

# Does Occupational Exposure to Swine Increase the Risk of Influenza? A Systematic Literature Review

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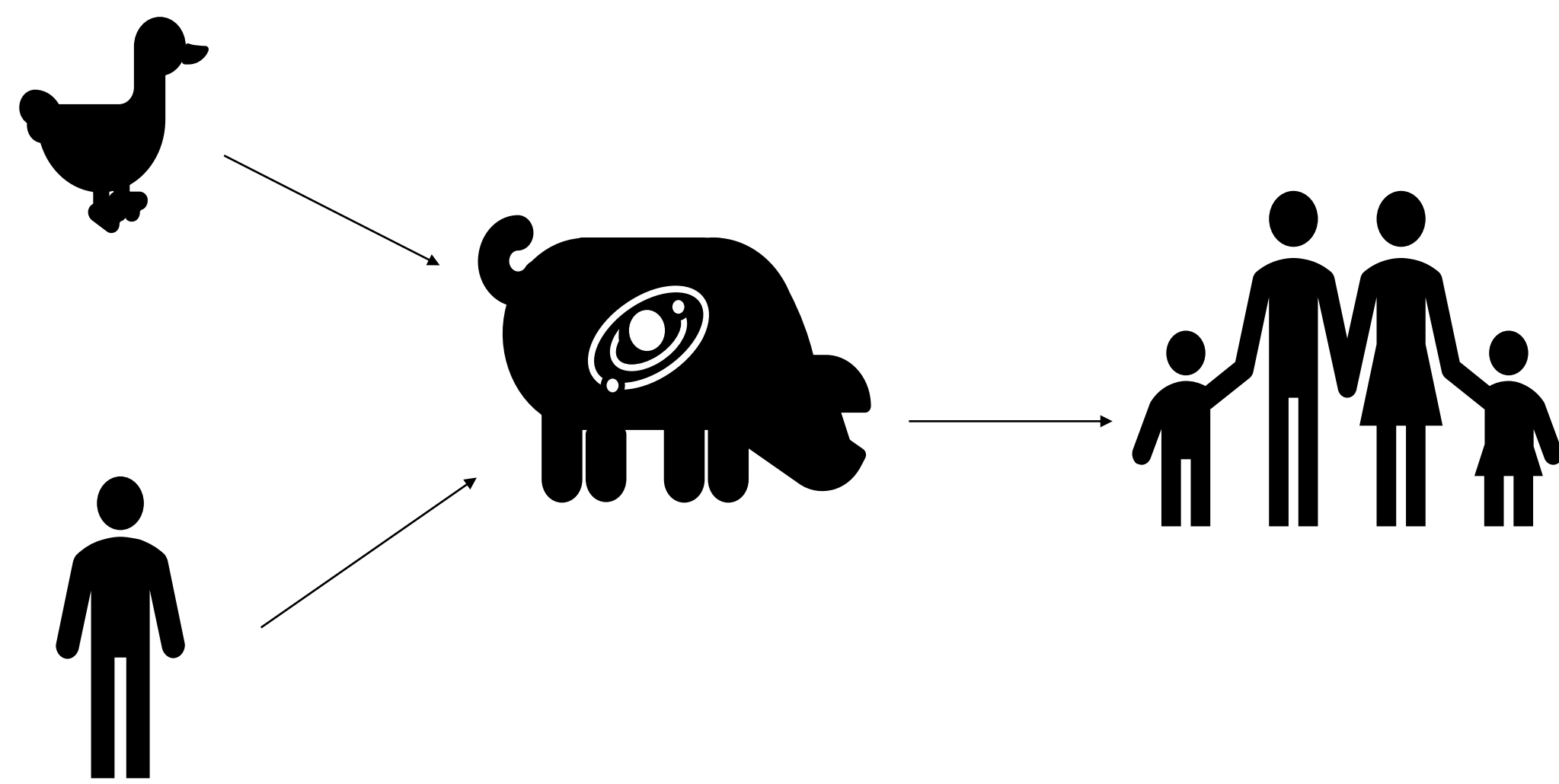


