

Pesticide Exposure and Polycystic Ovary Syndrome (PCOS):

A Systematic Review

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Study Question

Is exposure to pesticides associated with PCOS in women of reproductive age?

Scope & Introduction

Polycystic Ovary Syndrome (PCOS):

- Endocrine syndrome with high global prevalence
- One of the leading cause of infertility in women of reproductive age in the United States (CDC, 2020).
- Associated with insulin resistance, type II diabetes, cardiovascular disease, and obesity (CDC, 2020)



Pesticides:

- Chemicals used to control pests in home, agricultural, and industrial settings
- Most people in the United States likely experience low levels of pesticide exposure daily (CDC, 2019).

Intersection:

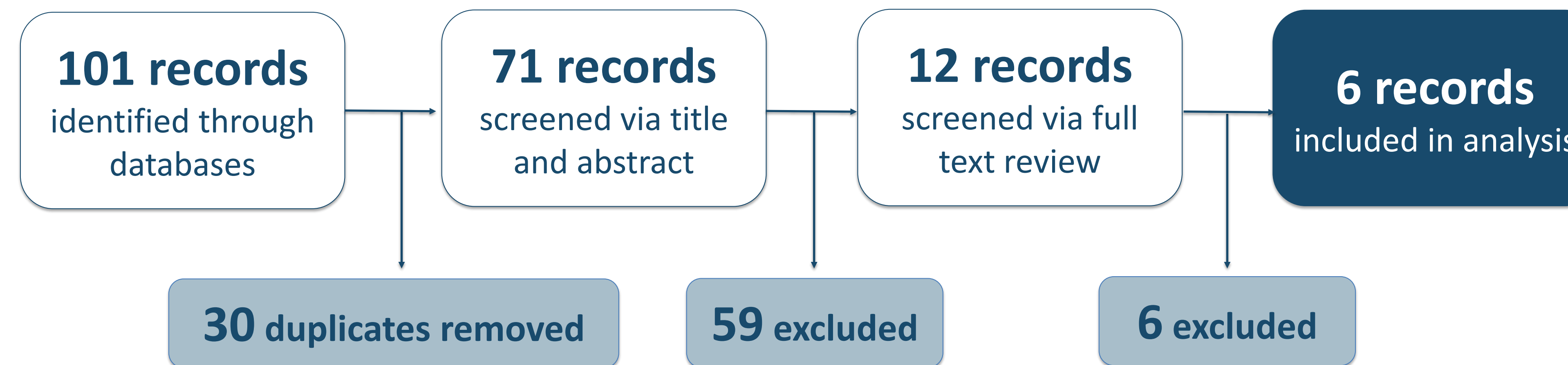
- Many pesticides are considered endocrine disrupting chemicals (EDCs), which disrupt the normal functioning of the human hormone system.
- As PCOS is an endocrine syndrome, the relationship between endocrine-disrupting pesticides and the syndrome merits exploration.

PECO Statement

Population (P): Females age 12-45 after the onset of menstruation and during reproductive years
Exposure (E): Higher levels of exposure to pesticides
Comparator (C): Females with lower pesticide exposures
Outcome (O): Polycystic Ovary Syndrome

