

Implementation of Infection Control Programs in Long-Term Care Facilities, Akershus County, Norway: a Repeated Cross-Sectional Study in 2001 and 2005

Nina Kristine Sorknes

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– Uppsats –

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Författare				
Nina Kristine Sorknes				
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Sammanfattning
<p>Bakgrunn: Kontroll og overvåking av institusjonservervede infeksjoner (sykehusinfeksjoner) ble regulert i lov og forskrift i 1996. Helseinstitusjoner ble pålagt å ha infeksjonskontrollprogram.</p> <p>Hensikt: Å beskrive i hvilken utstrekning sykehjem i Akerhus fylke fulgte lovverket med å ha infeksjonskontrollprogram, inkludert infeksjonsforebyggende- og overvåkende tiltak.</p> <p>Metode: To tverrsnittsundersøkelser ble gjennomført i sykehjem i Akershus fylke i 2001 og 2005. En spørreundersøkelse ble utformet i 2001 for å kartlegge infeksjonskontrollprogram, inkludert lovverk, retningslinjer, ansattes helse og opplæring. I 2005 ble spørreundersøkelsen utvidet til å inkludere retningslinjer for meticillin resistente <i>Staphylococcus aureus</i> (MRSA), isolering, samarbeid med mikrobiolgoisk laboratorie og vaksinerings. Spørreskjemaet ble sendt til institusjonssjef ved hvert sykehjem i fylket. I tillegg kontrollerte vi om institusjonene deltok i nasjonale prevalens registreringer og om de hadde erfaring med beboere med MRSA ved å benytte Nasjonale Folkehelseinstitutt sin database.</p> <p>Resultater: Antallet sykehjem som hadde etablert infeksjonskontrollprogram hadde steget fra 24 (48%) i 2001 til 45 (80%) i 2005 (Relativ risiko (RR)=1.6, 95% Konfidens interall (KI): 1.2-2.3). Det var en økning i kjennskap til fylkets lokale infeksjonskontrollprogram (RR=1.5, 95% KI: 1.1-2.1). Institusjonssjef vurderte det svært viktig å ha et infeksjonkontrollprogram (gjennomsnitt=6.2, variasjonsbredde 6.0-6.5 på en skala fra 1 til 7).</p> <p>Konklusjon: Det har vært økende oppmerksomhet på infeksjonskontroll og overvåking i sykehjem i Akershus fylke, Norge. Nasjonalt lovverk og gjentatte nasjonale prevalensregistreringer av institusjonservervede infeksjoner kan ha bidratt til dette.</p>
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Master of Public Health

– Essay –

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Author Nina Kristine Sorknes				
Author's position and address Senior advisor, Nasjonalt folkehelseinstitutt, P.O.Box 4404 Nydalen, NO-0403 Oslo, Norway				
Date of approval August 17, 2007			Supervisor NHV/External Cecilia Stålsby Lundborg Prof, PhD, MScPharm	
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Abstract

Background: In 1996, regulations regarding control and prevention of healthcare-associated infections in all healthcare institutions were implemented in Norway. It became mandatory for all healthcare facilities to have an infection control program.

Objective: To describe to what extent long-term care facilities (LTCFs) in Akershus County have implemented infection control programs including guidelines and surveillance.

Methods: A repeated, cross-sectional survey was performed among the LTCFs in Akershus County in 2001 and in 2005. A questionnaire was developed in 2001 investigating infection control programs including regulatory issues, guidelines, occupational health and training. In 2005, the questionnaire was expanded to include additional questions regarding policies and guidelines on methicillin-resistant *Staphylococcus aureus* (MRSA), isolation containment, collaboration with the microbiology laboratory and immunization policies. The questionnaire was sent to the head managing nurse of each LTCF in the county.

Additionally, we searched for participation of LTCFs in the national prevalence surveys on healthcare-associated infections and for MRSA positive cases in the databases of Norwegian Institute of Public Health.

Results: The number of LTCFs with an infection control program increased from 24 (48%) in 2001 to 45 (80%) in 2005 (Relative risk (RR) =1.6, 95% Confidence interval (CI): 1.2-2.3). There was an increasing knowledge about the county's infection control program (RR=1.5, 95% CI: 1.1-2.1). The LTCF's head managing nurses perceived having an infection control program as important (mean=6.2, range 6.0-6.5 on a scale of 1 to 7).

Conclusion: There has been an increased attention towards infection control in LTCFs in Akershus County, Norway. National regulations and repeated national prevalence surveys on healthcare-associated infections may have contributed to this improvement.

Key words

Healthcare-associated infection; Infection control; Long-term care facility

Content

1	Introduction	6
2	Aim of the study	9
	Specific objectives.....	9
3	Methods	10
	Study design	10
	Questionnaire.....	10
	Study process.....	10
	Additional databases.....	11
	Data analysis.....	11
4	Results	11
	Regulatory issues.....	12
	Surveillance	12
	Guidelines and policies.....	13
	Occupational health	14
	Training	14
5	Discussion.....	17
	Infection control programs	17
	Surveillance	19
	Guidelines and policies.....	20
	Hand hygiene.....	21
	Isolation containment	22
	Antimicrobial agents	22
	MRSA.....	23
	Influenza	24
	Occupational health	25
	Staffing and training	25
	Management	27
	Cost.....	27
	Validity, reliability and generalizability.....	28
6	Conclusion and perspectives	29
7	References	31
	Appendix 1: Manuscript	
	Appendix 2: Questionnaire for the 2001 survey	
	Appendix 3: Questionnaire for the 2005 survey	

Abbreviations

CI	Confidence interval
HAI	Healthcare-associated infections
LTCF	Long-term care facility
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
RR	Relative risk
SENIC	Study of the Efficacy of Nosocomial Infection Control
UTI	Urinary tract infection
VRE	Vancomycin-resistant enterococci

Forward

This MPH has been developed in close collaboration with the County Medical Office in Oslo and Akershus. I thank county nurse, Lise Sjømoen for excellent collaboration through many years and her continuous effort to push the long-term care facilities in the county to participate in the two surveys.

I would like to thank:

- the Department of Biostatistics at Rikshospitalet-Radiumhospitalet HF, Oslo for their contribution in relation to the statistical analysis,
- my advisor, professor Cecilia Stålsby Lundborg for constructive criticism and professional advice.

This MPH would never have been accomplished without my late friend and colleague, Anne Britt Bye Kjeldsberg, who initiated the collaboration with the County Medical Office and encouraged me to become a student at NHV. Without her contribution, the level of infection control in Akershus County would not have been what it is today.

1 Introduction

Healthcare-associated infections (HAIs), whether acquired during home-, ambulatory-, institutional- or hospital care, constitute one of the greatest challenges in modern medicine. According to the Institute of Medicine, hospital-related adverse events in the United States, including HAIs, are responsible for 44,000 to 98,000 deaths and represent a cost of US \$ 17 to 29 billion, annually. Among these, HAIs now concern 5 to 15 per 100 hospitalized patients and can lead to complications in 25% to 50% of those admitted to intensive care units (1). In the United Kingdom, hospital-acquired infections cost around £ 1 billion a year and contribute to at least 5,000 deaths (2). Importantly, these estimates only concern infections acquired in acute care hospitals. There are few similar studies relating to ambulatory care and other settings such as long-term care facilities (LTCFs). The cost of hospital acquired-infections in Norway is estimated to be NOK 1 billion (3). HAIs are responsible for an increase in mortality, morbidity, length of stay and resource utilization in almost all groups of patients studied (4-8). Because of this, infection control is a public health problem, within a more limited setting, namely the healthcare institutions.

Early examples of infection prevention are many. Ignaz F. Semmelweis and Florence Nightingale were the main pioneers of infection control and hospital epidemiology. Semmelweis was responsible for the first intervention showing that cleansing hands with an antiseptic agent between contacts with patients may reduce cross transmission of infectious agents. Today, Semmelweis is considered the father of hand hygiene and his intervention is a model for how epidemiology can be used to establish strategies for prevention. Nightingale reported mortality rates from hospitals and introduced the term “unhealthy hospitals” where she showed a relationship between sanitary conditions and postoperative complications as well as ward construction and air control. She suggested a relationship between crowding of patients and transmission of contagious diseases that could explain the excess mortality among soldiers in the Crimea. She pleaded for improved general hygiene in the hospitals. She also suggested nurses could survey hospital infections thus nurses could be considered the first hospital epidemiologist (1).

Infections occur frequently among elderly residents in LTCFs because of debilitating conditions that make them more susceptible to infections (5,8,9). Urinary tract infections (UTIs) are the most commonly diagnosed and treated infections among residents in LTCFs (7). Additional significant problems include respiratory tract, skin and soft tissue, gastrointestinal, and bloodstream infections. These infections are a leading cause of morbidity and mortality among residents in LTCFs. Infections have been implicated in up to 54% of acute medical problems in the LTCF and in 63% of deaths (10). Overall the need for antimicrobial therapy and the need for hospital admission are an indication of the morbidity associated with infections in LTCFs (8). Infection characteristics and risks are strongly related to changes in healthcare. HAIs are becoming increasingly important as a result of different converging changes (1,9,11). Technical and scientific progress such as medical devices, complexity of patient care, immunosuppressive therapy and organ transplantation increase the risk of acquiring

infections. Shortening of hospital stay leads to aggregation of the sickest patients who have to remain in the acute care setting and to the risk of early discharge of patients to other poorly prepared healthcare facilities, for instance LTCFs. Traditionally the focus for infection control has been the acute care setting. Of equal importance are infections arising in LTCFs which may constitute a reservoir for multiresistant pathogens.

Economic concerns have an increasing importance in infection control. The growing recognition of the preventive value of infection control programs has put the pressure on hospital administrators to allocate more resources to such programs. Seen from a societal perspective, it is clear that improvement in compliance with infection control practices is cost-effective in most instances (1,5,8,11-14).

HAI is considered as one of the most accurate indicators of the quality of patient care (15). Inter-hospital benchmarking of HAIs is performed with the aim of improving the effectiveness of healthcare and promoting patient safety. In order to compare rates, the case-mix of patients and the methodology must be considered closely.

In a Nordic perspective, the situation in relation to infection control has many common approaches and challenges; population demography, language, healthcare systems, level of training, low levels of resistant microorganisms. Norway is, however, the only country which has chosen to regulate infection control by a specific law and regulations. Norway has also, perhaps, the strongest involvement from national level when it comes to organising activities such as surveillance and coordinating strategies. The other Nordic countries have chosen a slightly different approach developing standards in infection control (Denmark) and linking infection control to other laws and regulations (Sweden). In 1996, regulations regarding control and prevention of HAIs in all healthcare institutions were implemented in Norway based on the Communicable Disease Control Act (16). It became mandatory for all healthcare facilities to have an infection control program (17,18). The national authorities developed guidelines for infection control in healthcare facilities which formed the basis for regional, county, community and local infection control programs. These national guidelines include basic principles in infection control and a description of HAI surveillance (18).

