Available online at www.sciencedirect.com
SCIENCE DIRECT®
Preventive Veterinary Medicine 74 (2006) 251–263
PREVENTIVE VETERINARY MEDICINE
www.elsevier.com/locate/prevetmed

Quantification and evaluation of antimicrobial drug use in group treatments for fattening pigs in Belgium

Tom Timmerman *, Jeroen Dewulf, Boudewijn Catry, Bianca Feyen, Geert Opsomer, Aart de Kruif, Dominiek Maes

Department of Reproduction, Obstetrics and Herd Health, Veterinary Epidemiology Unit, Faculty of Veterinary Medicine, Ghent University, Salisburylaan 133, B-9820 Merelbeke, Belgium

Received 3 December 2004; received in revised form 25 September 2005; accepted 4 October 2005

Abstract

To control the emergence of antimicrobial resistance, knowledge of antimicrobial drug consumption is essential. Because consumption data are not available in Belgium, a study was conducted between March and October 2003 to investigate the antimicrobial drug consumption in pigs, using the treatment incidence based on the animal daily dose pig (ADDpig), the treatment incidence based on the used daily dose pig (UDDpig) (number of ADDpig or UDDpig/1000 pigs at risk/day), and the ratio UDDpig/ADDpig.

The sampling frame consisted of 821 pig herds that (a) used a closed or semi-closed production system, (b) were located in the most dense pig areas of Belgium, and (c) had at least 150 sows and 600 fattening pigs each. Of 50 randomly selected herds, all group treatments with antimicrobial drugs, applied to fattening pigs that were within 2 weeks of slaughter (median age 187 days), were collected retrospectively.

The treatment incidence based on ADDpig for all oral and injectable antimicrobial drugs was 178.1 per 1000 pigs at risk per day. The treatment incidence based on UDDpig shows that in reality fewer pigs were treated, namely 170.3 per 1000 pigs at risk per day. Proportionally, the most often applied oral antimicrobial drugs were: doxycycline, amoxicillin, combination trimethoprim-sulphonamides and polymyxin E. The most often applied injectable antimicrobial drugs were long-acting amoxicillin and ceftiofur. The distribution of the UDDpig/ADDpig ratio per antimicrobial drug

* Corresponding author. Tel.: +32 9 264 75 40; fax: +32 9 264 77 97.
E-mail address: Tom.Timmerman@UGent.be (T. Timmerman).

0167-5877/$ – see front matter
doi:10.1016/j.prevetmed.2005.10.003

shows that 50–75% of the oral formulations were underdosed. Injectable formulations were almost always overdosed (>90%).

Keywords: Antimicrobial drug consumption; Swine; UDD; ADD; Group treatment

1. Introduction

The intensification of pig production has caused the need for strict sanitary health measures, but the use of antimicrobial drugs remains inevitable (Mateu and Martin, 2001; Mevius et al., 1999; Schwarz et al., 2001). The use of antimicrobial drugs in food-producing animals is considered to contribute to the emergence of antimicrobial resistance both in veterinary and human medicine (Aarestrup, 1999; Gyssens, 2001). Contamination of carcasses during slaughter can be a source of resistant bacteria to humans (Catry et al., 2003; McKellar, 1998; Schwarz et al., 2001). Because pork is the most consumed meat in Europe (45.9% of the total meat consumption) (EUROSTAT, 2003), possible transfer of resistant bacteria via pig meat is almost inevitable. Therefore, control of antimicrobial resistance in pigs should be a priority. A prerequisite for controlling antimicrobial resistance is a thorough knowledge of the antimicrobial drug consumption (Gyssens, 2001; Mevius et al., 1999; Nicholls et al., 2001). Detailed antimicrobial consumption data can be used to detect inappropriate usage, to identify underlying risk factors for the emergence of antimicrobial resistance, and to quantify the exerted selection pressure (Caprioli et al., 2000; Catry et al., 2003; Gyssens, 2001; Nicholls et al., 2001) from birth till slaughter age.

We modified existing antimicrobial drug use parameters from human medicine to quantify the antimicrobial drug consumption in group treatments for fattening pigs (pigs raised for human consumption) that were within 2 weeks of slaughter. Additionally, we evaluated the appropriateness of dosing.

2. Materials and methods

2.1. Study sample and data collection

Herds were obtained from the Belgian farm-animal identification and registration database (SANITEL, 2003). The sampling frame consisted of 821 herds that used a closed or semi-closed production system (purchase of breeding animals only). All herds were located in the most dense pig areas of Belgium (West- and East-Flanders, with 1030.8 and 399.0 pigs per km^2, respectively (SANITEL, 2003)), and had at least 150 sows and 600 fattening pigs each.

We assigned a computer-generated random number (Excel®, Microsoft Inc.) to all 821 herds and sorted the herds from low to high random number. Eighty-four herds were contacted by telephone, starting with the herd assigned to random number 1, to obtain 50 cooperative herds (response of 60%). Taking into account an expected treatment incidence