by the MRSA-colonized persons as having changed after colonization (Study I). In
care relationships, patients wish to maintain their dignity and be involved in and informed about their care, but at the same time they feel vulnerable and insecure (Berg & Danielson 2007). The personnel described a need to have a holistic view and to respect patients’ needs as well as hygiene routines. In the clinical practice, however, it seems this was not followed completely, as the MRSA-colonized persons felt some interactions were unprofessional or stigmatizing owing to personnel’s behaviour (Study IV). Such experiences are described by Skyman et al. (2010) as well. A care relationship that incorporates such an unprofessional approach (Holm 2009) gives the impression that healthcare personnel are afraid or uncomfortable. Furthermore, it indicates dissatisfaction with patient-professional interactions (Study IV). Source isolated patients experience a higher level of dissatisfaction with care than do non-isolated patients, because they have less contact with healthcare personnel (Jones 2010, Stelfox et al. 2003). Thus, it is essential that healthcare personnel realize the possible psychological consequences of source isolation of patients (Jones 2010, Zastrow 2011). The MRSA-colonized patients, however, did not refer to or described any experiences from being hospitalized or source isolated (Study IV). This could be due to the fact that the participants were colonized by MRSA and only a few of them had experiences of infections caused by MRSA that required hospitalization. Still, the results implied that healthcare personnel appear to be less professional when caring for patients with contagious diseases requiring hygiene precautions. The personnel stated that the level of distress increases when they have to handle situations or procedures that are relatively infrequent. In such situations, healthcare personnel may experience feelings of uncertainty and fear (Study IV). To achieve interactions that incorporate the important aspect of trust, a personal care relationship must be formed (Berg & Danielson 2007, Hagerty & Patusky 2003). The personnel perceived that knowledge of and experience from MRSA was an important factor in achieving adequate patient-professional interactions (Study IV), and the MRSA-colonized persons felt satisfied with their care when they encountered the same personnel at different visits (Study I). To form a care relationship, patients and nurses should use their specific competences to enhance patients’ experiences of confidence and safety (Berg & Danielson 2007). To achieve optimal healthcare outcomes, it is important to take the aspect of time into consideration (Hagerty & Patusky 2003). Patients want to be cared for by RNs who have time to talk to them (Shattell 2004), and they describe care relationships as good when they feel they have been treated with respect (Fleischer et al. 2009).

Some of the MRSA-colonized persons blamed the contagion on healthcare, as did most of the participants in Criddle and Potter’s paper (2006), while others thought the contagion source was friends or relatives. However, none
of the MRSA-colonized persons knew how, when or where they had acquired the bacteria (Study I and IV). MRSA-colonized persons are found to be unclear about the nature of MRSA (Newton et al. 2001), and they want information on what it is and how and where it was acquired (Criddle & Potter 2006). Hence, healthcare personnel ought to provide individualized and patient-centred information (McCabe 2004). However, several studies have revealed the inadequacy of information provision regarding MRSA, e.g., Criddle and Potter (2006) and Skyman et al. (2010). The personnel assumed that healthcare personnel give too much information in situations when they feel a threat to the self. Moreover they thought that making sure patients understand the information that is given can be problematic (Study IV). The MRSA-colonized persons felt that healthcare personnel’s information provision was adequate to deficient or superficial (Study I and IV). This could be interpreted in terms of how individuals perceive information, what type of information they seek and their ability to handle their reactions when they feel threatened. In such reactions, the concept of coping, which includes an individual’s effort to manage psychologically stressful encounters, could be used (Lazarus 1993). However, coping or styles of information seeking have not been studied in the present thesis, and no conclusions can be draw as to the participants’ psychological need for information. However, the information provided by infection specialists, as compared to other categories of personnel, was regarded as more satisfactory (Study I and IV). Swedish patients are generally not satisfied with information provision and perceive a low level of participation in contacts with primary healthcare centres (Swedish Association of Local Authorities and Regions 2010). This indicates that the overall information provision to patients by Swedish healthcare personnel at primary healthcare centres is considered inadequate, not just in care situations with patients with MDRB (Study IV).