A LTCF is defined as a healthcare facility authorised by law and regulations for the community, providing nursing care and related services to residents (19). A medical doctor and a nurse have the medical and nursing responsibility of the facility. The number of LTCF residencies in Norway has increased threefold since 1950 (20). The reason for this is an aging population. During the same time span, the society has changed. The elderly are often living by themselves and not with the extended family. Finally, early discharge from hospitals leads to an increasing need for LTCF residencies. Despite a general increase in LTCF residencies up to 2001, it was followed by a slight decrease in LTCF residencies from 44,941 to 40,961 between 2001 and 2005 (20). The residents are all above age 67 and 77% of them are above age 80. Approximately 50% of the population aged 90 years or older is institutionalized

compared to 20% of the population aged 85-89 years. Seventy percent of the residents are women (20). Forty percent of the population in Norway dies in a LTCF and this number is increasing.

The expression “nosocomial infections” has traditionally been used for infections arising in the hospital setting. HAIs refer more broadly to infections arising in any healthcare-facility, not only hospitals. HAIs are infections that arise two days after admission to the healthcare facility or later and were not incubating at the time of admission

Infection control programs are among the first organized efforts to improve the quality of healthcare delivered to patients and are, even today, an excellent model for the development of other healthcare performance improvement activities even (1,5,7-9,12,13,15,21). The term “infection control program” was introduced after the Study of the Efficacy of Nosocomial Infection Control (SENIC) was performed in the US in 1975 (1). Five hundred randomly selected hospitals were involved. A comprehensive survey of the infection control programs was conducted. Infection rates were analyzed during two 12-month periods, 5 years apart, in relation to the characteristics of the infection control program. Very effective programs were shown to reduce nosocomial infection rates by 32%. Components linked to efficacy of the infection control program were the presence of one infection control nurse per 250 beds; an actively involved, trained physician; active surveillance for surgical site infections and feedback of surgeon-specific surgical site infection rates. Another key result was that about 35% to 50% of all nosocomial infections were associated with a few patient care practices: use of urinary catheters, use of intravascular catheters, therapy and support of pulmonary functions, experience with surgical procedures, appropriate hand hygiene and isolation precautions. The study served as basis for staffing in infection control in many hospitals in the US, in Europe and especially in Scandinavia.

Most authors agree that an infection control program should include some form of infection surveillance, an epidemic control program, education of employees in infection control methods, policy and procedure formation and review, an employee health program and a resident health program (1,4,6,7,12,18,22).

Since the 1960s, surveillance of HAIs has been the foundation of infection control. It is defined as the ongoing systematic collection, analysis and interpretation of data to plan, implement and evaluate practice integrated with dissemination of the results to those involved. Its major components are detection and understanding of infections (risk factors), summarizing and reporting feedback to healthcare personnel, and corrective actions. The primary objective of surveillance is to measure HAIs and, based on this, to design interventions targeted at their reduction. Any surveillance should form the basis for structuring and guiding clinical practice in order to reduce HAI rates (5).

Surveillance of HAIs is a central element of an infection control program. The Norwegian Institute of Public Health coordinates national prevalence surveys for both hospitals and LTCFs. The objective is to measure the baseline prevalence of infections and use of antibiotics, monitor trends, and identify the distribution of HAIs. A second, but perhaps the most important objective, is to increase the focus on infection control and the importance of implementing infection control programs in these facilities. Results from national prevalence surveys became a national quality indicator in 2003. Participation in the national prevalence surveys is not yet compulsory for LTCFs.

Staphylococcus aureus frequently causes infections among humans, both in and outside hospitals. Serious HAIs with *S. aureus* include wound infections, surgical site infections, skin and soft tissue infections, bacteraemias, sepsis, osteomyelitis, endocarditis and pneumonias. *Staphylococcus aureus* is most commonly transmitted by the healthcare workers hands through contact transmission. Methicillin-resistant *Staphylococcus aureus* (MRSA) is an increasing problem in all countries. MRSA is generally resistant to several antibiotic classes (beta-lactams, macrolides, aminoglycosides, fluoroquinolones). A consequence of multiresistance is the difficulty to treat even simple infections because of the limited number of effective antibiotics (23-29).

As part of my Master of Public Health thesis, I have written a manuscript (Appendix I) where I aim to present the results from my two studies (2001 and 2005) and submit it to an international journal.

2 Aim of the study

The main aim of this study was to determine to what extent LTCFs in Akershus County have implemented infection control programs including guidelines and surveillance.

Specific objectives

More specifically, our aims in 2001 and 2005 were:

- to describe to what extent LTCFs in Akershus County were complying to existing national regulations in the field of infection control,
- to analyse and compare the results from the two surveys,
- to check how some of the reported data compare with existing national databases.

Our main research question was to compare whether there had been an improvement in the implementation of infection control programs in LTCFs between 2001 and 2005.

3 Methods

In Norway, with a total population of 4.6 millions. The population of Akershus County in 2005 was 499,300. The number of LTCFs in the county was 62 in 2001 and 64 in 2005, representing a total of 3,300 beds. The number of people above age 67 increased from 600,000 in 2001 to 683,000 in 2005.

Study design

A repeated, cross-sectional survey was performed among the LTCFs in Akershus County in 2001 and in 2005.

Questionnaire

An original questionnaire was developed in 2001 by a team of infection control nurses in the county in collaboration with the County Medical Office. The questionnaire was designed to reflect current national recommendations and the published literature on the structural components of an infection control program. It investigated several aspects of the infection control program including regulatory issues, guidelines, occupational health and training (Appendix 2).

This questionnaire was expanded in 2005 to include additional questions about regulatory issues, guidelines and occupational health, as well as questions on MRSA policies, isolation containment, collaboration with the microbiology laboratory and immunization policies. The questionnaires were designed with closed questions and binary (nominal) response alternatives. In 2005, we included one question on the perceived importance of having an infection control program in the LTCF with response on a continuous scale from 1 being “not important” to 7 being “very important”.

Four LTCFs, randomly chosen within the county by the County Medical Office, were asked to check the questionnaire before the study. The head managing nurses of these four LTCFs were visited and asked to give comments on the structure and the questions in order to improve clarity. The questionnaire was corrected according to their comments. The final questionnaire was then sent to all LTCFs in the county (Appendix 3).

There was no need to seek approval from an ethical committee since the questions were not directed towards patients, but only the institutional level (system level).

Study process

In 2001 as well as in 2005, the County Medical Office was officially responsible for sending the questionnaire, together with an information letter, to each LTCF in the county. The questionnaire was addressed to the head managing nurse of the LTCF. The

County Medical Office was responsible for data collection and quality check of the returned questionnaires. A reminder was sent after 4 weeks and the County Medical Office also called the LTCFs which had not replied.

Additional databases

A search was performed for participation of the LTCFs in national prevalence surveys on HAIs in a database at the Norwegian Institute of Public Health. The objective was to cross-check the reply given to the questionnaire, not to get data on the rates of HAIs for each institution. Similarly, by searching for MRSA cases in the national database on reportable diseases (MSIS), we cross-checked the reply given by the participating LTCFs about their experience with MRSA-positive residents.

A structured literature search in Medline, Cinahl, EMBASE, AMED and PsycINFO was done with the search items *infection control programs, infection prevention, nursing homes, long-term care facilities, skilled nursing facilities* in different combinations, excluding hospitals and limiting the search to the year 1995 – 2006. The search gave 76 results.

Data analysis

Data analysis was performed on SPSS 14.0 for Windows. The relative risk (RR), 95% confidence interval (CI) and p-value were calculated to compare the results between the survey in 2001 and 2005. Additionally, the McNemar's test was applied to compare the matched pairs of replies of only the LTCFs that participated in both surveys.

The McNemar's test is suitable for comparing two paired proportions based on frequencies of pairs with different outcomes. When applying the McNemar's test, we got a picture of the increase only within the matched pairs, LTCFs participating in both surveys, but did not see the results for the additional ten LTCFs which participated in 2005. Because of this it was decided to use RR for most analyses.

4 Results

In 2001, 50 (81%) of the 62 LTCFs in the county responded to the questionnaire. In 2005, 56 (88%) of 64 LTCFs responded. The responding facilities represented a total of 2,785 and 3,090 beds in 2001 and 2005, respectively. The comparison of the existence, knowledge and content of the infection control program in LTCFs in 2001 and 2005 is shown in Table 1. Results on topics that were only covered in 2005 are shown in Table 2.

Although all LTCFs in the county were invited to participate each year, only 38 participated in both surveys despite repeated attempts from the County Medical Office to enrol them. To take this point into account, we also compared the improvement in the existence, knowledge and content of the infection control program in only these 38

LTCFs. These results are described below, together with some of the results from Tables 1 and 2.

Regulatory issues

The overall number of LTCFs with an infection control program increased from 24 (48%) in 2001 to 45 (80%) in 2005 (RR=1.6, 95% CI: 1.2-2.3). Among the 38 LTCFs which participated in both surveys, the numbers with an infection control program increased from 15 to 29 (McNemar's test, $p=0.013$). In 2005, 42 (81%) of the LTCF's head managing nurses knew about the national regulations for the field of infection control and 21 (39%) reported that they had a plan for revision of the local infection control program. Fifty-three (95 %) of the head managing nurses reported to know about legal regulations of infection control.

Overall there was an increased knowledge about the county infection control program, 24 (49%) to 39 (72%) in 2005 (RR=1.5, 95% CI: 1.1-2.0). Looking at the 38 LTCFs participating in both 2001 and 2005 using the McNemars test, the increase was from 22 in 2001 to 30 in 2005 but this result was not significant (McNemar's test, $p=0.581$). In 2005 LTCFs were asked if the responsible physician had participated in developing and implementing the infection control program. Twenty-eight percent of the LTCFs reported that the physician was involved.

In 2005, the LTCF's head managing nurses perceived the importance of having an infection control program as 6.2 (range: 6-6.5) on a scale from 1 to 7, thus reflecting the high status given to infection control issues by LTCFs in the county.

Surveillance

From the County Medical Office surveys

In 2001, 17 (35%) of the LTCFs reported performing some kind of surveillance of HAIs. Thirty-seven (74%) LTCFs reported performing surveillance of UTIs and 35 (70%) reported performing surveillance of wound infections. However, no LTCF reported having a written protocol describing the methodology and definitions applied. None of the LTCFs reported performing continuous surveillance. In 2005, 36 (64%) LTCFs reported to have participated in the national prevalence surveys.

From database on national prevalence surveys on HAIs 4

In 2005, eleven LTCFs from Akershus County participated in the national prevalence surveys, three in the spring and ten in the fall. Overall, 39 facilities in the county had participated in the national prevalence survey at one point since the start in 2002 and up to 2005.

Guidelines and policies

From the County Medical Office surveys

In 2001, the questionnaire only included a question on hand washing guidelines. In 2005, it was asked if the LTCF had developed guidelines both hand washing and hand disinfection. Overall 56(100%) of the LTCFs reported having guidelines on hand washing and 55 (98%) reported having guidelines on hand disinfection. To be able to compare 2001 and 2005, the results for these two questions on hand hygiene in 2005 were merged. The number of LTCFs with a guideline on hand hygiene increased from 38 (78%) in 2001 to 56 (100%) in 2005 (RR=1.3, 95% CI: 1.1-1.5), (McNemar's test, p=0.039).

