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REPORT and INVOICE

Date: May 1st, 2022

Name of Project: Understanding motivations to biosecurity acceptance and practice among pig producers

Final report: *provide an overview of work accomplished and/or planned for the coming months. Please summarize your response in 2 pages or less.*

Below is a brief description of the fulfillment of both promised aims.

Specific Aim #1: Identify the conceptualizations of biosecurity risk (i.e mental models) of Pennsylvania pig producers and leading experts.

We created a survey to assess conceptualizations of biosecurity risk. At the close of the survey, we had 129 producers that responded to the survey in some fashion and 46 biosecurity experts that responded to the survey in some fashion. In the attached power points, more specific demographics of survey respondents can be found.

Mental models were analyzed and the results were presented at the American Society of Animal Science Annual Meeting in 2021 (see conference presentation powerpoint). Briefly, when defining Biosecurity, producers were more focused on preventing things from entering their herds/operations. This was noticed by Inward prevention and Limiting Outside Access being the most connected and most central concepts in their perceptions of biosecurity. Alternatively, when defining biosecurity, experts seemed to take a more holistic approach to the concept. The strongest concepts that showed up in connection were Inward prevention, Outward prevention, and Within prevention. This suggests experts were concerned about biosecurity coming into operations, moving within herds, and being transmitted out of herds. We believe this to be a significant gap between experts and producers. It is clear caution is taken not to bring vectors into operations, but producers may not be considering what they are taking off their property. Also, expert perceptions included herd health as a most connected and most central concept in their perception of biosecurity; leading us to believe there is both an animal management (i.e. nutrition) and human management (i.e. labor) connection in how experts approach understanding biosecurity that was not apparent in how producers approach biosecurity.

When defining strategies to combat biosecurity issues, producers elevated PPE as the most connected and central concept in their strategies, with SOP a close second. On the other hand, experts recognized SOP, workforce training, and line of separation as their most connected and central concepts.

Additionally, experts recognized more potential combinations of biosecurity strategies, almost 2x as many as producers.

Based on mental models of biosecurity, some recommendations include:

- More clearly tie diet, nutrition, and animal health to biosecurity
- Help producers recognize how they might take vectors off-farm
 - o As is, it seems producers see outsiders as a threat and do not recognize their contributions to problems or solutions.
- Help producers see more strategies
- Improve education on biosecurity that helps producers see the benefits of holistic approaches to biosecurity

While not tied to a specific aim, we assessed what producers view as characteristics of a Good Farmer/Producer. The original goal was to see if there was a link between these characteristics and the willingness to implement a formal biosecurity plan. The small sample size did not allow for the statistical interpretation of these data, but we did find several different identities appear within the PA swine producer population (See Figure 1). These identities can be used to tailor specific messaging to producers that fit their perceptions. For example, profit-motivated biosecurity messaging will work for traditional productivist-type producers, but is unlikely to motivate biosecurity practices in friendly-conservationist-type producers. Instead, community-tied messages would more likely motivate the friendly-conservationist-type producer.

When taken together, these results help us understand what matters most to producers and what communication gaps need to be bridged, along with what communication strategies to use.

Specific Aim #2: Redesign and testing of Secure Pork Supply Initiative Checklist.

We took our results from Specific Aim #1 and built an online risk assessment tool. This tool was tested at the 2021 Keystone Pork, Poultry, and Manure Expo. We had 36 respondents test the tool in person using computer tablets. The user experience and feedback helped us refine the tool and make it easier to navigate. We received positive feedback on the composite risk dashboard that is available after completing the tool (see Figures 2 and 3 below).

The tool provides an easy entry for any type of swine producer (e.g., show pigs, pastured pigs, 4Hers, and conventional pigs) to answer a few questions about their practices. In return, they learn their level of biosecurity risk. For any areas of high concern, feedback about how to mitigate risk is provided at the end of the survey. Below is a direct link to the risk assessment tool. This link can be embedded on the CPLE webpage to allow producers around the state to access it.

