Does Occupational Exposure to Swine Increase the Risk of Influenza? A Systematic Literature Review
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Study Question
Our objective was to answer the question, "Does direct, occupational contact with live hogs increase influenza infections among swine industry workers?"

The Issue

Methods

- Conducted a systematic literature review using the methodologies of the Navigation Guide
- Literature search:
  - 1540 records identified through database search
  - 525 records left after duplicates removed

PECO Statement

Population: Swine workers
Exposure: Live swine
Comparator: Workers with minimal exposure to live swine
Outcome: Serological evidence of influenza infection

Results

Individual Study Findings

| *proportion of study group population who tested positive for influenza* |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Population       | Iowa, USA        | Iowa, USA        | China            | China            | Romania          | Mexico           | Germany          | China            |
|                   |                  |                  |                  |                  |                  |                  |                  |                  |
| Results (Odds Ratio with 95% Confidence Interval) | 34.9 (9.0 to 232.6) | 41.2 (1.0 to 167.9) | 4.1 (1.1 to 10.7) | 4 out of 27 (14.8%)* | 25.3 (1.4 to 536.3) | 1.8 (1.3 to 2.9) | 3.05 (1.65 to 5.64) | 18/118 (15.3%)* |

Part 1: Assessing the risk of bias for each study

Risk Bias Factors:

- **Study Group Selection**
- **Outcome Assessment Methods**
- **Exposure Assessment Methods**
- **Confounding**
- **Selective Outcome Reporting**
- **Financial Conflict of Interest**

Part 2: Rating the quality of evidence across all studies

- Rated overall quality of the body of evidence as high, moderate, or low
- Considered potential "upgrades" or "downgrades" to the quality rating based on:
  - risk of bias, indirectness, inconsistency, imprecision, large magnitude of effect, dose response, and whether confounding minimizes the effect
  - We rated the overall body of evidence as "moderate" quality

Part 3: Rating the strength of the evidence across all studies

- Overall strength of the evidence was based on:
  - quality of body of evidence, direction of effect, and the likelihood that a new study could change our conclusion
  - We found "sufficient" evidence for an association between occupational swine exposure and risk of influenza

Discussion

- Overall, we concluded that there was "sufficient" evidence that increasing occupational exposure to live swine increased influenza infection
- Understanding the risk factors for possible spillover and species jump of influenza is critical to preventing not only illnesses, but also the next potential pandemic

Next Steps

- Increase surveillance systems
- Reduce unprotected exposure to swine
- Use proper personal protective equipment
- Require influenza vaccine for swine workers
- Reduce knowledge gaps among swine workers & include them in the disease response

References

Papers included in the literature review:
1. Gray et al. 2007
2. Terebuh et al. 2010
3. Ma et al. 2015
4. Beaudoin et al. 2010
5. Fragaszy et al. 2016
7. Wu et al. 2015
10. Krumholz et al. 2010
12. Yin et al. 2014

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