Because of the changing trends in healthcare, it was suspected that there may be an increasing need for isolating residents more frequently. There was no increase in this matter, (RR= 2.69, 95% CI: 0.6-12.7). In 2005, only 53% of the residents lived in a single room and only one LTCF (1.8%) had a contact isolation room (single room with bath, ante-room and decontaminator). However, there was an increase in LTCFs having developed guidelines for isolating residents, (RR=1.7, 95% CI: 1.3-2.2). Eighteen LTCFs (33%) reported to know about the national guidelines for isolation containment.

In 2005, 39 (70%) LTCFs reported knowing about the national MRSA guidelines. Thirty-two (59%) LTCFs reported to have developed local MRSA guidelines based on the national recommendations. Seven (13%) LTCFs reported to having previous experiences with MRSA-positive residents and 19 (37%) LTCFs had implemented MRSA screening policies for their employees.

In 2005, 18 (34%) of the LTCFs reported having written policies on antibiotic use.

The facility was asked if they had established an alert system with the local microbiology laboratory for resistant micro-organisms. Sixteen (30%) reported not to know if there was such an alert system in place for the facility. Twenty-five (46%) of the facilities reported having an alert system.

In 2005, 55 (98%) of the LTCFs reported vaccinating residents against influenza. Only 31 (58%) of the LTCFs offered pneumococcal vaccination to the residents. Twenty-seven (59%) LTCFs offered employees influenza vaccine. Seventeen (32%) LTCFs had a vaccination program. Seventeen (33%) reported not to have a vaccination program for residents or employees.

Results on policies on urinary catheter care, wound care, intravascular catheter care, dress code, waste management and environmental cleaning are shown in table 1 and 2. The results show a general positive trend, where the LTCFs have implemented guidelines on these issues as part of the infection control programs.

From database on national prevalence surveys on HAIs

The Norwegian Institute of Public Health received report of one outbreak with MRSA from one nursing home in Akershus during 2005. This outbreak included two residents and one employee. The residents are included in the number of cases reported.

In the national prevalence survey in 2005, there were three LTCFs participating in the first survey, covering for 254 residents. Seven of these residents (3%) were on antibiotic treatment at the time of the survey. In the second survey 10 LTCFs participated covering 688 residents. Thirty-five (5%) of the residents were on antibiotic treatment.

Occupational health

The LTCFs were asked if they had a guideline to prevent sharp injuries and a system to report sharp injuries. Twenty-four (49%) and 48 (86%) reported to have implemented a guideline for prevention of sharp injuries in 2001 and 2005 respectively (RR=1.7, 95% CI: 1.3-2.3). When asked about having a report system for sharp injuries, 16 (32%) LTCFs in 2001 and 45 (82%) in 2005 reported to have such a system (RR=2.6, 95% CI: 1.7-3.9).

Training

Overall, there was an increase in the number of LTCFs that provided systematic, basic training in infection control (RR=1.4, 95% CI: 1.0-2.0). However, there was no increase among the 38 LTCFs that participated in both studies (McNemar's test, $p=0.6$).

Table 1. Comparison of the existence, knowledge and content of the infection control program in LTCFs in Akershus County in 2001 (50 questionnaires) and 2005 (56 questionnaires)

Topic	Yes/Total (%)		RR (95% CI)*
	2001	2005	
Regulatory issues			
Infection control program	24/50 (48%)	45/56 (80%)	1.6 (1.2-2.3)
Knowledge about the Akershus County infection control program	24/49 (49%)	39/55 (72%)	1.5 (1.1-2.0)
Guidelines			
Written guidelines for hand hygiene	38/49 (78%)	56/56 (100%)	1.3 (1.1-1.5)
Written guidelines for isolation containment	27/49 (55%)	51/55 (93%)	1.7 (1.3-2.2)
Need for isolating residents monthly or more often	2/42 (5%)	6/43 (12%)	2.7 (1.0-12.7)
Written guidelines for care of infected wounds	32/49 (65%)	55/56 (98%)	1.5 (1.2-1.9)
Written guidelines for clean surgical site wounds	20/49 (41%)	52/56 (93%)	2.3 (1.6-3.2)
Policy on dress code (uniform)	31/49 (63%)	55/1 (98%)	1.6 (1.3-1.9)
Waste management	37/49 (76%)	56 (100%)	1.3 (1.1-1.6)
Environmental cleaning	34/50 (68%)	52/55 (95%)	1.4 (1.1-1.7)
Written guidelines for urinary catheter care	20/49 (41%)	45/53 (85%)	2.5 (1.7-3.4)
Occupational health			
Guidelines for employees sharp injuries	24/49 (49%)	48/56 (86%)	1.8 (1.3-2.4)
Reporting system when sharp injuries happen	16/50 (32%)	45/55 (82%)	2.6 (1.7-3.9)
Training			
Systematic training in basic infection control	24/49 (49%)	34/49 (69%)	1.4 (1.0-2.0)

*RR= relative risk, 95% CI=confidence interval

Table 2. Comparison of the existence, knowledge and content of the infection control program in LTCFs in Akershus County in 2005 (56 questionnaires)

Topic	Yes (%)
Regulatory issues	
Knowledge about legal regulations of infection control in long-term care	53 (95%)
Knowledge about national guidelines in infection control	42 (81%)
Plan for revision of the infection control program	21 (39%)
Surveillance	
Participation in the national healthcare-associated infection prevalence surveys	36 (65%)
Other forms of healthcare-associated infection surveillance	19 (36%)
MRSA	
Knowledge of MRSA national guidelines	39 (70%)
Local guidelines for handling MRSA-positive residents	32 (59%)
Previous cases of MRSA-positive residents	7 (13%)
Guidelines for screening employees for MRSA	19 (37%)
Guidelines	
Peripheral venous catheter care	40 (71%)
Central venous catheter care	29 (54%)
Handling of respiratory equipment	48 (87%)
Outbreak situations	39 (71%)
Antibiotics	18 (34%)
Collaboration with microbiology laboratory	
Alert system for resistant organisms from microbiologic laboratory	25 (46%)
Isolation containment	
Knowledge of national guidelines on isolation containment	18 (33%)
Local guidelines for isolating residents	51 (93%)
Availability of rooms for contact isolation	1 (2%)
Immunization of residents	
Influenza vaccine	55 (98%)
Pneumococcal vaccine	31 (58%)
Occupational health	
Sharp injuries	48 (86%)
Vaccination program for employees	17 (32%)
Hepatitis B vaccine	5 (14%)

5 Discussion

Our repeated, cross-sectional survey showed an improvement in the implementation, knowledge and content of infection control programs in LTCFs in Akershus County between 2001 and 2005.

Infection control programs

The overall number of LTCFs having implemented an infection control program increased with 60% from 2001 to 2005. There was also an improvement for the 38 LTCFs participating in both surveys from 40% to 76%. Even though the results of the main research question reached statistical significance, it is difficult to infer that the result was solely due to national regulations. The sample size is small and there is great variability. The results from the repeated cross-sectional study should thus be interpreted with caution. However, there is a positive improvement with a statistical significant result.

There are three principal goals for healthcare infection control programs regardless of the setting; to protect the patient/resident, to protect the healthcare- workers, visitors and others in the facility and to accomplish the previous goals in a timely, efficient, and cost-effective manner, whenever possible. Achieving these goals is the driving force behind every recommendation and action of the infection control program (4).

In 2004, the National Board of Health performed a national audit in LTCFs with a particular focus on infection control programs (30). The results were discouraging. Despite the 1996 regulation that Norwegian LTCFs should have such a program, most of the audited LTCFs did not have one and when there was a program, it seemed difficult to have it fully implemented. The report from the National Board of Health stated further that, in many counties, the County Medical Office appeared to have pushed LTCFs to establish infection control programs. In Akershus County, the County Medical Office established a countywide infection control program for LTCFs as early as 1999. This program was well known among the LTCFs. Akershus County actually was one exception in the report from the National Board of Health because only a few LTCFs did not have an infection control program and most of the LTCFs had a program covering the basic structural components of an infection control program. During this audit, nurses and physicians from these LTCFs reported that the national HAI prevalence surveys had contributed to increase awareness about local HAI problems and had been a factor contributing to the implementation of the infection control program in many of the LTCFs. The high profile of infection control in LTCFs in Akershus County was confirmed in our study where head managing nurses replied that they perceived having an infection control program as an important issue for their LTCFs.

There is no study documenting the efficacy of infection control in LTCFs similar to studies in acute-care hospitals (9). There are few controlled studies where the

effectiveness of control measures has been studied,(5) and virtually no studies evaluating the overall effectiveness of infection control programs in LTCFs. Several authors have discussed the components of an infection control program in LTCFs. These components are generally drawn from regulatory requirements, current nursing home practices, and extrapolations from hospital infection control programs. The limited resources of most LTCFs affect the type and extent of the programs developed. Most authors agree that an infection control program should include some form of infection surveillance, an epidemic control program, education of employees in infection control methods, policy and procedure formation and review, an employee health program and a resident health program (1,4,6,7,12,18,22).

Residents in LTCFs now represent a more vulnerable population and require an increasing use of medical devices which put them at risk for developing HAIs. Although, as mentioned above, some help is provided by the hospital infection control nurses in the county, this is not systematic. In Norway few LTCFs have appointed their own infection control nurse. In Akershus County none of the LTCFs had done so in 2005. The number of infection control positions or hours required to reduce HAIs in a LTCF is not known and it is not proven that the targets set for hospitals apply to LTCFs.

Infections are common among LTCF residents. Reported rates of infection in LTCFs vary from 1.8 to 9.4 per 1,000 resident-days, and the prevalence of infection varies from 1.6% to 14% (4,5,7,9,12,31). These wide variations reflect the differences in LTCF populations studied and differences of the definitions and methodology applied (7). Crude estimates of the number of HAIs among LTCF residents in the US range from 1 million to 7.4 million annually (32). In Norway, the national prevalence survey covering all LTCFs in 2002-2003 ranged from 6.6 to 7.6%. A newly published study from Norway reported an incidence rate of 5.2 infections per 1,000 resident days, ranging from 3.7 to 6.2 infections per 1,000 resident-days with overlapping CIs between facilities. UTIs and lower respiratory tract infections were the most common HAIs (33).

There is a constant transfer of residents to and from the hospital setting. Up to 40% of all hospitalizations among elderly (> 65 years of age) were from LTCFs (4,6,8). Another study found that transfer to hospital accounted for 25% to 50% of LTCF discharges (34). Infection was the main medical reason for approximately 27% of all hospital admissions among nursing home residents studied, suggesting that improvement of the LTCFs' infection control programs could have prevented many of these hospitalizations (32). The two acute care hospitals in the county were contacted in order to find out how many admissions and discharges there had been to and from LTCF within the county in 2001 and 2005. This number was not possible to estimate since LTCF residents are admitted to and discharged from hospitals as being community patients without mention of the LTCF.

