Surveillance programmes for terrestrial and aquatic animals in Norway
Norwegian Veterinary Institute

Annual Report · 2014

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ISSN 1894-5678

Title:
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Date: 2014-10-30

Front page photo: Colourbox

Example of citation:
Urdahl AM, Bergsjø B, Hofshagen M, Nordström M, Lium B. The surveillance programme for methicillinresistant *Staphylococcus aureus* in pigs in Norway in 2014. *Surveillance programmes for terrestrial and aquatic animals in Norway. Annual report 2014.* Oslo: Norwegian Veterinary Institute 2014.

The surveillance programme for methicillin resistant *Staphylococcus aureus* in pigs in Norway 2014

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Introduction

MRSA (Methicillin Resistant *Staphylococcus aureus*) are special variants of *Staphylococcus aureus* that are resistant to antibiotics. There are several varieties of MRSA, and some of these are carried by animals, especially pigs, and are called LA-MRSA (Livestock Associated - animal associated - MRSA). LA-MRSA has within a few years become common in the global swine population.

All MRSA variants can be transmitted between humans and animals. The bacteria rarely produces disease in animals and healthy humans, but it is important to prevent the spread to health institutions such as hospitals and nursing homes where the bacteria can cause serious infections that are difficult to treat.

Results from monitoring in 2008, 2011 and 2012 (NORM-VET) indicated very low prevalence of MRSA-positive pig herds in the country. LA-MRSA was detected for the first time in the 2011 monitoring in specimens from pigs sampled at one of the investigated slaughterhouses. In the 2012 monitoring, an anonymous study, LA-MRSA was detected in samples from only one farm. In 2013, two separate outbreaks of infection with LA-MRSA in Norwegian pig herds were discovered, one in the south-eastern part of the country and one in the south-western part in the county Rogaland. The Norwegian Food Safety Authorities decided to try to combat the bacteria in infected herds by slaughter of animals, thorough cleaning and disinfection of rooms in concern and restart with MRSA-free pigs. This is a very expensive and resource intensive process both for the farmers and the authorities. To the author's knowledge such strategy has not been conducted in any other countries, and although the results from the first eradications look very promising, it is still too early to conclude that this strategy is a success.

As a basis for the decision of future strategy for combating LA-MRSA in Norwegian pig herds, it was important to obtain knowledge about the true prevalence in swine herds, and compare it with the experience from the LA-MRSA eradications in herds involved in the outbreaks in 2013-14. Therefore, a survey of LA-MRSA in sow herds was performed in the spring 2014.

Aim

The objective is to provide a basis for sound administrative decisions by identifying the prevalence of methicillin resistant Staphylococcus aureus (MRSA) in Norwegian pig herds.

Materials and methods

In 2014, all Norwegian pig herds with more than 10 sows were sampled by the authorities.
Pigs were sampled by using sterile SodiBox cloths moistened with sterile water. A point on the cloth was rubbed firmly against the skin behind both ears of the pig (about 5x5 cm on each side). Each cloth was used for 20 pigs, and a total of three cloths, representing 60 pigs distributed on all rooms and all age groups except suckling piglets, were taken per herd. The three cloths were analyzed as one pooled sample. In addition, in each herd two cloths were used for environmental samples taken in all rooms with pigs. Each cloth was used on about 15 touch points (about 10x10 cm per location) representing furnishings, feeders, water nipples, window sills, door handles, tools, boots, ventilation system etc. These two cloths were analyzed as one pooled sample.

The samples were submitted to the Norwegian Veterinary Institute's laboratory in Oslo and analysed for MRSA by a method described by the EU reference laboratory on antimicrobial resistance (DTU Food, National Food Institute, Copenhagen, Denmark): Pre enrichment in 300 mL Mueller Hinton broth with 6.5% NaCl at 37°C for 16-20 h. Then 1 mL was transferred into 9 mL tryptone soya broth with cefoxitin (3.5 mg/L) and aztreonam (75 mg/L). After incubation at 37°C for 16-20 h, 10 µL were inoculated on Brilliance™ MRSA Agar (Oxoid) and incubated at 37 °C for 24-48 h. Suspect colonies were isolated on 5% blood agar and submitted to the Norwegian human reference laboratory for MRSA at St. Olavs Hospital in Trondheim for verification and typing. 95% confidence interval (CI) was calculated based on a binomial distribution.

Results and discussion

A total of 986 herds were included in the survey. Nine herds that should have been sampled were, however, sampled within the ongoing outbreak within the same time period, and these were not sampled again. None of these had LA-MRSA positive pigs at the time of reporting.

LA-MRSA was identified in only one herd; situated in the county Oppland (0.1%; 95% CI: 0.003-0.6). Both the animal and the environmental samples were positive. The isolates were typed as CC398, t11.

Table 1. Number of herds sampled and positive herds by county in February – July 2014.

County	Number of sampled herds	Number of positive herds
Østfold	74	0
Akershus	37	0
Hedmark	105	0
Oppland	74	1
Buskerud	23	0
Vestfold	62	0
Telemark	15	0
Aust-Agder	8	0
Vest-Agder	11	0
Rogaland	238	0
Hordaland	20	0
Sogn og Fjordane	29	0
Møre og Romsdal	31	0
Sør-Trøndelag	31	0
Nord-Trøndelag	165	0
Nordland	51	0
Troms	11	0
Finnmark	1	0
Total	**986**	**1**

References

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The Norwegian Veterinary Institute (NVI) is a nationwide research institute in the fields of animal health, fish health, and food safety. The primary mission of the NVI is to give research-based independent advisory support to ministries and governing authorities. Preparedness, diagnostics, surveillance, reference functions, risk assessments, and advisory and educational functions are the most important areas of operation.

The Norwegian Veterinary Institute has its main laboratory in Oslo, with regional laboratories in Sandnes, Bergen, Trondheim, Harstad og Tromsø, with about 360 employees in total.

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The Norwegian Food Safety Authority (NFSA) is a governmental body whose aim is to ensure through regulations and controls that food and drinking water are as safe and healthy as possible for consumers and to promote plant, fish and animal health and ethical farming of fish and animals. We encourage environmentally friendly production and we also regulate and control cosmetics, veterinary medicines and animal health personnel. The NFSA drafts and provides information on legislation, performs risk-based inspections, monitors food safety, plant, fish and animal health, draws up contingency plans and provides updates on developments in our field of competence.

The NFSA comprises three administrative levels, and has some 1300 employees.

The NFSA advises and reports to the Ministry of Agriculture and Food, the Ministry of Fisheries and Coastal Affaires and the Ministry of Health and Care Services.

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