Methicillin-Resistant
Staphylococcus aureus in Poultry

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Methicillin-resistant Staphylococcus aureus (MRSA) has been detected in several species and animal-derived products. To determine whether MRSA is present in poultry, we sampled 50 laying hens and 75 broiler chickens. MRSA was found in some broiler chickens but no laying hens. In all samples, spa type t1456 was found.

Staphylococcus aureus is a well-known pathogen of humans and animals. Methicillin resistance in this bacterial species represents a threat to human health. Originally, methicillin-resistant S. aureus (MRSA) was a nosocomial pathogen, but in the 1990s, MRSA spread into communities worldwide.

Recently, pigs were shown to be a major reservoir for MRSA multilocus sequence type 398 (ST398). Because this sequence type has also been isolated from other animal species, it is referred to as livestock-associated MRSA (LARS). This finding indicates that MRSA is absent or present only in low numbers in laying hens, possibly because of the limited use of antimicrobial drugs in these animals. Use of certain antimicrobial drugs in human hospitals has been shown to be a risk factor for acquiring MRSA infection, especially when the chosen treatment is inappropriate or insufficient (11). Antimicrobial-drug use may also be a risk factor for MRSA colonization of animals. The antimicrobial drugs used in the flocks included in this study were tylosin, amoxicillin, trimethoprim-sulfamethoxazole, lincomycin, tetracycline, and colistin.

MRSA was isolated from 8 broiler chickens from 2 of the 14 farms sampled. Low prevalence in poultry has also been found by Kitai et al. (6) and Lee (5), although they sampled chicken carcasses from slaughterhouses and did not find any livestock-associated strains. Given our relatively small sample size, our data did not permit us to estimate the within- and between-flock prevalence.

In the MRSA-positive flocks, the number of positive samples varied between 1/5 (20%) and 5/5 (100%). From the 1 MRSA-positive farm that was sampled twice, MRSA was isolated on both occasions. This finding indicates that MRSA may persist on a farm and colonize future flocks. MRSA was found in nearly equal numbers from the nares samples and the cloaca samples. Of the 8 MRSA-positive animals (16 samples), MRSA was found in all samples except for 1 cloacal swab, for a total of 15 MRSA isolations.

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Susceptibility testing showed that all 15 isolated strains were resistant to erythromycin, kanamycin, tobramycin, lincomycin, tyllosin, tetracycline, and trimethoprim. All strains were susceptible to chloramphenicol, ciprofloxacin, linezolid, mupirocin, quinopristin-dalfopristin, rifampin, and sulfonamides.

Molecular typing showed that the strains all belonged to spa type t1456 of the livestock-associated ST398, which is typically not typeable by pulsed-field gel electrophoresis. To our knowledge, this spa type has not been found in other animal species (11, 12). Its relatedness to other spa types isolated from pigs is shown in the Table. A shortage of variable number tandem repeat composition seems to be present in spa type t1456. Whether t1456 is a clone typically associated with poultry, or specifically broiler chickens, and whether it is spreading internationally needs further investigation.

### Conclusions

We confirmed the presence of MRSA in broiler chickens, but we were unable to find it in laying hens. All isolates belonged to 1 spa type, t1456, and thus differed from the other strains belonging to ST398 isolated from other animal species in Belgium and abroad. Whether this spa type is typically associated with poultry still needs to be confirmed. More detailed data are also needed to gain further insight in the true within- and between-flock prevalence of MRSA in poultry and its evolution over time.

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