Surveillance

It was difficult to draw a conclusion on the issue on surveillance. The questions relating to surveillance were not the same for the survey in 2001 and 2005. Looking at participation in the national prevalence surveys, there was a decrease of LTCFs in Akershus County participating from 27 in 2004 to 11 in 2005, where 2004 was the year with the highest participation and 2005 the lowest participation since the start in 2002. Because of this low participation, it is difficult to draw any conclusion and the data are not generalisable.

Each year, the Norwegian Institute of Public Health coordinates two prevalence surveys in LTCFs. National data on HAIs are not available for the first year of this study since the National prevalence surveys were introduced in LTCFs in 2002. All LTCFs in the country are invited to participate. The survey focuses on the four major HAIs: UTIs lower respiratory tract infections, surgical site infections and skin and soft tissue infections, and on antibiotic use. The prevalence of HAIs in LTCFs in Akershus County ranged from 4.7 to 7.0% in 2005. The overall national prevalence for the same year ranged from 6.3% to 6.9%. Differences in methodologies and resident population do not allow a stringent comparison of prevalence, however, the results seem to be comparable to results found in other studies where the prevalence rates ranged from 2.7% to 33% (5). In Akershus County, UTIs were the most frequent infections accounting for approximately 45%.

The objective of the national surveillance is not only to measure crude rates, but more so to set focus on the prevention of HAIs. Norwegian Institute of Public Health assists LTCFs to implement surveillance of HAI in a standardized way. Participation in the prevalence surveys is not yet compulsory. One can debate the validity of the data Norwegian Institute of Public Health receives when healthcare-personnel with limited training in infection control is to apply epidemiological definitions on HAIs. However, the valuable thing about the national surveillance is the process itself and the gradual improvement and compliance from all LTCFs in the country. Although the methodology is the same each year, there is no good explanation for the decrease of participation in the two surveys from 2004 to 2005.

Prevalence is calculated as the number of active HAI divided by the number of beds visited. The advantages of prevalence surveys are that it is a rapid and inexpensive way to estimate the magnitude of HAI. However, prevalence surveys tend to overestimate the rates and, in smaller hospitals/facilities, the number of patients/residents surveyed is insufficient to detect important differences among patient populations. Additionally, a weakness in any surveillance is the compliance with definitions and the proper identification of cases (35). Prevalence rates should be used for comparing rates within the LTCF, but not for comparing rates between different LTCFs. Incidence, site-targeted surveillance focuses on detecting one or more specific sites of infection occurring among a population at risk, in this case, residents in a LTCF. Incidence surveillance is more resource demanding and more difficult to perform. Prevalence

surveys can be debated, but seem a feasible way to start surveillance in LTCFs considering their structural challenges such as no dedicated infection control personnel, high rate of turnover- and lack of skilled personnel.

Another form of surveillance is the alert system for defined microorganisms. Twenty-five (46%) LTCFs reported having an alert system. There is obviously room for improvement. An alert system is crucial in order to inform the facilities early enough to intervene and prevent outbreaks of multiresistant microorganisms.

Most LTCFs do not have on-site diagnostic laboratories. Diagnosis of infection is primarily based on clinical judgement. The older resident lacks localized physical signs and symptoms and may be unable to verbalize his/her complaints. Treatment is therefore based on most likely syndromes and microorganisms (36). In addition, the responsible physician only works part time. Many of the prescriptions are done by telephone. The correct diagnosis and treatment may be postponed with the risk for the individual resident, but also for potential transmission of resistant organisms to other residents.

With the incidence of MRSA increasing in LTCFs, lacking an alert system makes a LTCF particularly vulnerable. Physicians have the responsibility to actively diagnose the microorganisms causing different infections by correct sampling and to improve the collaboration with the local laboratories.

Guidelines and policies

Guidelines are important for preventing transmission. Guidelines should be evidence based. The objective of interventions is to obtain adherence to precise guidelines and to standardize care at bedside (1,4,6). Practices most frequently do not correspond to recommended guidelines. However, it is important that designed strategies including educational-based programs aim at better compliance to infection control. Adherence to guidelines is essential in order to be able to interpret infection rates, target interventions in order to reduce HAI and improve patient safety and quality of care. Written guidelines and policies should address all elements of care, must be relevant to the setting, continually updated to remain current and accessible to the staff. Unfortunately, much necessary information on the effectiveness of infection control mainstays (outbreak investigation/control, surveillance, isolation precautions) does not exist for LTCFs. There is minimal data on the effect of infection control interventions on LTCF residents' outcomes and costs. Finally, healthcare workers in LTCFs are often ethnically and culturally diverse. Little is known on how this diversity might influence the acceptance and adherence to infection control guidelines (9).

Several surveys have found infection control in LTCFs to be less than adequate (32). Goodman and Solomon reported in their review that most of the outbreaks were associated with non-adherence to infection control procedures (4).

Hand hygiene

The result relating to LTCFs having implemented guidelines on hand hygiene is the most important improvement. The result was statistically significant. All the LTCFs in Akershus County now have guidelines on hand hygiene, showing that the LTCFs had understood the importance of having these guidelines in place. Hand hygiene is the primary measure to reduce the transmission of microorganisms in healthcare institutions (1). There has been a big emphasis on hand hygiene in infection control in the past years with a shift of focus from hand washing to hand disinfection (37). The infection control nurses employed in the hospitals within the county have, by law, the responsibility to assist LTCFs in infection control matters including teaching. Hand disinfection has been a major focus of infection control teaching of LTCF personnel. Our study shows that most LTCFs had written guidelines on hand hygiene. Non-compliance with hand hygiene is well-known challenge and future studies should aim at studying compliance with hand hygiene procedures in LTCFs.

Healthcare workers may play an important role in the dissemination of antibiotic-resistant microorganisms in LTCFs. Staff hands were found to be colonized with MRSA and vancomycin-resistant enterococci (VRE) 2-13% and 13-41% of the time, respectively (24). Colonization of residents with resistant gram negative bacteria is common and one study found that 26% of the nurse hands were colonized with similar strains suggesting horizontal transmission (38).

Non-compliance with hand hygiene remains a major problem in healthcare settings. The compliance differs between professional groups, medical doctors being the group with lowest compliance (39). There is a strong behavioural aspect with regard to hand hygiene compliance. Perceived barriers to adherence to hand hygiene practice include skin irritation, inaccessible hand hygiene supplies, interference priority of care, wearing of gloves, forgetfulness, lack of knowledge, insufficient time, workload, understaffing. Several healthcare facilities have implemented intervention strategies, without significant success on sustainable improvement on compliance. By promoting bedside hand disinfectant, compliance has proved to improve, coinciding with lower MRSA rates and reduced costs (1). There are indications that increased staffing, better hand hygiene may reduce resistant microorganisms in LTCFs (25).

Hand disinfection has been a major focus in the teaching towards employees working in LTCFs. The results seem encouraging showing that the LTCFs have guidelines in place. In 2001, LTCFs were asked whether they had guidelines on hand washing since hand disinfection was not yet the standard for care. In 2005, they were asked whether they

had guidelines for both hand washing and hand rub. The results showed very little difference, between hand washing and hand disinfection.

Isolation containment

There was no increase in the need for isolating residents. The CI is very wide and none of the tests reached statistical significance. Several LTCFs had developed local guidelines for isolating residents showing that there is a need to care for residents with infections in a standardised way within the LTCF. Isolation precautions are developed for the hospital setting. Isolation precautions require modification when applied in LTCFs where rehabilitation, socialization, and long-term custodial care are primary goals. Routine confinement of residents to private rooms for prolonged periods of time, for instance when colonized with resistant microorganisms that may persist for months, may not be justifiable (5,11,18,30,40).

The Norwegian Institute of Public Health published national guidelines for isolation containment for hospitals and LTCFs in 2004 (41). Only 33% of the LTCFs knew about these guidelines. However, 93% of the LTCFs did have local guidelines in place. In 2005 only 53% of the residents lived in a single room and only one LTCF (1.8%) had a contact isolation room. Norwegian Institute of Public Health certainly should promote the national guidelines towards LTCFs in order to ensure standardised practice for isolating residents.

An isolation system is an important means of preventing cross-infection. The use of standard precautions in LTCFs has been handicapped by insufficient number of single rooms and inappropriate ventilation systems. Especially the lack of single rooms represents a challenge. In order to prevent cross-transmission it is essential that healthcare workers understand and comply with infection control measures like standard precautions. The single rooms are in itself an isolation unit which can contribute to prevent cross-transmission. Single rooms also contribute to improved quality of life for the residents and make the daily infection control measures easier to carry out for the staff.

Antimicrobial agents

The results from the two national prevalence surveys in 2005 show a low use of antibiotics in LTCFs in Akershus County. This number is low compared to international literature. However, the numbers may not be representative since there were so few LTCFs participating in 2005. The methodology for collecting data on antibiotic use in the national prevalence surveys is not optimal and thus the numbers must be interpreted with caution.

Antimicrobial agents are the most frequently used drugs in LTCFs accounting for up to 40% of all systemic drugs prescribed. The point prevalence of systemic antibiotic use in

LTCFs is approximately 8% (27). A substantial proportion of antimicrobial use in LTCFs is considered inappropriate. Recent reports indicate that 25% to 75% of systemic antimicrobials and up to 60 % of topical antimicrobials are prescribed inappropriately (27). The diagnostic tools in LTCFs are limited, the diagnosis of infections may be impaired thus leaving it difficult to establish appropriateness of antimicrobial use difficult (29). The most important adverse outcome of inappropriate use in LTCFs is the promotion of antimicrobial resistance in this high risk population with an increasing risk for transmission of resistant organisms such as MRSA. There is strong evidence that level of use is correlated to resistance (27-29,42-44).

There has been a focus on antimicrobial resistance in hospitals showing that this can result in excess costs of up to \$ 4 billion annually (27,29). Antimicrobial resistance in LTCFs has not yet received the same attention, although resistant pathogens have the same potential to develop in this setting causing serious infections and increased costs to LTCF residents in a setting with limited resources (43).

Until recently, Norway, similarly to the other Scandinavian countries, reported low rates of resistant microorganisms. The cause of this is internationally debated. However, many claim that the reason for the low resistance rates is due to a restrictive use of antimicrobials in the population in general. The results of the national point prevalence survey show that antimicrobials, with prevalence of 2.7% and 5% in the two surveys of 2005, are not extensively used in the Akershus County's LTCFs.

Lack of an alert system, lack of physician time in the LTCFs and large proportion of unskilled employees make the LTCFs vulnerable when it comes to resistant microorganisms.

MRSA

The results relating to MRSA show an increased knowledge despite few LTCFs having had residents with MRSA. This improvement may be caused by the fear of resistant microorganisms and the fear among the staff becoming colonised. Norway, together with the other Scandinavian countries, has traditionally been a country with very low prevalence of MRSA (45). In the past, most cases of MRSA occurred in hospitals or were imported by patients transferred from foreign hospitals in high endemic countries. This situation has changed and the major reservoir for MRSA now seems to be outpatients and LTCFs. Although more research is needed to understand this change, the challenge is to secure that each LTCF has a systematic approach on how to control MRSA. In our study, few LTCFs had an experience with MRSA-positive residents, but a majority reported to have a procedure for handling such residents and some had a system for screening personnel for MRSA.

