



## On-farm characteristics and biosecurity protocols for small-scale swine producers in eastern Australia



N. Schembri<sup>a,\*</sup>, M. Hernandez-Jover<sup>a,b</sup>, J.-A.L.M.L. Toribio<sup>a</sup>, P.K. Holyoake<sup>a,c</sup>

<sup>a</sup> The University of Sydney, Farm Animal and Veterinary Public Health, 425 Werombi Road, Camden, NSW 2570, Australia

<sup>b</sup> Graham Centre for Agricultural Innovation (NSW Department of Primary Industries and Charles Sturt University), School of Animal and Veterinary Sciences, Locked Bag 588, Wagga Wagga, NSW 2678, Australia

<sup>c</sup> Victorian Department of Primary Industries, Pig Health and Research Unit, Epsom, VIC 3551, Australia

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### ABSTRACT

Pigs are considered high risk for the introduction and spread of foot and mouth disease (FMD) in Australia. Facilities where animals from different origins are commingled, such as saleyards, pose a high risk for disease spread. Sound on-farm management practices and biosecurity protocols are the first line of defence against a potential on-farm disease outbreak. This study evaluated the practices of 104 producers (vendors who sold pigs and purchasers of live pigs for grow-out) who traded pigs at 6 peri-urban and rural saleyards in eastern Australia. Specifically, management and on-farm biosecurity practices were assessed using an in-depth questionnaire. Univariable and multivariable logistic regression analyses were used to investigate (1) producer associations: producer type, State, motivation to keep pigs, farm type, gender, years having owned pigs, and the acquisition of formal livestock qualifications; and (2) pig associations: herd size, housing, management (husbandry and feeding) practices and biosecurity (including pig movement) practices. Backyard operations (<20 sows) were undertaken by 60.6% of participants, followed by small-scale pig operations (28.8%; 21–100 sows). Few producers (16.3%) reported residing in close proximity (<5 km) to commercial operations; however, less rural producers had neighbouring hobby pig operations within 5 km of their property ( $P=0.033$ ). Motivation for keeping pigs was significantly associated with a number of biosecurity practices. Producers who kept pigs for primary income were more likely to provide footwear precautions ( $P=0.007$ ) and ask visitors about prior pig contacts ( $P=0.004$ ). Approximately 40% of backyard and small-scale producers reported not having any quarantine practices in place for incoming pigs, compared to only 9.1% among larger producers. The main reasons cited for not adopting on-farm biosecurity practices in this study included having no need on their property (43.1%) and a lack of information and support (by the industry and/or authorities; 18.5%). Up to three-quarters of all producers maintained an open breeding herd, regularly introducing new pigs to the main herd. Saleyards are an important source of income for backyard and small-scale producers as well as an important risk factor for the introduction and dissemination of endemic and emerging animal diseases. Differing management and biosecurity practices as well as the motivations of these producers keeping pigs in small numbers and trading pigs at saleyards need to be taken into account in the development of successful biosecurity extension programmes for this sector of the Australian pork industry.

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\* Corresponding author at: The University of Sydney, Faculty of Veterinary Science, Department of Farm Animal and Veterinary Public Health, 425 Werombi Road, Camden, NSW 2570, Australia. Tel.: +61 2 9351 1609.

E-mail address: [nicole.schembri@sydney.edu.au](mailto:nicole.schembri@sydney.edu.au) (N. Schembri).

## 1. Introduction

The high animal health status of Australia, being free of many OIE (World Organisation for Animal Health) listed animal diseases, contributes to the nation's comparative advantage in the agricultural sector and enhances the international marketability of Australian livestock and products.

Livestock industries and livestock officials recognise that the practices of small-scale producers pose threats to livestock biosecurity and the sustainability of our livestock industries. However, the nature of these threats has not been previously evaluated.

On a national scale and in terms of productivity, small-scale pig producers are a relative unimportant sector of the pork industry. However, from an emergency animal disease (EAD) introduction and spread perspective, small-scale producers are considered to be a high-risk sector among livestock officials and regulators.

