

Innovative Strategies for Managing Missing Data in APAC Real-World Data : Insights From Global Capability Centers

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Background

Real-world data (RWD) generated from electronic health records, national surveys, and observational databases are increasingly used for regulatory, clinical, and policy decision-making. In Asia-Pacific (APAC) settings, RWD frequently suffer from substantial missingness due to non-response, loss to follow-up, infrastructure heterogeneity, and governance differences. Conventional complete-case analysis often results in biased estimates, reduced statistical power, and unstable inference.

Aim

To compare advanced missing-data-handling-strategies-applied-in-APAC real-world datasets and evaluate their impact on bias reduction, precision, sample completeness, and stability of effect estimates.

Results

Key Findings : Comparative Country Level Insights

Country	Primary Imputation Strategy	Key Performance Gain
China	Doubly robust multilevel imputation	<5% bias; ≤2% variance difference
Korea	Hot-deck + regression + multiple imputation	+29% effective sample size; ↓ standard errors
India	Random-effects–based imputation	22% narrowing of confidence intervals
Japan	Regression & multiple imputation (FCS)	Hazard ratios within ±5% across hospitals

Methods

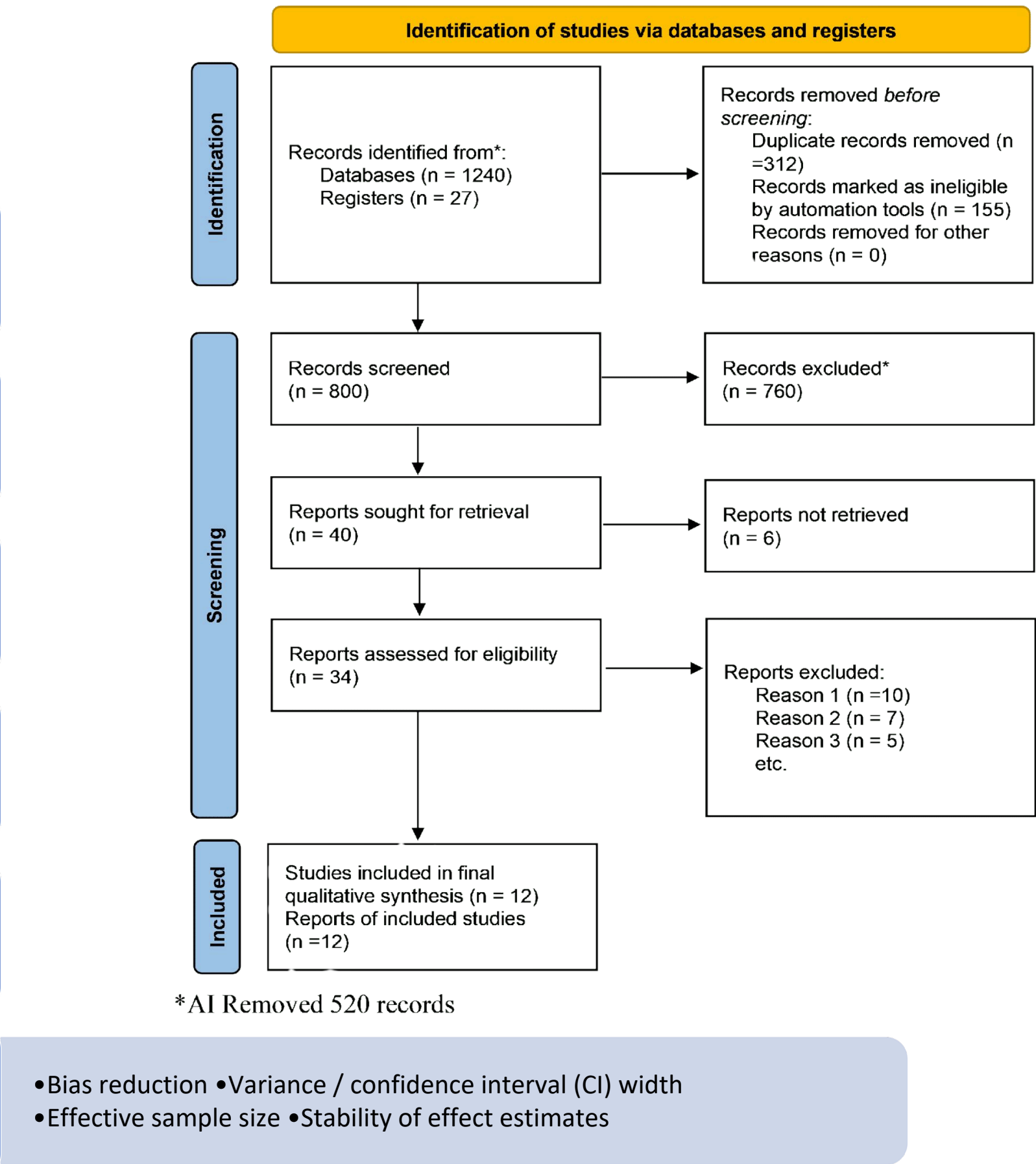
Design: Artificial intelligence–assisted rapid review (2018–2024)

Data sources: PubMed, Scopus, Web of Science, Google Scholar

Records screened: 1,267 → Studies included: 12

Geographic scope: China, Korea, India, Japan

Performance metrics assessed:



Implications for Global Capability Centers (GCCs)

No single imputation method is universally optimal

Method selection should align with:
•Data structure and missingness mechanism
•Analytical objectives
•Regulatory and operational constraints

Hybrid and multilevel approaches offer a pragmatic balance between rigor, scalability, and reproducibility

Transparent reporting of assumptions strengthens confidence in RWE outputs

Conclusion

Tailored imputation strategies consistently outperform complete-case analysis in APAC real-world datasets by improving bias control, precision, and inferential stability. Context-aware methodological choices are essential for credible and decision-ready real-world evidence generated within Global Capability Centers.

Selected Evidence Highlights

China: Multilevel doubly robust methods consistently balanced bias control and variance stability in hierarchical survey data.

Korea: Hybrid imputation pipelines improved completeness and predictive accuracy in national survey and wearable datasets.

India: Random-effects imputation corrected non-screening bias and improved geographic comparability in tuberculosis prevalence estimates.

Japan: Multiple imputation produced robust and reproducible effect estimates across large multi-hospital cohort.