Online Self-administered Risk Assessment Tool:

https://dvuarc.qualtrics.com/jfe/form/SV_9oway7u5lcCR0cC?Q_CHL=qr

Figure Appendix:

Items	Components and Loadings				
	<i>friendly conservationist</i>	<i>civically-savvy</i>	<i>willing naturalist</i>	<i>productivist</i>	<i>appearance-minded</i>
Minimizes top soil loss	0.887	-0.002	-0.090	0.087	-0.088
Maintains soil organic matter	0.765	0.056	0.239	0.229	-0.003
Minimizes nutrient runoff	0.752	-0.135	0.175	0.005	0.061
Helps friends and neighbors	0.625	0.190	0.241	-0.128	0.464
Socio-ecological health of watershed	0.614	0.095	0.427	0.303	0.056
Minimizes soil disturbance (min tillage)	0.564	0.013	0.047	0.177	0.428
Profit & environment impact	0.501	0.317	0.134	0.407	-0.197
Considers stream health	0.445	-0.104	0.408	0.389	0.042
Cronbach's α: .843					
Most up-to-date equipment	-0.051	0.739	0.042	0.188	0.344
Active in producer organizations	0.078	0.718	-0.014	-0.055	0.342
Active in community	-0.115	0.701	0.036	0.009	0.196
Maximizes government payments	-0.038	0.661	-0.109	0.398	0.012
Shares equipment	0.196	0.601	0.169	-0.026	-0.031
Community leader	-0.254	0.533	0.222	0.233	-0.054
Protects watersheds through planning	0.361	0.511	0.228	0.277	0.095
Reduces income volatility	0.324	0.450	0.296	0.081	-0.197
Cronbach's α: .805					
Uses diverse forages	0.091	0.224	0.698	0.007	0.201
Minimizes pesticide & antibiotic use	0.381	0.107	0.668	0.169	0.019
Tries new practices & approaches	-0.175	0.041	0.660	0.168	0.147
Shares knowledge	0.280	0.309	0.580	-0.049	-0.247
Maintains wildlife habitat	0.393	0.330	0.568	-0.169	0.221
Walk-through before treating	0.311	-0.049	0.455	0.201	-0.042
Cronbach's α: .767					
Highest profit per pound	0.360	0.210	0.015	0.750	0.032
Highest gain to feed ratio	-0.027	0.167	0.198	0.706	0.138
Dams bred back quickest	0.254	0.265	-0.035	0.660	0.076
Cronbach's α: .751					
Property line clear of brush	0.004	0.056	0.218	0.085	0.757
Farm looks nice	0.050	0.253	0.064	-0.050	0.706
Latest feed & chemical technology	-0.067	0.277	-0.273	0.253	0.642
Facility clean	0.180	-0.083	0.452	0.080	0.501
Cronbach's α: .681					

Figure 1. Five Swine Producer Identities (friendly conservationist, civically savvy, willing naturalist, productivist, and appearance-minded)

You've completed the biosecurity risk self-assessment. Below you will find your personal risk. Only use the value provided, ignore the N/A values.

Scores between 1-2 are low risk.

Scores between 2-3.5 are a moderate risk.

Scores above 3.5 are high risk.

Risk Score: 2.9

Please compare your risk to others in the state [by following this link](#).

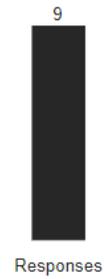
Based on your score these are our recommendations:

Pathogen spread from human movement can be mitigated. Best practice includes creating a clear line of separation. A line of separation divides the pig housing area from non-controlled farm areas. Lines of separation should be visually marked by painting doorframes and concrete or designating areas with colored duct tape as a reminder of hygiene practices needed to enter the pig area. Street clothes should not cross the line of separation. Only clean-side farm attire should be worn in spaces with pigs.

Figure 2. Sample of Risk Assessment Output

Biosecurity Risk Assessment Report

Average Risk for All Commercial Producers



Average Risk for All Show & 4H Producers

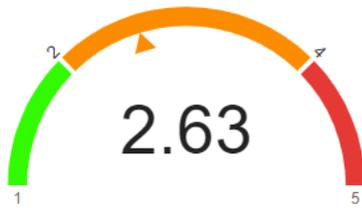


Figure 3. Sample of Linked Composite Dashboard Report

Please submit this form, copies of invoices and the mid-term report to Jennifer at jrharry@pennag.com