Asymptomatic colonization with antibiotic-resistant bacteria is common in LTCFs. It has been estimated that more than 20% of LTCF residents are colonized with MRSA and up to 10% with VRE. It has been shown that a significant proportion of patients already are colonized upon admission into a LTCF. Once colonized, residents seem to be carriers for prolonged periods of time (23).

In 2004, the Norwegian Institute of Public Health published national MRSA guidelines for both hospitals and LTCFs. MRSA has been a reportable disease since 1995. In the first 10 years, only infections with MRSA were to be reported. This system changed in 2005 and since then both infections and colonisations must be reported to the Norwegian Institute of Public Health. This may partially explain an increase in the rates. Although the prevalence is still low, it has been increasing steadily since 2002.

MRSA can be used as a model for infection control. Handling residents with MRSA encompasses all aspects of infection control, i.e. surveillance, prevention, isolation, outbreak control, antibiotic policies, alert systems and not least, morbidity and increased costs. The procedures for MRSA have almost become a “quality indicator” for the hospital setting in Norway where employees to a great extent comply to the guidelines when receiving a patient suspected to be MRSA-positive. The reason for this may be the fear of becoming colonized themselves. Hopefully, this compliance will disseminate to the LTCF as it is becoming more experienced with the problem.

Influenza

The results show that overall compliance to the national recommendations on influenza vaccine was good. The compliance to pneumococcal vaccine was not as high, and has a potential for improvement. However, the target population for this vaccine is more limited compared to influenza vaccine. More serious is the low vaccination coverage of health care workers. There is a huge lack of knowledge and understanding for their potential role in transmitting influenza to risk groups such as residents in LTCFs.

Influenza infections pose a serious threat to LTCF residents. Vaccination of residents and staff continues to be the mainstay of prevention (46-49). Influenza causes increased morbidity and mortality among the elderly. Ninety percent of deaths occur among persons aged 65 and older, with the highest death rates among those aged 85 and older (46). LTCF residents may suffer even higher influenza-related morbidity and mortality because of greater debility and of higher risk of being exposed. Outbreak investigations report that up to 60 % of residents can be affected. Staff vaccination is an important measure to reduce the exposure of residents.

The Norwegian Institute of Public Health recommends influenza vaccination of persons aged 65 or older. Few healthcare workers volunteer to take the vaccine. The situation in relation to healthcare workers compliance to influenza vaccination is similar to hospitals

and LTCFs in Norway. Several hospitals have tried to improve the influenza vaccination coverage with targeted interventions without remarkable success. The LTCFs should target interventions at improving vaccination coverage for the employee group and develop a more systematic approach.

Occupational health

There was an improvement of LTCFs having guidelines on sharp injuries. This indicates that the management in the LTCFs understands that occupational health is an important part of the infection control program for the facility. Healthcare personnel are more frequently exposed to infectious diseases. If they themselves develop a communicable disease, healthcare workers also pose a risk to residents and colleagues. Having an occupational health program is a crucial component of an infection control program (4).

Healthcare facilities in Norway have the responsibility, regulated by law, to protect the employees from being exposed to biological agents in relation to work (50). The regulation requires that the facility performs a risk assessment of the microorganisms that the employees are likely to be exposed to at work, and to keep records for each exposure. The employer has the responsibility to implement preventive measures and secure the employees. Not the least, the regulations state that proper training is a required element in order for employees to be able to do the correct risk assessment in different work situations. The regulations are not part of the regulations for infection control.

Prevention of sharp injuries, personal protective equipment, provision of uniforms, hand disinfection, proper waste management is considered elements to contribute protect the employees. All the LTCFs in Akershus County had improved their guidelines in this aspect from 2001 to 2005.

The results on policies on urinary catheter care, wound care, intravascular catheter care, dress code, waste management and environmental cleaning show a general positive trend. Not all the areas were covered in both surveys so the results are not comparable. These issues are all important element of an infection control program showing that the LTCFs have understood what the different elements of an infection control program should be.

Staffing and training

Overall, there was an increase in LTCFs that provided systematic, basic training in infection control. The result showed a high level of improvement, but was not statistically significant. Training is a key issue in infection control. To have an implemented infection control program means that the staff has received training in how

the different elements of the program is to be understood and practiced. The results on HAIs will depend much on how this issue is taken care of.

There is a growing concern that changes in the size of the nurse workforce and hospital restructuring negatively impact on patient outcome. Several studies have showed that overcrowding, understaffing or an imbalance between workload and resources are important determinants of HAIs and cross-transmission of resistant pathogens (1). The quantity, as well as the quality, of the staff may drastically influence outcomes. The importance of training in infection control is accentuated by the great turnover in LTCF personnel (5). Most studies have focused on acute-care hospitals, but it is prone to conclude that the situation is similar in LTCFs. The increasing complexity of care provided to residents and the increasing severity of illness of residents in out-of-hospital settings necessitates increasing awareness of appropriate measures of infection prevention and control (4). Staff should receive ongoing training in infection control procedures and knowledge of the epidemiology of HAIs specific to the setting in which they are employed. This knowledge will allow them to understand and comply with the practices and procedures necessary to prevent HAIs.

Training is an essential part of an infection control program. In a survey of 259 skilled LTCFs, nearly all the facilities had infection control practitioner responsible for the infection control program. Eighty-five % of the infection control practitioner were registered nurses, and most had other responsibilities. The infection control practitioner spent a mean of 10 hours a week on infection control activities. Of the time, 53% was spent on surveillance and 25 % of teaching and other activities. A positive association ($p < .05$) was found between time spent on infection control activity and scores on surveillance and control indices (32). One study found that education of the infection control practitioner is critical to an effective infection control program. Compared with staff in acute care facilities, staff in LTCFs may have less training in infection control and in other patient care practices. Staff turnover may be high, making it difficult to train personnel adequately.

Residents in LTCFs have become more acutely ill. There is an increasing use of medical devices which may pose a threat to developing infections. In order to understand the complexity and prevent these infections, the knowledge of the staff is crucial. Some studies indicate a causal relationship between training and infection control practice among infection control personnel and that education is crucial to an effective infection control program. There is also a need for physician involvement in infection control in LTCFs. In Akershus, 28% of the LTCFs had involved the physician when developing the infection control program.

In Norway, few LTCFs have an infection control nurse. In Akershus County none of the facilities had appointed personnel working with infection control. The infection control nurses employed by the hospitals assist the LTCFs, but not in a systematic way. The

number of positions or hours required in order to reduce HAIs in the LTCF is not known. The recommendations for hospitals may not be applicable.

Several studies provide evidence of relationship between hospital nurse staffing and adverse outcomes among medical and surgical patients (32). Imbalance between workload and resources are important determinants of HAI and cross-transmission. In 2005, the number of occupied and unoccupied positions for different professional groups was checked to see if there was a relationship between staffing and having an infection control program. The facilities could not give the correct number on staffing for the different professional groups. The County Medical Office had official numbers for staffing for both 2001 and 2005 for different professional group. The biggest increase from 2001 to 2005 was within the group of unskilled healthcare workers. The fact that the largest group of employees is unskilled may reflect a low level of knowledge in infection control, and the possible limitation to obtain the desired effect on reducing HAI in LTCFs. More research is needed to define the better patient-to-nurse ratio in the LTCFs.

Management

In 2005, the LTCF's head managing nurses perceived the importance of having an infection control program as high as 6.2 (range: 6-6.5) on a scale from 1 to 7, thus reflecting the high status given to infection control issues by LTCFs in the county. One can debate if the way this issue was measured was the best. However, in 88% of the LTCFs, the head managing nurses scored 6.5 in relation to placing the importance of having an infection control program.

There is a strong link between a focus of infection control and training of the staff. Despite limited resources and no systematic access to expertise in infection control, the head managing nurses make an effort to follow national regulations and implement infection control programs. The challenge for the head managing nurses is increasing with increasing number of unskilled staff. The head managing nurse is the person setting the standard of care, defining the level of resident safety and quality of care within the LTCF. A systematic approach to increase the level of knowledge in the staff is crucial.

Cost

The cost of caring for residents with HAI in LTCFs has received little attention. Studies on the cost of HAIs have used different methods, definitions and degrees of stringency when calculating indirect cost. For LTCFs, transfer to hospital and choice of antimicrobial agent affect costs, and both factors have not been extensively studied. In the US direct expenditures for antimicrobial therapy are estimated to range from \$ 38

million to \$ 137 million per year and the costs of hospitalization resulting from transfer because of an infection range from \$ 673 million to \$ 2 billion each year (2,5-9,51-53).

HAIs are serious patient safety issues. In the US, it is estimated that HAIs cost approximately US\$ 17 to 29 billion, annually (1). In UK, the cost of HAIs is estimated to £ 1 billion, annually. Patients who had one or more HAIs incurred hospital costs that were on average 2.8 times greater than uninfected patients, equivalent to £ 3,000. A 10% reduction in the incidence of HAI may result in releasing resources up to £ 361,297 for just one single hospital, an estimated 1,413 bed days and 191 finished consultant episodes (53). On average, a patient with HAI spends 2.5 times longer in hospital.

An increasing number of elderly persons in need for continuous care will result in increasing costs for the society. It is reasonable to assume that the estimated costs of HAIs in hospitals are applicable to LTCFs. However, from a societal perspective, it will be necessary to estimate the specific costs of HAIs in LTCFs.

Validity, reliability and generalizability

The main aim of this study was to determine to what extent LTCFs in Akershus County have implemented infection control programs including guidelines and surveillance by a repeated cross-sectional study in 2001 and 2005. Our main research question was to compare whether there had been an improvement in the implementation of infection control programs in LTCFs in the county between the two studies. There was a statistically significant improvement of LTCFs having implemented infection control programs in Akershus County between the two surveys.

All the LTCFs within the county were invited to participate by the County Medical Office, thus adjusting for selection bias. It is difficult to infer any association between the LTCFs with an infection control program and rates of HAIs. The reason for this is that it is difficult to interpret this association with only two cross-sectional studies and because there was no systematic participation in the National prevalence surveys from the LTCFs in Akershus. Cross-sectional studies can provide evidence of valid statistical associations when repeated over time, but is more useful for raising questions of the presence of association rather than for testing hypothesis.

Despite efforts from the County Medical office to enrol all LTCFs, some never returned the questionnaire. Hopefully the losses to follow-up have not influenced the results too much. One may question whether these LTCFs did have an infection control program in place. Of the LTCFs participating in both surveys, four LTCFs which had an infection control program in 2001 replied not to have this in 2005. There may be many explanations to this, among others that they had not understood fully what an infection control program was or that they had not updated the existing infection control program.

The LTCFs having an infection control program reflects that these LTCFs are motivated, have improved and have fully understood what an infection control program is. It is not easy to generalize the results of Akershus referring to the national audit done by the Board of Health where Akershus together with Oslo were the counties where most LTCFs had an infection control programs.