**Responsibility for infection prevention**

The MRSA-colonized persons and the personnel pointed out the mutual responsibility for infection prevention among patients, proxies and all healthcare personnel (Study III and IV). In accordance with clinical evidence, e.g. Camins and Fraser (2005), Grayson et al. (2008), Henderson (2006) and Pittet et al. (2008), adherence to hand hygiene procedures was thought to be the most important measure to limit the spread of infection. The MRSA-colonized persons mentioned the need to take cultures to be able to manage MRSA, although they as well as the personnel felt there was probably a large number of unknown cases in the public (Study IV). The medical officer of the Department of Communicable Disease Control and Prevention and the infection control experts serve as bridges between
managers and clinicians as well as provide leadership including commitment to infection prevention measures at all levels within the healthcare organization (Brannigan et al. 2009). It would be interesting to test the MDRB Attitude Questionnaires applicability when evaluating implementation of infection control practices. As described in the literature, e.g. by Gardam et al. (2009) and Reynolds (2009), the personnel expressed that both healthcare personnel and managers must be committed to and involved in patient safety and infection control procedures, although such commitment was thought to be insufficient among healthcare personnel (Study IV). From the perspective of patient safety, a healthcare organization should act to support and guide healthcare personnel in appropriate application of procedures (Boyle et al. 2001). The MRSA-colonized persons described how different care specialities assumed different levels of responsibility for infection control measures (Study IV). However, the personnel felt it was their professional duty to assume responsibility for being secure in every measure they perform so that patients would feel confident (Study IV). As RNs have a central role in the process of care (Shattell 2004), they should live up to their professional responsibility for patient safety and infection prevention (Storr et al. 2005).

In accordance with descriptions in the present findings, there has been a debate regarding use of the “white coat” within healthcare in Sweden (Magnusson 2007, Rössner & Neovius 2006) and internationally e.g. by (Ikusaka et al. 1999, Wear 1998, Wong et al. 1991) owing to the potential risk of transmission of organisms. The MRSA-colonized persons described healthcare personnel as potential MRSA carriers (Study I). This is an accurate description, because healthcare personnel’s attire could be a source of transmission (Gaspard et al. 2009, Perry et al. 2001, Wiener-Well et al. 2011). Furthermore, outbreaks of MRSA initiated by healthcare personnel have been described (Wang et al. 2001). Thus, it is important that healthcare personnel be aware of how MRSA is transmitted and adhere to hygiene precautions. Consequently, the recommended short-sleeve uniforms should be used to facilitate proper hand disinfection. Furthermore, protective clothing, such as aprons and gloves, should be used properly to limit the spread of infection (The National Board of Health and Welfare 2007). Colonization rates among healthcare personnel are described to be low, and routine screening for MRSA is therefore not recommended, unless an outbreak is underway (Coia et al. 2006, Hawkins et al. 2011). However, some researchers feel these recommendations need to be reconsidered (Albrich & Harbarth 2008, Vonberg et al. 2006).

In the present thesis, the MRSA-colonized persons were well aware of the necessity for infection control precautions, and stated that healthcare personnel are responsible for informing patients about such matters.
Moreover, they understood the need for specific rooms at primary healthcare centres designated to patients with infections to limit the spread of infection. In contrast, MRSA-colonized persons have also been described as having a low level of understanding for the need for hygiene precautions and source isolation (Newton et al. 2001). Healthcare personnel must take responsibility for infection control as well as patient-professional interactions in such situations (Jones 2010). International and national studies have shown that MRSA-colonized patients perceive isolation as either positive, by providing privacy, or negative, owing to the lack of attention from healthcare personnel, feelings of loneliness (Newton et al. 2001) or because they felt isolation was limiting and violating (Skyman et al. 2010). Thus, responsibility for infection prevention within healthcare settings also includes clear communication (Baker et al. 2010, Gallagher et al. 2003) to discover and avoid adverse events.