Methods

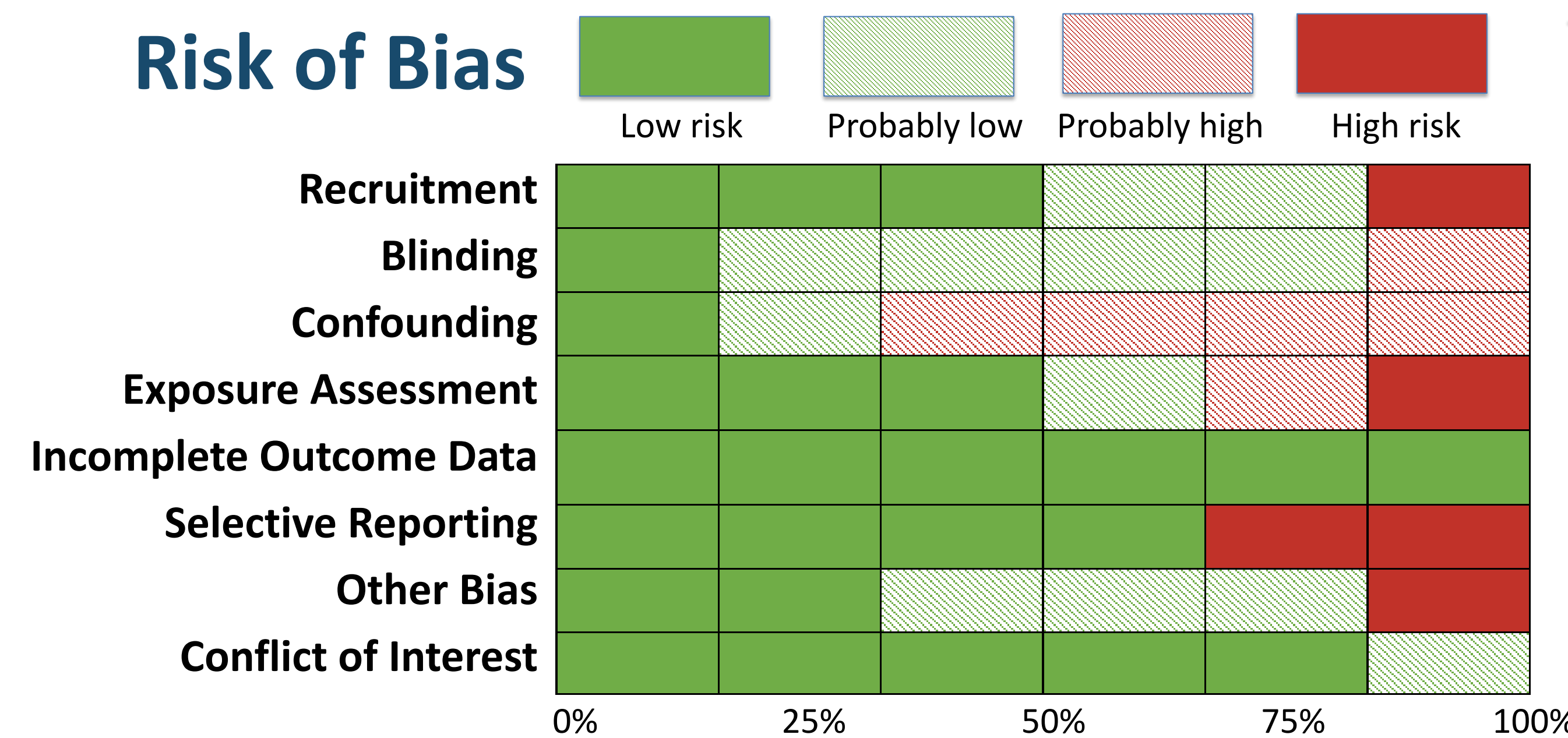
The systematic literature review was conducted using **The Navigation Guide** methodology. The study search and selection process was as follows:



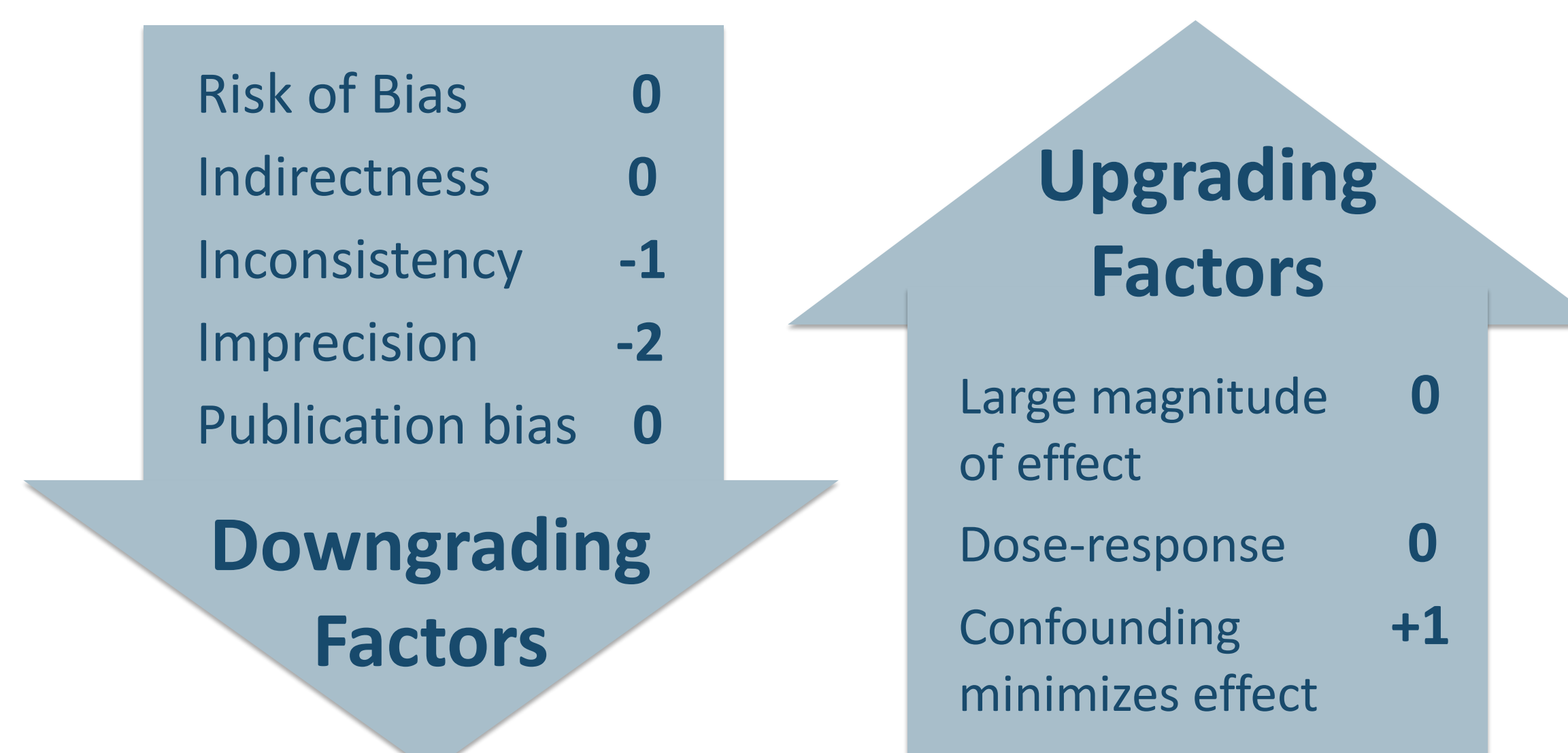
Results

Study Author, Year	Gu et al., 2019	Guo et al., 2017	Vagi et al., 2014	Yang et al., 2015	Ye et al., 2018	Zhang et al., 2014
Sample Size	123	178	102	80	296	507
Location	China	China	United States	China	China	China
Pesticides Analyzed	Triclosan	Organochlorine pesticides (OCPs)	OCPs	OCPs	Triclosan	Self-reported contact

Risk of Bias



Quality of Evidence: LOW



Strength of Evidence:

Direction of effect estimate
Suggests positive

Confidence in effect estimate
Low

Overall strength of evidence:
Inadequate

Conclusions

Inadequate evidence of toxicity based on **low quality of evidence** and **low confidence** that the results would not be influenced by the effect estimate of a new study.

Next Steps

Future Studies:

- Prospective cohort studies could help establish temporality related to this association
- Additional study of populations outside of China is necessary to examine variations in prevalence in different demographic groups
- Studies of *in utero* exposure & PCOS are needed to explore the epigenetic impacts of pesticides exposure

References

Centers for Disease Control and Prevention (CDC). (2019). Pesticide exposures. Retrieved online.

CDC. (2020). PCOS (polycystic ovary syndrome) and diabetes. Retrieved online.

Included Studies:

Gu, J., et al. (2019). *Environmental Research*, 168, 48-53. doi:10.1016/j.envres.2018.09.014

Guo, Z., et al. (2017). *Chemosphere*, 171, 595-600. doi:10.1016/j.chemosphere.2016.12.127

Vagi, S.J., et al. (2014). *BMC Endocrine Disorders* 14(86). <https://doi.org/10.1186/1472-6823-14-86>

Yang, Q., et al. (2015). *Human Reproduction*, 30(8), 1964-1973. doi:10.1093/humrep/dev123

Ye, J., et al. (2018). *BMJ Open*, 8(10), e019707. doi:10.1136/bmjopen-2017-019707

Zhang, J., et al. (2014). *Journal of biological regulators and homeostatic agents*, 28(2), 203-211.

Acknowledgements

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Contact mclemons@gwu.edu with any questions.