Another limitation to this study may have been the general understanding of infection control terminology among the head managing nurses in Akershus County in the first survey in 2001. When asking whether the LTCF had an infection control program, 48% responded positively. However, when asking whether the LTCF had guidelines for infection prevention and performed surveillance of HAIs, the same respondents replied not to have implemented these. This may have resulted in an overestimate of the number of LTCFs with an infection control program in 2001. To improve the questionnaire, we tested the questionnaire by interviewing four head managing nurses in 2005 before sending out the questionnaire. Nevertheless, this may have led us to underestimate the level of improvement in infection control programs in LTCFs between 2001 and 2005.

6 Conclusion and perspectives

Our study showed that there has been an increased attention on infection control in LTCFs in Akershus County, Norway. It is likely that national regulations and repeated national prevalence surveys on HAIs have raised awareness about this issue in LTCFs and have pushed them to put infection control on the agenda. This observation was mentioned in a recent report from the National Board of Health (30). The reason for the good results from Akershus County should be used to encourage the LTCFs to further develop their infection control programs and improve infection control, not the least, perhaps share their experience with LTCFs in other counties in the country.

Future efforts are needed on training and educational programs on the prevention of HAIs in Norwegian LTCFs. This is an essential point because of the recent increase in the proportion of unskilled personnel working in LTCFs. Guidelines specifically addressing infection control issues in LTCFs are often missing. This is true for Norway and is true in many other countries. Additionally, implementation of continuous and targeted surveillance may be needed to complement the national prevalence surveys.

Because of the similar situation in all the Nordic countries, a systematic and pro-active collaboration will be beneficial and cost saving. Because of a constant fluctuation of healthcare personnel between the countries, especially collaboration on training would be beneficial. Guidelines and policies, provided they are evidence based, should not differ between the countries. Applying common definitions and methodology on surveillance of HAIs in the Nordic countries will develop possibilities for comparing rates. Infection control is in essence international and should thus be implemented and performed in the same manner in any country.

Finally, we would like to assess the relationship between the level of infection control and prevalence of HAIs in LTCFs. With aging populations and the increasing role played by LTCFs in healthcare, it has become essential to address infection control in these facilities. Although further efforts are needed, our study suggests that this is already happening in Norway.

During the next decades, a high level of quality of care provided in LTCFs will be an increasingly important public health priority.

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Appendix 1

Implementation of Infection Control Programs in Long-Term Care Facilities, Akershus County, Norway: a Repeated Cross-Sectional Study in 2001 and 2005

Nina Kristine Sorknes^a

Lise Sjomoen,^b

Marte Olstad,^c

Are Hugo Pripp,^c

Bjørn Iversen,^a

Preben Aavitsland,^a

Cecilia Stålsby Lundborg^d

^aNorwegian Institute of Public Health, Oslo, Norway

^bCounty Medical Office, Oslo and Akershus, Norway

^cRikshospitalet-Radiumhospitalet HF, Oslo, Norway

^dNordic School of Public Health, Göteborg and Karolinska Institutet, Stockholm, Sweden

Corresponding author:

Nina Kristine Sorknes

Norwegian Institute of Public Health

P.O. Box 4404 Nydalen

NO-0403 Oslo

Norway

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Healthcare-associated infection; Infection control; Long-term care facility

Abstract

Background: In 1996, regulations regarding control and prevention of healthcare-associated infections (HAIs) in all healthcare institutions were implemented in Norway. It became mandatory for all healthcare facilities to have an infection control program (ICP).

Objective: To describe to what extent long-term care facilities (LTCFs) in Akershus County have implemented infection control programs including guidelines and surveillance.

Methods: A repeated, cross-sectional survey was performed among the LTCFs in Akershus County in 2001 and in 2005. A questionnaire was developed in 2001 investigating infection control programs including regulatory issues, guidelines, occupational health and training. In 2005, the questionnaire was expanded to include additional questions regarding policies and guidelines on methicillin-resistant *Staphylococcus aureus* (MRSA), isolation containment, collaboration with the microbiology laboratory and immunization policies. The questionnaire was sent to the head managing nurse of each LTCF in the county. Additionally, we searched for participation of LTCFs in the national prevalence surveys on healthcare-associated infections and for MRSA positive cases in the databases of Norwegian Institute of Public Health.

Results: The number of LTCFs with an infection control program increased from 24 (48%) in 2001 to 45 (80%) in 2005 (Relative risk (RR) =1.6, 95% Confidence interval (CI): 1.2-2.3). There was an increasing knowledge about the county's infection control program (RR=1.5, 95% CI: 1.1-2.1). The LTCF's head managing nurses perceived having an infection control program as important (mean=6.2, range 6.0-6.5 on a scale of 1 to 7).

Conclusion: There has been an increased attention towards infection control in LTCFs in Akershus County, Norway. National regulations and repeated national prevalence surveys on healthcare-associated infections may have contributed to this improvement.

Introduction

Given the last decade's trends in healthcare towards early discharge from hospitals and increased use of home-based care, long-term facilities (LTCFs) are increasingly becoming closer to acute-care hospitals.¹⁻⁴ Healthcare-associated infections (HAIs) are common and important causes of illness and death among elderly residents in LTCFs. Traditionally, studies on HAIs have focused on acute-care hospitals. Over the last few years, however, increased attention has been given to infection control in LTCFs.

The risk of developing HAIs in LTCFs appears to be comparable with that of developing HAI in acute care hospitals.^{1,5} HAIs occur frequently among elderly residents in LTCFs because of debilitating conditions that make them more susceptible to infection. Urinary tract infections (UTIs) are the most commonly diagnosed and treated infections among LTCF residents.^{2,4,6-10} Additional problems include infections in the respiratory tract, skin and soft tissue infections, gastrointestinal infections and bloodstream infections. These infections are a leading cause of morbidity and mortality among LTCF residents, although many of these deaths are inevitable in an aged and debilitated population.¹⁻⁵

Infection control programs were among the first organized efforts to improve the quality of healthcare delivered to patients.^{1-3,5,11-14} Early studies have demonstrated their benefit and efficacy in preventing infections in hospitals and LTCFs and longitudinal analysis have confirmed their impact on reducing HAIs over time.^{3,13,15} Infection control and prevention is a model for quality management and patient safety. It relies on measuring parameters integrated in the healthcare structure, process, or outcome.¹³

There are substantial differences in patient characteristics, the type of care provided the specific needs for increased social and personal contact, and staff resources between acute-care hospitals and LTCFs. Recommendations for infection control programs in LTCFs have applied infection control programs from hospitals as a model.¹¹ There are, however, few studies that evaluate the overall effectiveness of an infection control program in a LTCF.

In 1996, regulations regarding control and prevention of HAIs in all healthcare institutions were implemented in Norway based on the Communicable Disease Control Act.¹⁶ It became mandatory for all healthcare facilities to have an infection control program. The national authorities developed guidelines for infection control in healthcare facilities which formed the basis for regional, county, community and local infection control programs. These national guidelines include basic principles in infection control and a description of HAI surveillance.¹⁷

Every year, the Norwegian Institute of Public Health coordinates two national point prevalence surveys on HAIs, which includes both hospitals and LTCFs. The objective is to measure the baseline prevalence of HAIs and use of antibiotics, identify the distribution of HAIs and monitor trends. A second objective is to increase awareness about infection control and the importance of implementing infection control programs in hospitals and LTCFs. In Autumn 2005, 285 Norwegian LTCFs participated in the survey.⁶ The HAI prevalence rate became a national healthcare quality indicator in 2003.

Norway has a population of 4.6 million inhabitants. Between 2001 and 2005, the number of persons aged 67 or above increased from 600,000 to 683,000. In 2001, there

were approximately 1,000 long-term care facilities with a total of 42,900 beds. In 2005, the number of LTCFs was approximately the same with a slight reduction in the number of beds to 41,000.¹⁸

The aim of this study was to describe to what extent LTCFs in Akershus County have implemented infection control programs including guidelines and surveillance. The population of Akershus County in 2005 was 499,300. The number of LTCFs in the county was 62 in 2001 and 64 in 2005, representing a total of 3,300 beds.

Methods

A repeated, cross-sectional survey was performed among the LTCFs in Akershus County in 2001 and in 2005.

An original questionnaire was developed in 2001 by a team of infection control nurses in the county in collaboration with the county medical office (CMO). The questionnaire was designed to reflect current national recommendations and the published literature on the structural components of an infection control program. It investigated several aspects of the infection control program including regulatory issues, guidelines, occupational health and training (Table 1). This questionnaire was expanded in 2005 to include additional questions about regulatory issues, guidelines and occupational health, as well as questions on MRSA policies, isolation containment, collaboration with the microbiology laboratory and immunization policies. The questionnaires were designed with closed questions with binary response alternatives. In 2005, we included one question on the perceived importance of having an infection control program in the LTCF on a continuous scale from 1 being “not important” to 7 being “very important”. Both questionnaires are available in Norwegian from the corresponding author.

The CMO was officially responsible for sending one questionnaire, together with an information letter, to each LTCF in the county. The questionnaire was addressed to the head managing nurse of the LTCF. The CMO was responsible for data collection and quality check of the returned questionnaires. A reminder was sent after 4 weeks and the CMO also called the LTCFs which had not replied.

Additionally, we searched for participation of the LTCFs in national prevalence surveys on HAIs in a database at the Norwegian Institute of Public Health. The objective was to cross-check the reply given to the questionnaire, not to get data on the rates of HAIs for each institution. Similarly, by searching the national database on reportable diseases (MSIS) for MRSA cases, we cross-checked the reply given by the participating LTCFs about their experience with MRSA-positive residents.

Data management and analysis were performed on SPSS 14.0 for Windows. The relative risk (RR), 95% confidence interval (CI) and p-value were calculated to compare replies to the survey in 2001 and 2005. Additionally, the McNemar’s test was applied to compare the matched pairs of replies of only the LTCFs that participated in both surveys.

Results

Fifty (81%) of the 62 LTCFs in the county responded to the questionnaire in 2001 and 56 (88%) of 64 LTCFs in 2005. The responding facilities represented a total of 2,785 and 3,090 beds in 2001 and 2005, respectively. Thirty-eight LTCFs participated in both surveys. The comparison of the existence, knowledge and content of the infection control program in LTCFs in 2001 and 2005 is shown in Table 1. Results on some topics that were only covered in 2005 are shown in Table 2.

The number of LTCFs with an infection control program increased from 24 (48%) in 2001 to 45 (80%) in 2005 (RR=1.6, 95% CI: 1.2-2.3). Among the 38 facilities which participated in both surveys, the numbers with an infection control program increased from 15 to 29 (McNemar's test, $p=0.013$). In 2005, 42 (81%) of the LTCF's head managing nurses knew about the national regulations for the field of infection control and 21 (39%) reported that they had a plan for revision of the local infection control program.

Overall, there was an increasing knowledge about the county's infection control program (RR=1.5, 95% CI: 1.1-2.0), but this was not seen among the 38 LTCFs that participated in both studies (McNemar's test, $p=0.581$). In 2005 LTCFs were asked if the responsible physician had participated in developing and implementing the infection control program. Twenty-eight percent of the LTCFs reported that the physician was involved.