Methodological considerations

The main strengths of the present thesis were the use of both qualitative (Study I and IV) and quantitative (Study II and III) research in a mixed-methods approach, in combination with the inclusion of the perspectives of both MRSA-colonized persons (Study I and IV) and healthcare personnel (Study II, III and IV). The mixed-methods approach recognizes both qualitative and quantitative research as important and useful. The goal of mixing methods is to expand our understanding of the studied phenomenon (Johnson & Onwuegbuzie 2004). In the present thesis, the mixed-methods approach and the use of different perspectives enabled a rich description of the research objectives, as the qualitative studies deepened our understanding of the studied area, and the quantitative studies broaden our understanding by providing quantifiable measures and statistical significances. The methodological approaches and designs used to evaluate experiences of patient-professional interactions, healthcare personnel’s attitudes towards patients with MDRB, and responsibilities for infection control were guided by the respective study aims and considered adequate. The design levels employed (exploratory, descriptive, correlational and comparative) are weak designs by nature (Polit & Beck 2012). However, as there is limited knowledge in this research area, studies like the present ones are necessary to increase our awareness and understanding of patients’ and healthcare personnel’s experiences. When such knowledge has been assessed and reviewed, it is then possible to assess data using stronger designs, such as randomized controlled trials. A complementary data collection method, such as direct observations aimed at assessment of hygiene practices, could have been used for data triangulation to improve the rigour of Study II and III, as self-reported adherence to hand hygiene has been shown to be
overestimated (Boyce 2008, Jenner et al. 2006). However, Larsson et al. (2004) describe a small effect size when monitoring both direct observation and self-report, and conclude that direct observations are costly. The use of direct observations was not possible in the present thesis owing to economic and practical circumstances, but it was also not necessary as the study aims did not include the study of actual behaviour. Being able to provide the participating MRSA-colonized persons with referrals to an infection specialist after the interview, if needed, was valuable in the present thesis. Three of the participants (Study I) took advantage this opportunity as they desired further information about their condition. Some of the MRSA-colonized persons appreciated the opportunity to share their experiences of living with MRSA, and felt it was as a relief to have someone to talk to who wanted to listen to them. This indicates that it might be valuable to implement an MRSA team in the present county council to meet patients’ need for professional support.

Trustworthiness

In research using a qualitative approach, like Study I and IV, the interrelated concepts credibility, dependability and transferability are commonly used (Graneheim & Lundman 2004) when evaluating study procedures. These concepts are further discussed below.

To achieve credibility (Graneheim & Lundman 2004) in Study I and IV several aspects were considered during the research process. A purposive sampling procedure was performed to include informants (MRSA-colonized persons and healthcare personnel) with various experiences and perspectives within one Swedish county council district. The number of participants was regarded as adequate in the studies and all informants contributed to the rich material. There could be sampling bias, however, as some characteristics relevant to the research question may be over- or under-represented, and this could reduce the trustworthiness of the findings. This is unlikely, however, as previous studies have revealed similar findings (Criddle & Potter 2006, Newton et al. 2001, Skyman et al. 2010). The used data collection methods (one-to-one and focus group interviews) were considered the most appropriate in regard to the study aims. The focus group technique aims to generate a discussion on a particular topic, the emphasis being on interaction between four to eight participants (Kitzinger 2005). The four focus group interviews consisted of between four and six participants, respectively. The dynamics were sufficient in all groups, and although the participants expressed themselves to different degrees, they all contributed to the discussions (Study IV). Thorough verbal descriptions of the analysis process were specified to facilitate understanding of the findings for readers. The length of the meaning units was considered to achieve the most appropriate
content (Study I and IV). The meaning units selected from the focus group interviews (Study IV) with healthcare personnel were more comprehensive compared with those from the MRSA-colonized persons. This would seem natural given that they included discussions among several persons. However, they still contained just one meaning. No relevant data were inadvertently excluded from the analysis, and during the condensation and abstraction process, an effort was made to not lose any meaning in the text (Study I and IV). Conducting interviews with MRSA-colonized persons as well as heads of department, FLMs, physicians and RNs within different care specialities was valuable, as it revealed both expected and unexpected similarities and differences of their experiences regarding patient-professional interactions and responsibility for infection control. The selection of informants in terms of gender and age contributed to rich variation in the studied areas. The participants’ expressed opinions about both positive and negative aspects, as well as their use of representative excerpts from the interviews strengthen credibility.

