(p=0.13), an adequate rodent eradication program (p=0.01) and the with-holding of feed for maximum 18 hours before transport to the slaughterhouse (p=0.13).

Discussion: The application of a herd-specific HACCP-plan on pig herds can be a useful tool to guarantee product quality and safety and can be part of an Integrated Quality Control System (Noordhuizen and Frankena, 1999). In the present study, possible risk indicators for several diseases were investigated. This risk analysis can be the basis for the determination of the critical control points. It is important for the farmer to obtain feed-back from the slaughterhouse to be informed about the disease status of his animals. Several diseases, like *Salmonella*, occur subclinically in pigs, but can cause human disease. Other infectious agents, like *Mycoplasma*, *Actinobacillus pleuropneumoniae*, *Ascaris suum*, or *Sarcoptes scabiei*, do not manifest clinical symptoms or visual lesions, but can be the cause of a reduced feed consumption and subsequently retarded growth. The risk factors were the result of a univariate analysis with significance at the 0.2 level. This means that the results should be interpreted with caution and no definitive conclusions can be drawn. Another limiting factor in the study is the low number of herds, due to by practical and budget considerations.
The strict use of a HACCP-system on pig herds however is a utopia. It is impossible to control all risk factors, since the product is a living animal which is subject to a lot of variable factors. However, a HACCP-based system can be useful to reduce the hazards associated with the consumption of meat.

Conclusions: Pig farmers can apply a HACCP-based quality system to ensure the delivery of healthy and safe pigs to the slaughterhouse. It is possible to define risk indicators and consequently control points by feedback of slaughterhouse data.

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PE 09 USDA Multi-Agency Project: Collaboration in Animal Health, Food Safety & Epidemiology (CAHFSE)

Kraeling, R.R.[1], Bush, E.J.[2], Wineland, N.E.[2], Anandaraman, N.[3], Ladely, S.[1], Fedorka-Cray, P.J.[1]

Richard Russell Research Center, ARS, USDA, Athens, GA 30604[1], Center for Animal Health Monitoring, APHIS-VS, USDA, Fort Collins, CO 80526[2], Office of Public Health and Science, FSIS, USDA, Washington, D.C. 20250[3]

Summary: Despite producer interventions, on-going research and continued surveillance, food borne outbreaks continue and multiple antimicrobial resistant bacteria have emerged. A multi-agency APublic Health Action Plan to Combat Antimicrobial Resistance@ was developed to address these concerns and one USDA response was the development of the Collaboration in Animal Health, Food Safety and Epidemiology (CAHFSE), a partnership among the Agriculture Research Service (ARS), Animal and Plant Health Inspection Service (APHIS), and Food Safety Inspection Service (FSIS. The objective of CAHFSE is to implement and expand a surveillance system patterned after the APHIS National Animal Health Monitoring System (NAHMS) which focuses on animal health and food safety. Swine is the first commodity in CAHFSE. To date, fecal samples from 8 farms have been collected and processed for culture of *Salmonella, Campylobacter, Enterococci* and *E. coli.* Preliminary results indicate that all four bacteria have been recovered from a number of operations and are currently being characterized.

Keywords: Swine, Pork, USDA, Food safety

Introduction: Food animals are an important source of bacteria causing illness in humans. *Campylobacter* and non-typhoidal *Salmonella* spp. account for 2.4 and 1.4 million cases, respectively, of acute bacterial gastroenteritis in humans annually in the United States (Mead et al. 1999). Because of these outbreaks and emergence of antimicrobial resistance among food borne bacteria, the scientific community and public health officials have examined antimicrobial use in food animal production (Levy, 1992; FDA, 1998; WHO, 1997). Also, a multi-agency APublic Health Action Plan to Combat Antimicrobial ResistanceA was developed to address these concerns (CDC 2003). USDA responded by developing the Collaboration in Animal Health, Food Safety and Epidemiology (CAHFSE), a partnership among the Agricultural Research Service (ARS), Animal and Plant Health Inspection Service (APHIS), and Food Safety Inspection Service (FSIS). The objectives of CAHFSE are: 1) to enhance understanding of pathogens that pose a food-safety risk by tracking these pathogens on the farm and to the plant and 2) to routinely monitor critical diseases in food-animal production. Factors associated with the development of antimicrobial resistance will also be addressed. Swine is the first commodity in CAHFSE.

Materials and Methods: Twelve swine farms in each of four states (Iowa, Minnesota, North Carolina and Texas), were selected based on a quota sampling scheme approximated from distribution in the National Animal Health Monitoring System=s (NAHMS) Swine 2000 study. Participation is voluntary. Selection criteria included production types (indoor farrow-to-finish, outdoor farrow-to-finish, indoor finish only, and outdoor finish only) and swine density in respective counties within each state.