In 2005, the LTCF's head managing nurses perceived the importance of having an infection control program. to be 6.2 (range: 6-6.5) on a scale from 1 to 7, thus reflecting the high status given to infection control issues by LTCFs in the county.

In 2001, 17 (35%) of the LTCFs reported performing some kind of surveillance of HAIs. Thirty-seven (74%) LTCFs reported performing surveillance of UTIs and 35 (70%) reported performing surveillance of wound infections. However, no LTCF reported having a written protocol describing the methodology and definitions applied.. None of the LTCFs reported performing continuous surveillance. In 2005, 36 (64%) LTCFs reported participating in the national prevalence surveys. Overall, 39 facilities in the county had participated in the national prevalence survey at one point since the start in 2002.

In 2001, the questionnaire only included a question on hand washing guidelines whereas it asked about both hand washing and hand disinfection guidelines in 2005. Fifty-six (100%) of the LTCFs reported having guidelines on hand washing and 55 (98%) reported having guidelines on hand disinfection. To be able to compare 2001 and 2005, the results for these two questions on hand hygiene in 2005 were merged. The number of LTCFs with a guideline on hand hygiene increased from 38 (78%) in 2001 to 56 (100%) in 2005 (RR=1.3, 95% CI: 1.1-1.5). This increase was significant when considering only the 38 facilities which participated in both surveys (McNemar's test, $p=0.039$).

In 2005, 39 (70%) LTCFs reported knowing about the national MRSA guidelines. Thirty-two (59%) LTCFs reported to have developed local MRSA guidelines based on the national recommendations. Seven (13%) LTCFs reported to having previous experiences with MRSA-positive residents and 19 (37%) LTCFs had implemented MRSA screening policies for their employees.

Overall, there was an increase in the number of LTCFs that provided systematic, basic training in infection control (RR=1.4, 95% CI: 1.03-2.0). However, there was no increase among the 38 LTCFs that participated in both studies (McNemar's test, $p=0.6$).

Discussion

Our repeated, cross-sectional survey showed an improvement in the implementation, knowledge and content of infection control programs in LTCFs in Akershus County between 2001 and 2005. There was an increase in the number of LTCFs with an infection control program. On average, few LTCFs in Norway have implemented an infection control program. In 2004 the National Board of Health did a national audit in LTCFs with a particular focus on infection control programs.¹⁹ The results were discouraging. Despite the 1996 regulation that LTCFs should have such a program, most of the audited LTCFs did not have one and when there was a program, it seemed difficult to have it fully implemented. The report from the National Board of Health stated that, in many counties, the county medical office appeared to have pushed LTCFs to establish infection control programs. In Akershus County, the county medical office established a countywide infection control program for LTCFs as early as 1999. This program was well known among the LTCFs. Akershus County actually was one exception in the report from the National Board of Health because only a few facilities did not have an infection control program and most of the facilities had an infection control program covering the basic structural components of an infection control program. During this audit, nurses and physicians from these LTCFs reported that the national HAI prevalence surveys had contributed to increase awareness about local HAI problems and had been a factor contributing to the implementation of the infection control program in many of the facilities¹⁹. The high profile of infection control in LTCFs in Akershus County was confirmed in our study where head managing nurses replied that they perceived having an infection control program as an important issue for their LTCFs.

To our knowledge, there is no study documenting the efficacy of infection control in LTCF similar to studies in acute-care hospitals. There are few controlled studies where the effectiveness of control measures has been studied²⁰ and virtually no studies evaluating the overall effectiveness of infection control programs in LTCFs. Several authors have discussed the components of an infection control program in LTCFs. These components are generally drawn from regulatory requirements, current nursing home practices, and extrapolations from hospital infection control programs. The limited resources of most LTCFs affect the type and extent of the programs developed. Most authors agree that an infection control program should include some form of infection surveillance, an epidemic control program, education of employees in infection control methods, policy and procedure formation and review, an employee health program and a resident health program.^{1, 2, 5, 11-13, 17}

Hand hygiene seems to be the primary measure to reduce the transmission of pathogens in healthcare institutions.¹³ There has been a big emphasis on hand hygiene in infection control in the past years with a shift of focus from hand washing to hand disinfection. The infection control nurses employed in the hospitals within the county have, by law, the responsibility to assist LTCFs in infection control matters including teaching. Hand disinfection has been a major focus of infection control teaching of LTCF personnel. Our study shows that most LTCFs had written guidelines on hand hygiene.

Nevertheless, non-compliance with hand hygiene is well-known challenge and future studies should aim at studying compliance with hand hygiene procedures in LTCFs.

Norway has traditionally been a country with very low prevalence of MRSA. In the past, most cases of MRSA occurred in hospitals or were imported by patients transferred from foreign hospitals in high endemic countries. This situation has changed and the major reservoir for MRSA now seems to be outpatients and LTCFs. Although more research is needed to understand this change, the challenge is to secure that LTCFs have a systematic approach on how to control MRSA within the facility. In our study, few LTCFs had an experience with MRSA-positive residents, but a majority reported to have a procedure for handling such residents some had a system for screening personnel and residents for MRSA.

Residents in LTCFs now represent a more vulnerable population and require an increasing use of medical devices which put them at risk for developing HAIs. Although, as mentioned above, some help is provided by the hospital infection control nurses in the county, this is not systematic. In Norway few LTCFs have appointed their own infection control nurse. In Akershus County none of the LTCFs had done so in 2005. The number of infection control positions or hours required to reduce HAIs in a LTCF is not known and it is not proven that the targets set for hospitals apply to LTCFs.^{1, 11, 13}

A limitation of our study is that we do not know why 8 LTCFs did not respond to our questionnaire despite the CMO's efforts to contact them and ask to return the questionnaire. It is possible that these LTCFs were afraid to report that they did not have implemented an infection control program despite the national regulation. Another issue remains the level of understanding of what is infection control among head managing nurses in LTCFs. When preparing the 2005 questionnaire, we suspected that the terminology used for infection control in the 2001 questionnaire had been difficult to understand for the respondents. For instance, when asking the head managing nurse if the facility had an infection control program, 48% responded positively to this question. However, when asking if the facilities had guidelines for infection prevention and performed surveillance of HAIs, the same respondents replied not to have implemented these. This may have resulted in an overestimate of the number of LTCFs with an infection control program in 2001. To improve the questionnaire, we performed pilot interviews on the questionnaire with some head managing nurses in 2005. Nevertheless, this may have led us to underestimate the level of improvement in infection control programs in LTCFs between 2001 and 2005.

In conclusion, our study showed that there has been an increased focus on infection control in LTCFs in Akershus County, Norway. It is likely that national regulations and repeated national prevalence surveys on HAIs have raised awareness about this issue in LTCFs and have pushed them to put infection control on the agenda. This observation was mentioned in a recent report from the National Board of Health.¹⁹ Future efforts are needed on training and educational programs on the prevention of HAIs in Norwegian LTCFs. This is an essential point because of the recent increase in the proportion of unskilled personnel working in LTCFs. Guidelines specifically addressing infection control issues in LTCFs are often missing. This is true for Norway and is true in many other countries. Additionally, implementation of continuous and targeted surveillance may be needed to complement the national prevalence surveys. Finally, we would like

to assess the relationship between the level of infection control and prevalence of HAIs in LTCFs. With aging populations and the increasing role played by LTCFs in healthcare, it has become essential to address infection control in these facilities. Although further efforts are needed, our study suggests that this is already happening in Norway.

Table 1. Comparison of the existence, knowledge and content of the infection control program in long-term care facilities in Akershus County in 2001 (50 questionnaires) and 2005 (56 questionnaires)

Topic	Yes/Total (%)		RR* (95% CI)
	2001	2005	
Regulatory issues			
Infection control program	24/50 (48%)	45/56 (80%)	1.6 (1.2-2.3)
Knowledge about the Akershus County infection control program	24/49 (49%)	39/55 (72%)	1.5 (1.1-2.1)
Guidelines			
Written guidelines for hand hygiene	38/49 (78 %)	56/56 (100%)	1.3 (1.1-1.5)
Written guidelines for isolation containment	27/49 (55 %)	51/55 (93%)	1.7 (1.3-2.2)
Need for isolating residents monthly or more often	2/42 (5 %)	6/43 (12%)	2.7 (1.0-12.7)
Written guidelines for care of infected wounds	32/49 (65 %)	55/56 (98%)	1.5 (1.2-1.9)
Written guidelines for clean surgical site wounds	20/49 (41 %)	52/56 (93%)	2.3 (1.6-3.2)
Policy on dress code (uniform)	31/49 (63 %)	55/1 (98%)	1.6 (1.3-1.9)
Waste management	37/49 (76 %)	56 (100%)	1.3 (1.1-1.6)
Environmental cleaning	34/50 (68 %)	52/55 (95%)	1.4 (1.1-1.7)
Written guidelines for urinary catheter care	20/49 (41 %)	45/53 (85%)	2.5 (1.7-3.4)
Occupational health			
Guidelines for employees sharp injuries	24/49 (49 %)	48/56 (86%)	1.8 (1.3-2.4)
Reporting system when sharp injuries happen	16/50 (32 %)	45/55 (82%)	2.6 (1.7-3.9)
Training			
Systematic training in basic infection control	24/49 (49 %)	34/49 (69%)	1.4 (1.0-2.0)

*RR= relative risk, 95% CI=confidence interval

Table 2. Comparison of the existence, knowledge and content of the infection control program in long-term care facilities in Akershus County in 2005 (56 questionnaires)

Topic	Yes (%)
Regulatory issues	
Knowledge about legal regulations of infection control in long-term care	53 (95%)
Knowledge about national guidelines in infection control	42 (81%)
Plan for revision of the infection control program	21 (39%)
Surveillance	
Participation in the national healthcare-associated infection prevalence surveys	36 (65%)
Other forms of healthcare-associated infection surveillance	19 (36%)
MRSA	
Knowledge of MRSA national guidelines	39 (70%)
Local guidelines for handling MRSA-positive residents	32 (59%)
Previous cases of MRSA-positive residents	7 (13%)
Guidelines for screening employees for MRSA	19 (37%)
Guidelines	
Peripheral venous catheter care	40 (71%)
Central venous catheter care	29 (54%)
Handling of respiratory equipment	48 (87%)
Outbreak situations	39 (71%)
Antibiotics	18 (34%)
Collaboration with microbiology laboratory	
Alert system for resistant organisms from microbiologic laboratory ^a	25 (46%)
Isolation containment	
Knowledge of national guidelines on isolation containment	18 (33%)
Local guidelines for isolating residents	51 (93%)
Availability of rooms for contact isolation	1 (2%)
Immunization of residents	
Influenzae vaccine	55 (98%)
Pneumococcal vaccine	31 (58%)
Occupational health	
Sharp injuries	48 (86%)
Vaccination program for employees	17 (32%)
Hepatitis B vaccine	5 (14%)
Influenzae vaccine	27 (59%)
Overview of employees' vaccination coverage by management	17 (33%)

^a16 (29%) did not know if there was such an alert system.