To strengthen dependability (Graneheim & Lundman 2004) in Study I and IV, an open dialogue among co-researchers regarding the content of the analysis was continued over time. The planned study designs were sustained during the whole analysis process and data collection was conducted within a limited time perspective, which strengthens dependability. Furthermore, the use of an interview guide in the respective studies guaranteed that the probed questions covered the study-specific areas and consequently limited the risk of inconsistency during data collection. As the interviews were open-ended, the informants themselves decided what they wanted to talk about. Even so, some participants were emotionally affected. To counteract such effects, the participants were encouraged to take the time they needed or to end the interview if they wished. However, they all completed the interview. Thus, the use of open-ended questions provided a deeper insight into the informant’s actual experiences. It also enabled the interviewer to explore and probe the research area to enhance the quality of the self-reported data (Polit & Beck 2012). Accordingly, tailored follow-up questions were used in the interviews (Study I and IV).

To help the reader decide whether the findings in Study I and IV are transferrable to other settings or groups, praxis, cultures, and contexts (Graneheim & Lundman 2004), data collection methods and analysis process are well-defined in the studies. The rich and illustrative excerpts presented in the respective studies, as well as the fact that national and international results describe similar research findings, also increase transferability. However, it is up to the reader to make the final judgement.
Validity and reliability

In research using a quantitative approach, as in Study II and III, the concepts of validity, i.e. the degree to which a tool measures what it is supposed to measure, and reliability, i.e. the consistency with which a tool measures the target attribute, are commonly used to assess a tool’s quality and adequacy (Polit & Beck 2012). The processes of face, content, and construct validation as well as internal consistency reliability (Strainer & Norman 2008) are further discussed below in relation to the systematic strategies (Rattray & Jones 2007) used to construct, develop and evaluate the questionnaire.

The three-component attitude model (Hogg & Vaughan 2008, Pratkanis et al. 1989) was regarded as relevant in the construction of the questionnaire (Study II). This decision was based on the importance of evaluating cognitive, behavioural as well as affective responses in an individual’s disposition to respond favourably or unfavourably to an object or person. Attitudes, however, are described as being learned through one’s own experiences or in interactions with others (Hogg & Vaughan 2008). This could be regarded as a limitation when using the questionnaire, owing to the possibility that certain healthcare personnel have never cared for a MRSA-colonized patient and thus lack such experiences.

To derive items corresponding to the three components, strategies such as literature searches, discussions with experts and an empirical explorative enquiry were used (Strainer & Norman 2008). The discussions with experts, i.e. physicians with expertise in infection prevention and control practice, were performed to support the facts found in the literature for content validation of items with clinical relevance in the Swedish healthcare context. As there was no previous knowledge regarding emotional responses related to caring for MRSA-colonized patients, it was necessary to perform the empirical explorative enquiry. The decision to use RNs working within infection care was regarded as appropriate, as they had different degrees of clinical experiences of such care. Their experiences were assumed to contribute to a variety of potential emotions. To minimize the risk of missing possible emotional responses, all RNs were asked to describe how they feel in such care situations and thereafter requested to describe how one could feel in such situations. To verify whether the constructed items were coherent or in need of revision, a panel of experts on infection control conducted an interpretability test (Strainer & Norman 2008).

Face validation of items should be judged in terms of the intended users of a questionnaire (Strainer & Norman 2008). Consequently, such validation was performed among healthcare personnel and nursing students to acquire knowledge about the acceptance and relevance of the items. Thus, the
development of the items was in accordance with recommended preparation for scale construction (Strainer & Norman 2008). Additionally, the used strategies strengthen the development process, as both experts in the field and laypersons, i.e. healthcare personnel and nursing students, were included.