Public Health

## 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

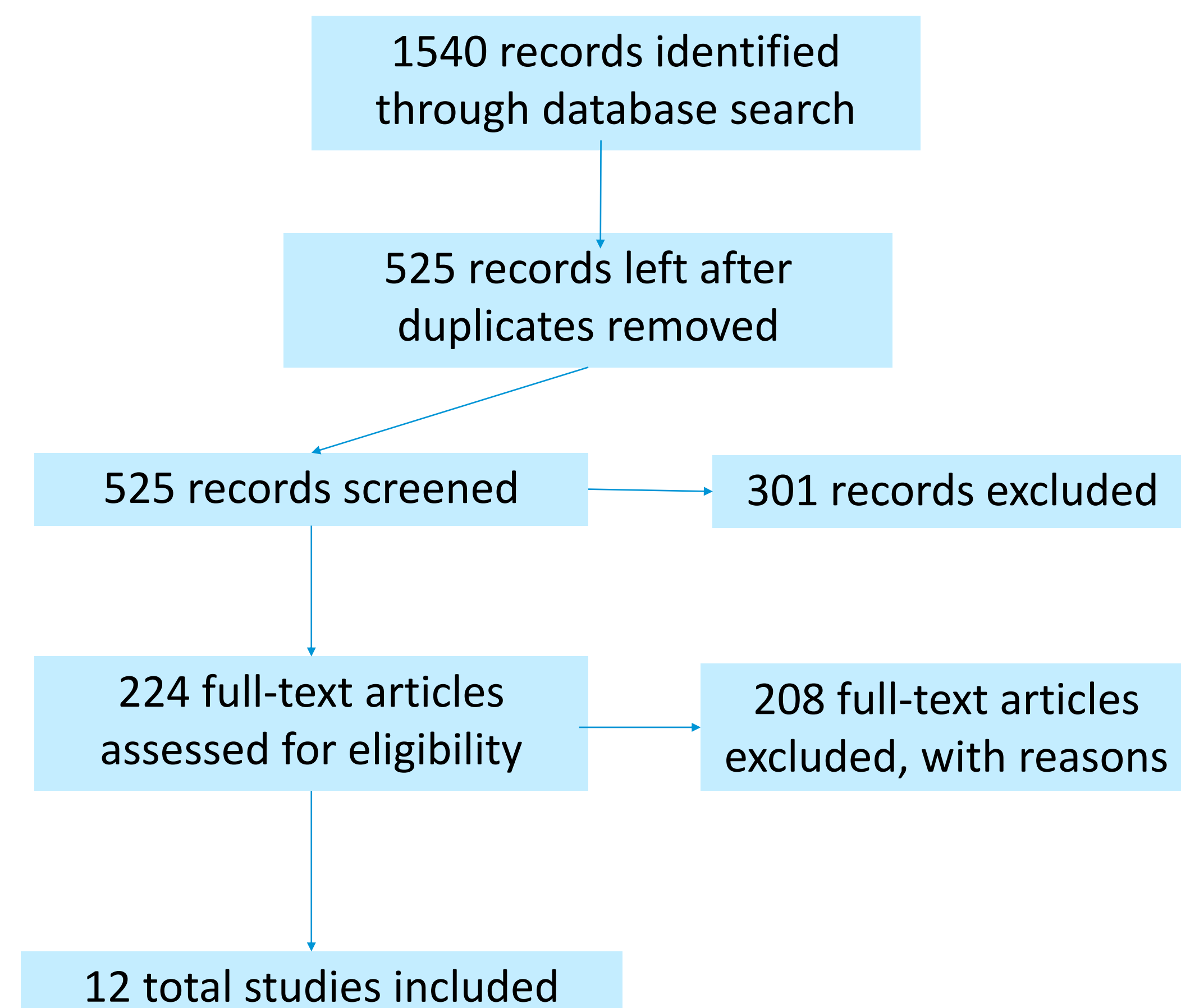


## PECO Statement

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

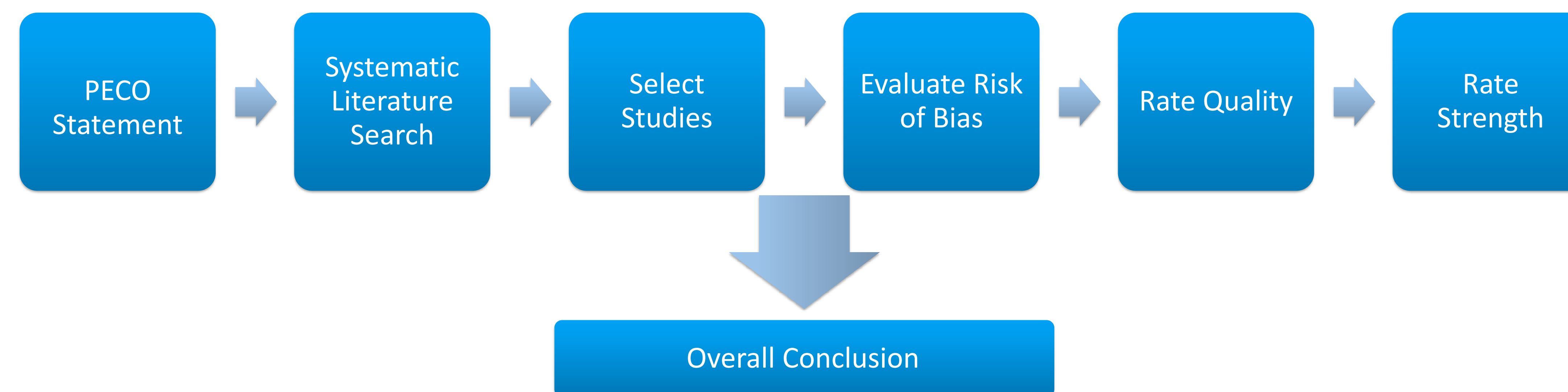
## Methods

- Conducted a systematic literature review using the methodologies of the Navigation Guide
- Literature search:



- Exclusion Criteria:**
- Papers were not in English
  - Papers were not published within the last 10 years
  - Studies did not include exposure to live swine
  - Studies were not on livestock workers or veterinarians

## The Navigation Guide



## Results

### Individual Study Findings

\*proportion of study group population who tested positive for influenza

	1	2	3	4	5	6	7	8	9	10	11	12
Population	Iowa, USA	Iowa, USA	China	USA	UK	China	China	Romania	Mexico	Germany	Germany	China
Results (Odds Ratio with 95% Confidence Interval)	54.9 (13.0 to 232.6)	Yr 1: 46/88 (52%)* Yr 2: 47/76 (62%)*	3.4 (1.1 to 10.7)	4 out of 27 (14.8%)*	25.3 (1.4 to 536.3)	61 out of 546 (11.2%)*	7.23 (3.29 to 15.88)	1.8 (1.1 to 2.9)	3.05 (1.65 to 5.64)	18/118 (15.3%)*	--	8-11%* (difference from type of assay used)

### Part 1: Assessing the risk of bias for each study

Risk Bias Factors:	1	2	3	4	5	6	7	8	9	10	11	12
Study Group Selection	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
Exposure Assessment Methods	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
Outcome Assessment Methods	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
Confounding	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
Selective Outcome Reporting	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
Financial Conflict of Interest	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk

### 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:

- Gray et al. 2007
- Terebuh et al. 2010
- Ma et al. 2015
- Beaudoin et al. 2010
- Fragaszy et al. 2016
- Zhou et al. 2014
- Wu et al. 2015
- Coman et al. 2014
- López-Robles et al. 2012
- Krumbholz et al. 2010
- Krumbholz et al. 2014
- Yin et al. 2014

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