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Fylkeslegen i Akershus

Registreringsskjema for sykehjem og lignende institusjoner i Akershus fylke

Vennligst sett ring rundt aktuelle svaralternativer

Institusjonens navn: _____ Kommune: _____

Antall beboere/pasienter: _____

1. I henhold til forskrift om smittevern i helseinstitusjoner – sykehusinfeksjoner av 5. juli 1996, skal også sykehjem ha et infeksjonskontrollprogram.

Har institusjonene et slikt program? Ja__ Nei__

2. Kjenner du til ”Infeksjonskontrollprogram ved kommunale helseinstitusjoner” utgitt av Fylkeslegen i Akershus?

Ja__ Nei__

3. Registreres det sykehusinfeksjoner ved din institusjon:

- a) en gang i året
- b) oftere enn en gang i året
- c) har aldri registrert sykehusinfeksjoner

Kommentarer: _____

4. Dersom din institusjon skulle starte med å registrere infeksjoner, hvilke mener du er de mest aktuelle infeksjoner å registrere?

5. Har din institusjon skriftlige retningslinjer/prosedyrer for:

- a) Håndhygiene
- b) Forebygging av urinveisinfeksjoner
- c) Forebygging av trykk sår
- d) Stell av operasjonssår
- e) Stell av infiserte sår
- f) Stell av smitteisolert pasient
- g) Bruk av arbeidstøy
- h) Håndtering av smitteavfall
- i) Håndtering av stikkende/skjærende avfall
- j) Renhold
- k) Håndtering av smittetøy i
 - avdelingen
 - vaskeriet

6. Hvilke er de vanligste årsakene til at beboere/pasientene smitteisolereres ved din institusjon?

7. Hvor ofte har din institusjon en smitteisolert pasient?

- a) en gang i måneden
- b) en gang i halvåret
- c) en gang i året
- d) aldri

8. Hvilke kjemiske desinfeksjonsmidler er i bruk ved din institusjon?

- a) Virkon
- b) Kloramin
- c) Kloracid
- d) 70% desinfeksjonssprit
- e) Andre _____

9. Har din institusjon en dekontaminator? Ja__ Nei__

10. Finnes det ved din institusjon skriftlige retningslinjer for hvordan personalet skal forholde seg ved blodsmitte/stikkskade? Ja__ Nei__

11. Finnes det eget skjema for melding og registrering av blodsmitteuhell? Ja__ Nei__

12. Hvor skal personalet henvende seg for å få tatt evt. blodprøve og få immunglobulin/vaksine/behandling?

13. Hvor henvender sykehjemmet seg ved infeksjonsutbrudd/spesielle infeksjonstilstander?

- a) Kommunelegen
- b) Fylkeslegen
- c) Folkehelse
- d) Sykehuset
- Infeksjonsmedisiner
- Mikrobiolog
- Smittevernoverlege/hygienesykepleier

14. Foregår det systematisk opplæring i hygiene/infeksjonsforebyggende arbeid ved din institusjon? Ja__ Nei__

Utfylt skjema sendes til Fylkeslegen i Akershus innen 21. juni 2001

Registrerings nummer: _____

Registreringsskjema for sykehjem/bo- og behandlingstilstander i Akershus fylke

Fylles ut av institusjonssjef

Institusjonens navn:.....

Kommune:.....

1. Antall beboere (heldøgns plasser):.....

2. Antall avdelinger (poster/seksjoner):.....

3. Har alle beboere enerom? Ja Nei

4. Hvor mange flersengsrom finnes?

5. Antall stillingshjemler for pleiepersonalet:

	Besatt	Ubesatte stillinger
Lege		
Sykepleiere		
Hjelpepleiere		
Ufaglærte		

Lovverk

Er du som leder kjent med med det lovverk som regulerer smittevern?

6. "Lov om vern mot smittsomme sykdommer", 1995 Ja Nei

7. "Forskrift om smittevern i helseinstitusjoner – sykehusinfeksjoner", 1996 Ja Nei

8. Veileder til forskriften Ja Nei

9. Smittevernplan Helse Øst Ja Nei

Infeksjonskontrollprogram

I henhold til "Forskrift om smittevern i helseinstitusjoner – sykehusinfeksjoner", § 2-1, skal alle helseinstitusjoner ha et infeksjonskontrollprogram (et skriftlig system for infeksjonsforebyggende og infeksjonsovervåkende tiltak).

10. Har institusjonen du er leder for et infeksjonskontrollprogram? Ja Nei

11. I tilfelle "Ja", når ble infeksjonskontrollprogrammet ferdigstilt (årstall)? _____

12. Finnes det en plan for revisjon av infeksjonskontrollprogrammet? Ja Nei

13. I 1999 etablerte daværende Fylkeslegen i Akershus en mal for et infeksjonskontrollprogram ved kommunale helseinstitusjoner". Kjenner du til dette? Ja Nei

Infeksjonsforebyggende tiltak

Et infeksjonskontrollprogram skal inneholde en infeksjonsforebyggende del som beskriver prosedyrer institusjonen har for å forebygge at beboere/klienter får en institusjonsservervet infeksjon.

14. Har tilsynslege vært med i arbeidet med å utarbeide infeksjonsforebyggende tiltak? Ja Nei

Har institusjonen skriftlige retningslinjer for følgende:

Håndhygiene

15. Hånddesinfeksjon Ja Nei
16. Håndvask Ja Nei
17. Kan institusjonen levere forbrukstall på hånddesinfeksjonsmidler i bruk? Ja Nei

Bruk av blærekateter

18. Innleggelse av permanent kateter Ja Nei
19. Bruk av intermitterende kateterisering (RIK) Ja Nei

Sårstell

20. Stell av infiserte sår Ja Nei
21. Stell av rene sår (operasjonssår) Ja Nei

Infeksjoner i blodbanen

22. Innleggelse av perifer venekanyle Ja Nei
23. Stell av sentralt venekateter Ja Nei
24. Andre typer katetere (spesifiser) _____ Ja Nei

Lungebetennelse

25. Håndtering av utstyr til oksygenbehandling Ja Nei
26. Stell av tracheostomi Ja Nei

Tilbys beboere vaksine mot:

27. Influensa Ja Nei
28. Pneumoni Ja Nei

Isolering/smitte

29. Finnes det retningslinjer for hvordan ansatte skal forholde seg dersom en beboer/klient må isoleres? Ja Nei
30. Kjenner du som leder til "Isoleringsveilederen" utgitt av Nasjonalt Folkehelseinstitutt 2004? Ja Nei
31. Har institusjonene en plan for utbrudd med f.eks gastroenteritt? Ja Nei

32. Har institusjonen et eget rom (isolat) med forgang og dekontaminator i nær tilknytning til rommet? Ja Nei

Dersom en beboer/klient har følgende tilstand, blir han/hun isolert?

33. Staph.aureus (gule stafylokokker) i et sår Ja Nei

34. Diaré Ja Nei

Hvor ofte har institusjonen pasient som må isoleres?

35. Månedlig _____

36. Hvert halvår _____

37. Årlig _____

38. Aldri _____

Multiresistente bakterier (MRSA)

39. Kjenner du som leder til ”MRSA veilederen”, utgitt av Nasjonalt Folkehelseinstitutt i 2003? Ja Nei

40. Har institusjonene retningslinjer for hvordan beboere/klienter med påvist MRSA skal ivaretas? Ja Nei

41. Har institusjonen hatt beboere med påvist MRSA? Ja Nei

42. Finnes det retningslinjer for screening av ansatte for MRSA? Ja Nei

Har institusjonene retningslinjer for spesielle tilstander som:

43. Tuberkulose Ja Nei

44. HIV Ja Nei

45. Annet (spesifiser) _____ Ja Nei

Renhold/desinfeksjon

46. Bruk av arbeidstøy? Ja Nei

47. Benyttes institusjonstøy til de ansatte? Ja Nei

48. Håndtering av smitteavfall? Ja Nei

49. Håndtering av stikkende/skjærende avfall? Ja Nei

50. En plan for generelt renhold? Ja Nei

51. Spesielt renhold/desinfeksjon ved smitte? Ja Nei

52. Antall dekontaminatorer på institusjonen? _____

Hvilket kjemisk desinfeksjonsmiddel anvendes?

53. Virkon Ja Nei Vet ikke

54. Perasafe Ja Nei Vet ikke

55. Desinfeksjonssprit 70% Ja Nei Vet ikke

56. Annet Ja Nei Vet ikke

Infeksjonsovervåkende tiltak (registrering av institusjoneervertet infeksjons)

57. Deltar institusjonene i de nasjonale prevalensregistreringer som arrangeres av Nasjonalt folkehelseinstitutt to ganger årlig? Ja Nei

Hvem er ansvarlig for gjennomføring av infeksjonsregistrering?

58. Lege _____

59. Sykepleier _____

60. Annet personell _____

61. Foreligger andre former for infeksjonsregistrering utover prevalensregistreringer? Ja Nei

I tilfelle ja, hvilke infeksjoner registreres:

62. Urinveisinfeksjoner Ja Nei
63. Sårinfeksjoner Ja Nei
64. Pneumonier Ja Nei
65. Diarétilstander Ja Nei
66. Andre tilstander? _____

Antibiotika

67. Finnes egne retningslinjer for antibiotika dosering/administrering ved institusjonen? Ja Nei

Hvem mottar svar fra mikrobiologisk avdeling på prøver tatt av beboere/klienter?

68. Tilsynslege Ja Nei
69. Institusjonsleder Ja Nei
70. Avdelingssykepleier Ja Nei

71. Er det etablert et slags varslingsystem fra mikrobiologisk laboratorier hvor institusjonen mottar telefonisk beskjed ved påvisning av definerte mikroorganismer så som MRSA? Ja Nei Vet ikke

Ansatte og infeksjoner

72. Finnes det retningslinjer for hvordan ansatte skal forholde seg ved stikkskader/blodsmitteuhell? Ja Nei

73. Har institusjonen eget meldeskjema som skal fylles ut når stikkskader opptrer? Ja Nei

Hvor kan personalet henvende seg for å få tatt blodprøver ved stikkskader, og evt. få immunglobulin/vaksine/antiviral behandling?

74. Sykehuset _____
75. Bedriftshelsetjeneste _____
76. Egen lege _____
77. Institusjonens lege _____

78. Har institusjonen et vaksinasjonsprogram for ansatte? Ja Nei

I følge vaksinasjonsprogrammet, tilbys de ansatte vaksine som:

79. Hepatitt B Ja Nei
80. Influensa Ja Nei
81. Har du som leder oversikt over hvor mange av de ansatte som har blitt vaksinert i 2004? Ja Nei

Opplæring av ansatte i infeksjonsforebyggende tiltak

82. Har institusjonen et opplegg for opplæring av ansatte i infeksjonsforebyggende tiltak som gjelder for institusjonen? Ja Nei
83. Inngår opplæringen som en del av opplæring av nyansatte? Ja Nei

84. Hvor nødvendig anser du som leder det er å ha et infeksjonskontrollprogram?
(sett ring rundt)

1____ 2____ 3____ 4____ 5____ 6____ 7____
Ikke nødvendig Svært nødvendig

Navn/Tittel

Dato: _____

Tusen takk for at du tok deg tid til å besvare dette spørreskjemaet!