To evaluate the psychometric properties of the questionnaire (Study II), respondents were reached by using a quota sampling procedure. This procedure was used to invite haemodialysis settings from all over the country, the ambition being to include university, regional and local hospitals. To achieve the recommended sample sizes and a suitable number of completed responses (Fergusson & Cox 1993) for performing PCA, the decision to send about 400 questionnaires was made. However, the response rate (Study II) was high (80%), which left us with a larger sample than required for the analysis. The low proportion (58%) of responses within the group of district, haematology and infection RNs (Study III) could be a reflection of an inadequate data collection method. Thus, responding to a work-related questionnaire may not have been prioritized when the RNs were at home. No power calculation of necessary responses for the intended analysis was performed prior to the systematic sampling procedure used to recruit RNs from the respective associations’ membership registers (Study III). There could be a risk of selection bias in using RNs that had chosen to become members of an association, as these RNs may be more dedicated to their work and therefore be more professional and skilful compared to RNs without such membership. However, the sampling procedure appears to have been appropriate, as the results from the three groups of RNs (Study III) were similar to the results from the haemodialysis sample (Study II). Furthermore, the age distribution among the RNs (Study II and III) was in accordance with the working population. Consequently, there was no indication of selection bias.

Common ways of replacing missing values (Tabachnick & Fidell 2007) were used based on the assumption that items were either omitted deliberately or at random (Strainer & Norman 2008). There is no ideal solution to replacing deliberately or mistakenly omitted item. However, in the knowledge component, non-response items were judged to be “incorrect answers”, meaning that all participants could have a minimum of zero points, and a maximum of 18 points (Study II and III). In the behaviour component, the last-value-carried-forward method (Tabachnick & Fidell 2007) were considered the most accurate way to replace occasional missing data (Study II). Finally, in the emotional response component the group mean was used to replace occasional randomly missing data (Study III). This strategy of replacing missing values was appropriate, as the proportion of omitted answers was less than five percent (Tabachnick & Fidell 2007).
Furthermore, it was important to have a complete data set when performing, e.g., the factor analysis. The replacement of missing values was not considered to bias the results. To counteract missing values, the participants could have been asked, at the end of the questionnaire, to go back and check that every item had been answered (Strainer & Norman 2008).

Items within a scale should address different aspects of the same attribute, i.e. be homogenous (Strainer & Norman 2008). Thus, to define homogeneity among the items in the emotional response component, internal consistency reliability was properly computed and interpreted using Cronbach’s alpha coefficient (Study II and III). To determine whether the MDRB Attitude Questionnaire discriminates between groups, a construct validation technique called known-groups was used. The hypothesized difference between the groups of RNs was confirmed (Study III).

Some people tend to give positive responses, such as “yes” or “agree”, in favour for negative responses, like “no” or “disagree”, when responding to a questionnaire. Such response bias is called yea-saying and tends to occur in tools measuring an individual’s knowledge when the individual is ignorant of the correct answer (Strainer & Norman 2008). To counteract such potential bias in the knowledge and behaviour components, the items were balanced with respect to how they were keyed, as well as by using the response alternative “don’t know” for the knowledge items. Another issue is that items based on respondents’ knowledge restrict the possibilities to conduct stability tests, for example test-retest of the scale (Polit & Beck 2012). Respondents could “learn” the questions and find out the correct answers prior to the next response occasion.