Samples are collected quarterly and during each site visit a questionnaire regarding animal inventory, animal health, and antimicrobial use is conducted. Blood is collected from 15 market pigs which are 6-8 wks, 11-13 wks, 16-18 wks, and > 22 wks old for *Lawsonia* intracellularis serological testing. In addition, 40 pen floor fecal samples are collected from pigs at least 22 wks old for culture, isolation, and characterization of *Salmonella, Campylobacter, Enterococci,* and *E. coli.* All *Salmonella, Enterococcus* and *E. coli* isolates are tested for susceptibility to antimicrobials using a semiautomated broth microdilution system (Sensititre™, Trek Diagnostics, Westlake, OH) and *Campylobacter* are tested using the E-Test (AB Biodisk, Piscataway, NJ). The antimicrobials used in evaluating the respective bacterial species are as described for the National Antimicrobial Resistance Monitoring System (NARMS). Selected isolates will be characterized by molecular techniques to determine relatedness.

Sample collection at slaughter (carcass swabs, lymph nodes, and ground product) will be implemented in 2004. Plant samples will be cultured and characterized similarly to on-farm isolates. Slaughter findings will be linked with on-farm and in-plant questionnaire and laboratory data to determine risk factors.

Results: To date, fecal samples from 8 farms have been collected and processed for culture of *Salmonella, Campylobacter, Enterococci* and *E. coli.* Preliminary results indicate that all four bacteria have been recovered from a number of operations and are currently being characterized.

Discussion: The NAHMS Swine 2000 study (APHIS 2002) indicated antimicrobials were fed to grower/finisher pigs on 88.5% of swine farms, which represent 95.9% of grower/finisher pigs in the USA. Thus, antimicrobial use and related issues are a major concern to the pork industry. Little information is available over time regarding production uses of antimicrobials on the development and persistence of antimicrobial resistance among enteric bacterial species. CAHFSE will provide on-farm and in-plant trends in prevalence, antimicrobial susceptibility, and genetic relatedness of enteric bacterial species. Isolate characterization trends will be correlated to management practices to help identify risk factors associated with antimicrobial resistant bacterial species in food animals and their products.

CAHFSE will also provide an epidemiological description of *Lawsonia* intracellularis associated ileitis in multiple age groups of weaned market pigs. Prevalence of *Lawsonia* intracellularis and resulting morbidity and mortality rates shall be correlated with management practices and operation facilities.

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PE 10 REPEATED OBSERVATIONS ON THE SALMONELLA CULTURE STATUS OF MIDWEST U.S. HERDS

Bahnson, P.B.[1] Omran L. M.,[2] Fedorka-Cray, P.J,[3] Ladely S.R.[3] and Troutt, H.F.[2]

[1] Dept. of Medical Sciences, School of Veterinary Medicine, University of Wisconsin-Madison, 2015 Linden Ave., Madison, Wisconsin, 53706, U.S.A. 608.265.1855, pbbahnson@wisc.edu
[2] Dept. of Veterinary Clinical Sciences, University of Illinois at Urbana-Champaign, Urbana, Illinois, U.S.A.
[3] Russell Research Unit, United States Dept. of Agriculture, Agricultural Research Service, Athens, Georgia, U.S.A.

Summary: Mesenteric lymph nodes were collected from pigs from 115 Midwest U.S. swine herds at slaughter on two occasions separated by 6-9 months. These herds were sampled up to three additional times during a three-year period, with 30 herds sampled five times. Thirty pigs were sampled at each collection. Herds were categorized positive if one or more samples revealed *Salmonella* spp. While culture status at collection one was associated with the second sampling collection ($p < 0.01$), the association was only moderate in strength (OR = 2.6). Herds with three consecutive positive tests (9 of 38) were all positive on sample four. Prevalence estimates were weakly or not correlated between samplings. In conclusion, *Salmonella* culture status of these swine herds was weakly predictive of future culture results. Accurate description of *Salmonella* status based on bacterial culture appears to require repeated or ongoing testing.

Keywords: swine, predictability, *Salmonella* shedding, slaughter

Introduction: *Salmonella* carriage among pigs at slaughter poses a potential public health threat, if hygiene practices at the time of slaughter may fail to prevent the transmission of the bacteria through the food chain. Although pigs have been shown to shed Salmonella on the farm and after transport and time in lairage (Hurd, et al.) the bacteria can be brought forward from the farm. Therefore, it may be useful to categorize herds by *Salmonella* status prior to shipment. For this to be most effective, the *Salmonella* status or prevalence should be predictable over time. However, little has