Preliminary investigations suggest small-scale pig producers are likely to introduce and spread EADs. Key factors leading to this assumption include: (1) the trading of live pigs via saleyards (East et al., 2014); (2) a lack of isolation protocols for new stock and implementation of biosecurity strategies to minimise pathogen entry on their farms (Ribbens et al., 2008); (3) poor knowledge and recognition of EAD clinical signs (Sahlström et al., 2014); (4) little knowledge of swill feeding and understanding of the consequences of feeding swill (Schembri et al., 2006); and (5) exposure to wildlife and feral swine. Furthermore, it is believed the small-scale producing sector of the industry is neither well informed nor compliant with pig keeping policies and legislation (Cutler, 2005; Schembri et al., 2006).

A number of studies have highlighted the importance of biosecurity in pig farming, including producers' attitudes towards biosecurity in today's food-livestock production systems. These studies predominantly detail biosecurity practices undertaken on commercial operations or by highly organised producer groups (Amass and Clark, 1999; Pinto and Urcelay, 2003; Boklund et al., 2004; Casal et al., 2007; Lambert et al., 2012; Christensen et al., 2008; Ribbens et al., 2008; Norémark et al., 2010; Bottoms et al., 2013). Currently, little is known about the biosecurity practices undertaken by small-scale pig producers, particularly in an Australian context.

At the time of this study the Australian pig herd consisted of approximately 318,000 sows, producing over 5.3 million pigs for slaughter annually (Australian Pork Limited, 2006; Synapse Research Consulting, 2005). Since this study, pig numbers have trended downwards in Australia with the national herd consisting of approximately 237,000 sows with over 4.7 million pigs being slaughtered annually (Australian Pork Limited, 2013a).

Around 90% of Australia's pork production stem from highly concentrated large, commercial pig farms (NSW Parliament et al., 2006). The remaining 10% of pork is produced by 80% of the producers residing on small-scale and mixed farming operations (Australian Pork Limited, 2006,

2013a). The largest concentrations of pig operations are located in areas that have the smallest average numbers of sows (less than 100) per farm. These high pig farm density regions account for approximately 27% of total sow numbers and are located in major grain growing areas.

Prior to 2007 there were few official government records identifying the presence and location of backyard and small-scale producers and producers who traded via saleyards under cash transactions (Schembri et al., 2007). Identification of active pig producers relied upon State swine registration systems that were in many cases not up-to-date. At this time, there was no requirement by law for the proprietor of a saleyard to record the purchaser's personal details (name, address, telephone number) where a purchaser paid with cash and vendor details could be as simple as one's initials (Schembri et al., 2007).

Estimates suggest approximately 5% of pigs in Australia are sold live via auction at public saleyards (East et al., 2014). There are 15 major saleyards in Australia where pigs are traded on a weekly, biweekly or monthly basis (Cutler and Holyoake, 2007). It is believed most producers who sell pigs at saleyards rear them as a sideline to another enterprise or as a hobby. Larger specialist commercial pig producers use saleyards to sell cull sows and boars and lesser quality pork and bacon pigs that are outside their consignment contracts. Pigs traded at saleyards provide the commercial processing sector with a source of pigs to 'top-up' their needs without the requirement for commercial contracts. Saleyards also provide pigs for non-commercial growers and for a small sub-population of consumers who purchase them for personal consumption (Cutler and Holyoake, 2007).

There are a number of examples demonstrating the potential of livestock saleyards as a method of rapid spread of infectious animal diseases over large geographical areas (Bouma et al., 2003; Shirley and Rushton, 2005). Infected animals that are able to move through the saleyard to another farm (re-stockers) or back to the home-farm pose a much greater risk for disease spread than pigs sold for direct slaughter (Mansley et al., 2003). Infection may spread from infected to susceptible animals at the saleyard through direct contact, wind and/or fomites (clothing, vehicles; Sanson et al., 2004; Pharo, 2002; Kitching and Alexandersen, 2002; Mansley et al., 2003). Animals from different sources are often mixed in the same saleyard pen prior to sale, increasing the risk of disease transmission. In addition, multiple livestock species (such as pigs and cattle) may be sold in close proximity on the same day at some saleyards, facilitating the potential for cross-species disease transmission.

Currently, little is known about the biosecurity practices undertaken by small-scale pig producers, particularly in Australia. Studies indicate small-scale pig producers lack information on biosecurity, implement few strategies to minimise pathogen entry to their farms, have poor recognition of exotic disease and little knowledge of swill feeding regulations (Schembri et al., 2006; Ribbens et al., 2008).

This paper describes an in-depth interview study investigating producer husbandry and biosecurity practices of

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