Responses may not be evenly distributed in the range of response alternatives, but display a positive skew towards the top of the scale, i.e. produce a ceiling effect (Strainer & Norman 2008). It is possible that ceiling effects could have been produced for the items in the emotional response component, because most of the marks were grouped at the favourable end, i.e. verbal tags with a positive wording. A ceiling effect indicates that it is more or less impossible to detect any improvement among respondents. However, methods to counteract this bias have been proposed, for instance that the “average” does not have to be in the middle when the aim of the scale is to discriminate individuals’ degree of excellence (Strainer & Norman 2008). With regard to the above-discussed risks of bias, the questionnaire’s usefulness in repeated measures or in intervention studies could be limited. Nevertheless, the MDRB Attitude Questionnaire is considered to be a useful and valuable tool for quality improvements in patient safety regarding HAIs. The MDRB Attitude Questionnaire requires further validation, and one important aspect concerns how to best interpret
and implement the questionnaire in clinical practice. Additional data are thus needed to establish normative references regarding what constitute normal scores for healthcare personnel, e.g. RNs, in the components knowledge, behaviour and emotional response. Such normative references are important if we wish to transform numerical findings into verbal estimations, for instance to understand what an “adequate” emotional response should entail when caring for MDRB-colonized patients. At this point in the development of the MDRB Attitude Questionnaire, however, one can argue that healthcare personnel constitute a risk to patient safety if they answer incorrectly on only one of the items classified as a “red item” in the knowledge and behaviour components. The classification is based on the respective items’ clinical relevance to limiting the spread of infection and thus to promoting safe care, and indicates that it is inappropriate to lack knowledge or being non-adherent in relation to these items.
Conclusions

The present thesis investigated experiences of living with MDRB, using MRSA colonization as an illustration, patient-professional interactions, healthcare personnel’s attitudes towards patients with MDRB, and responsibilities for infection prevention. The conclusions are:

- MRSA colonization constitutes an indefinable threat that has to be managed in both everyday life and in contacts with healthcare (Study I and IV).
- MRSA-colonized persons and healthcare personnel have different views of the reality of living with MRSA colonization (Study IV).
- Healthcare personnel’s interactions with and information provision to MRSA-colonized persons are inadequate (Study I, IV).
- The MDRB Attitude Questionnaire is a valid and reliable tool for measuring RNs’ knowledge, behavioural intention and emotional responses when caring for patients with MDRB (Study II and III).
- RNs have insufficient knowledge regarding MDRB and hygiene precautions, and a high proportion did not intend to adhere to infection control measures (Study II, III).
- RNs feel they are not competent or professional in providing care for MDRB colonized patients (Study II, III).
- Patients and healthcare personnel have a mutual responsibility for infection prevention, but healthcare personnel do not assume sufficient responsibility for hygiene precautions (Study III, IV).
Clinical implications

Healthcare personnel have a duty to develop practices that promote people’s health and well-being. Five fundamental responsibilities - 1) to promote health, 2) to prevent illness, 3) to restore health, and 4) to alleviate suffering, in combination with 5) having respect for human rights - should be inherent in healthcare personnel’s work. However, the present findings show that MRSA-colonized persons are stigmatized in today’s healthcare services. Such patient-professional interactions are not in accordance with the professional code of ethics and therefore warrant quality improvement. In an effort to improve healthcare personnel’s interactions with MRSA-colonized persons, it is important that:

- Healthcare personnel be aware of the varying ways in which MRSA-colonized persons experience colonization.
- MRSA-colonized persons as well as healthcare personnel who feel fears or worries towards MDRB be provided with support.
- Healthcare personnel have sufficient knowledge of MDRB and necessary hygiene precautions, and that those with poor adherence to hygiene precautions be identified to limit the risk for spread of infection.
- Healthcare personnel have opportunities to practice their verbal and non-verbal communication skills.

Such enhancements can help us understand and ensure improvement of patient-professional interactions as well as enhance individualized information provision so as to improve patient safety and better address patients’ needs. The MDRB Attitude Questionnaire is useful in identifying where to target additional training concerning RNs’ knowledge, behaviour and emotional response in relation to patients with MDRB.
Populärvetenskaplig sammanfattning
(Summary in Swedish)

