



Review

Understanding the role of insects in the acquisition and transmission of antibiotic resistance



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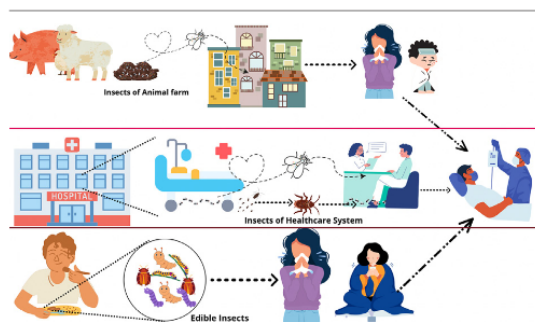
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HIGHLIGHTS

- AR circulation in the environment is facilitated by animals that includes insects.
- Insects are stable reservoirs of both ARB and associated ARGs.
- Insects engage in AR spread to humans, thereby causing clinical manifestations.
- More inclusive surveillance strategies to monitor AR burden is required.

GRAPHICAL ABSTRACT



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ABSTRACT

Antibiotic resistance (AR) is a global healthcare threat that requires a comprehensive assessment. Poorly regulated antibiotic stewardship in clinical and non-clinical settings has led to a horizontal dissemination of AR. A variety of often neglected elements facilitate the circulation of AR from antibiotic sinks like concentrated animal feeding operations and healthcare settings to other environments that include healthy human communities. Insects are one of those elements that have received underwhelming attention as vectors of AR, despite their well-known role in transmitting clinically relevant pathogens. We here make an exhaustive attempt to highlight the role of insects as zoonotic reservoirs of AR by discussing the available literature and deriving realistic inferences. We review the AR associated with insects housing various human-relevant environments, namely, animal farm industry, edible-insects enterprise, healthcare institutes, human settlements, agriculture settings and the wild. We also provide evidence-based accounts of the events of the transmission of AR from insects to humans. We evaluate the clinical threats associated with insect-derived AR and propose the adoption of more sophisticated strategies to understand and mitigate future AR concerns facilitated by insects. Future works include a pan-region assessment of insects for AR in the form of AR bacteria (ARB) and AR determinants (ARDs) and the introduction of modern techniques like whole-genome sequencing, metagenomics, and *in-silico* modelling.

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