Under de senaste åren har kolonisation eller infektion orsakad av bakterier som är motståndskraftiga mot antibiotika, så kallade multiresistenta bakterier (MRB), blivit allt vanligare i vårdmiljöer och i samhället i hela världen. I ett internationellt perspektiv har Sverige relativt låg förekomst av MRB, men det finns en uppenbar risk att förekomst och smittspridning av MRB i såväl sjukvården som i samhället kommer att öka. MRB utgör ett hot mot patientsäkerheten eftersom antibiotika som vanligtvis används för behandling av infektioner är verkningslösa. Sjuksköterskor har en central roll i vården av patienter och därmed även ett ansvar för att förebygga smittspridning inom vården. Beroende på sjuksköterskors professionalism och kunnighet avseende MRB, kan patienter uppfatta den vård som ges på skilda sätt. Det övergripande syftet med avhandlingsarbetet var att studera erfarenheter av att leva med MRB, genom att använda MRSA kolonisation som exempel, samt att utveckla och validera ett formulär för att beskriba vårdpersonals attityder till vård av patient med MRB. Vidare var syftet att studera MRSA-koloniserade personers och vårdpersonals erfarenheter av bemötande i vården samt ansvarstagande för att förhindra smittspridning.

För att besvara det övergripande syftet utfördes fyra empiriska studier. Totalt intervjuades 18 personer med MRSA kolonisation och 20 vårdpersonal/chefer avseende deras erfarenheter (Delarbete I och IV) och 726 sjuksköterskor besvarade det formulär som utvecklades (Delarbete II och III). I Delarbete I, utfördes tretton intervjuer med personer med MRSA kolonisation angående deras upplevelser och erfarenheter av att vara bämare av MRSA. Dessa intervjuer spelades in digitalt för att sedan skrivas ut ordagrant och bearbetas med innehållsanalys. Delarbete II, innefattar utveckling och utvärdering av ett formulär för att beskriva vårdpersonals attityder till vård av patient med MRB. Formuläret består av tre separata komponenter: ”Kunskaper”, ”Intention med beteende” samt ”Känslomässig respons”. Formulärets användbarhet utvärderades bland 329 sjuksköterskor, vid sammanlagt 19 svenska bloddialysecentrer eftersom bloddialisvård medför en ökad risk för kolonisation eller infektion med MRB. I Delarbete III, utvärderades innehållsvaliditet i det formulär som utvecklades i Delarbete II. Vidare studerades specialistsjuksköterskors attityder till vård av
patient med MRB samt deras uppfattning om politikers, chefers och det egna ansvaret för följsamhet till hygienrutiner som förhindrar smittspridning. Totalt deltog 397 kliniskt verksamma sjuksköterskor som var medlemmar i någon av de tre specialistsjuksköterskeföreningarna för hematologi-, infektions- och distriktssköterskor. Beskrivande och jämförande statistik genomfördes. I Delarbete IV, studerades erfarenheter gällande bemötande och informationsgivning, kallat patient-personal interaktioner, samt ansvarstagande för förhindrande av smittspridning vid vård av patienter med MRB. Individuella intervjuer genomfördes med fem personer med MRSA kolonisation. Fyra fokusgruppsintervjuer genomfördes med vårdpersonal samt chefer, i första gruppen deltog fem sjuksköterskor/distriktssköterskor, i andra gruppen deltog sex läkare/distriktsläkare, i tredje gruppen deltog fem vårdenhetschefer och i den fjärde gruppen deltog fyra verksamhetschefer. Samtliga individuella intervjuer och fokusgruppsintervjuer spelades in digitalt, skrevs ut ordagrant och bearbetades med innehållsanalys.

Sammanfattningsvis visar detta avhandlingsarbete att MRSA kolonisation utgör en psykologisk påfrestning och att bemötande från vårdpersonal resulterade i känslor som stigmatisering. Det framkom även att det föreligger ett behov av att förbättra vårdpersonals kunskaper, beteende och emotionella respons i relation till patienter med MRB för att kunna garantera patienternas säkerhet och behov vid vårdkontakter. Verksamhetschefer är ansvariga för sådana förbättringar och det i avhandlingen utvecklade formuläret är användbart för att identifiera områden i behov av förbättring.
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