

Review of Standards-based Electronic Case Reporting (eCR) for Public Health Surveillance

SCHOOL OF NURSING

UNIVERSITY OF MINNESOTA

Driven to DiscoverSM

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01. Background

- Traditional reporting methods (phone/fax/paper) for notifiable infectious diseases are delayed, incomplete and inefficient.
- Electronic Case Reporting (eCR)¹, built on HL7 standards, automates case reporting from healthcare to public health, enhancing timeliness, accuracy, and scalability of disease surveillance (Figure 1).
- This study evaluates the impact of eCR on key metrics: timeliness, completeness, and reporting volume.

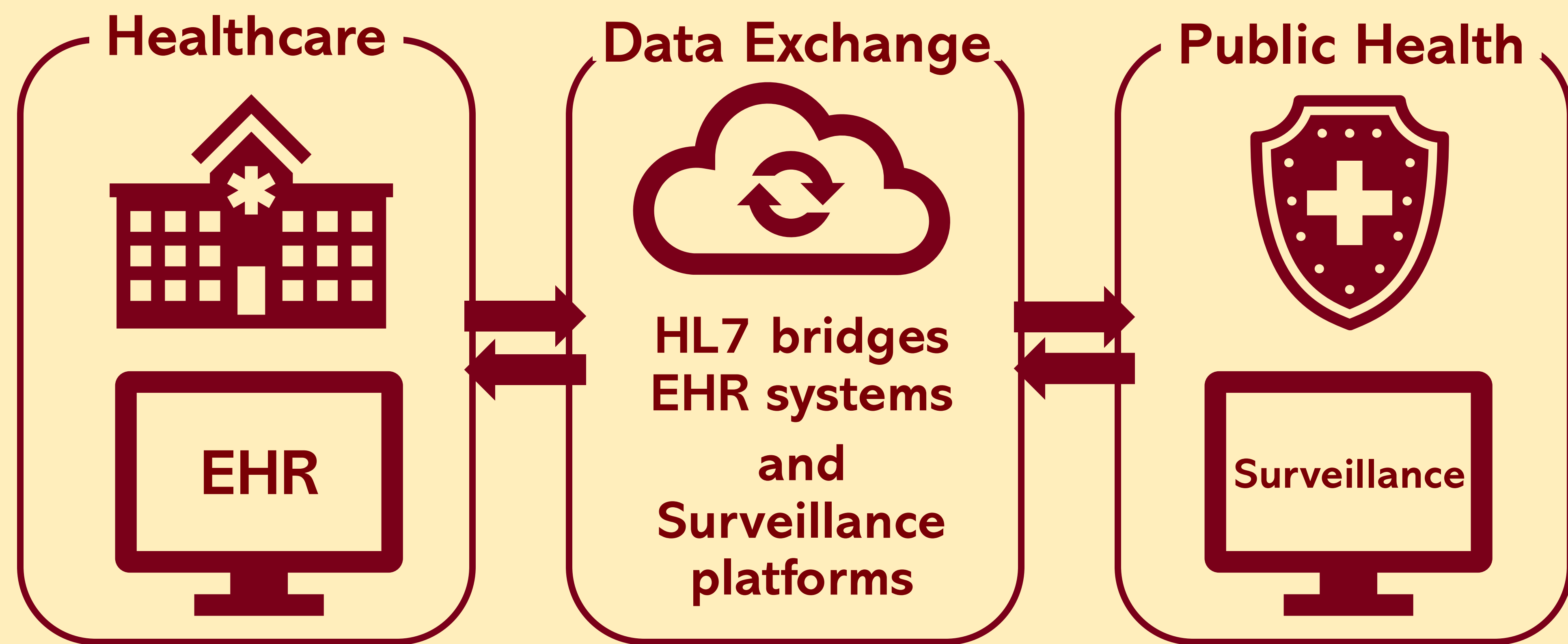


Figure 1. Workflow of Public Health Data Exchange Based on HL7

02. Objectives

- Explore the benefits of eCR systems in improving public health surveillance.
- Identify challenges and solutions in implementing standards-based eCR systems.

03. Methods

- The searches were conducted on October 2nd, 2024, in two major databases, Ovid MEDLINE[®] and Embase, to ensure comprehensive coverage of both medical and public health literature.
- The search terms included combinations of keywords such as "infection," "communicable disease," "case," "reporting," "electronic," and "public health," which captured the core concepts of the review.
- The timeframe was limited to studies published from 2010 onwards, aligning with the adoption of significant health IT policies, the HITECH Act, that promoted nationwide eCR implementation².
- Only articles in English and focused on the United States were included to ensure relevance to the geographical and linguistic scope of the review.

04. Results

- Eight studies met inclusion criteria (Figure 2).
- Quality assessment with QuADS tool (n=13 criteria, with score of 3/criteria) revealed that most studies demonstrated methodological rigor, particularly in sampling methods, data collection, and analytical approaches (Table 1).

Paper	QuADS Criteria													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	
Dixon et al., 2020	0	3	3	3	3	3	3	3	3	3	3	0	3	33
Knically et al., 2024	0	1	3	0	1	3	0	3	3	0	3	0	1	18
Mishra et al., 2019	0	1	3	0	1	3	0	3	3	0	3	0	1	18
Mishra et al., 2021	0	3	3	3	3	3	3	3	3	0	3	0	3	30
Mishra et al., 2023	0	3	3	3	3	3	3	3	3	0	3	0	3	30
Rajamani et al., 2022	0	1	3	0	3	3	0	3	3	0	3	0	2	21
Todd et al., 2022	0	3	3	3	3	3	3	3	3	0	3	0	3	30
Whipple et al., 2019	0	2	3	1	3	3	3	3	3	0	3	0	3	27

Table 1. Results of Quality Assessment Using the QuADS Tool

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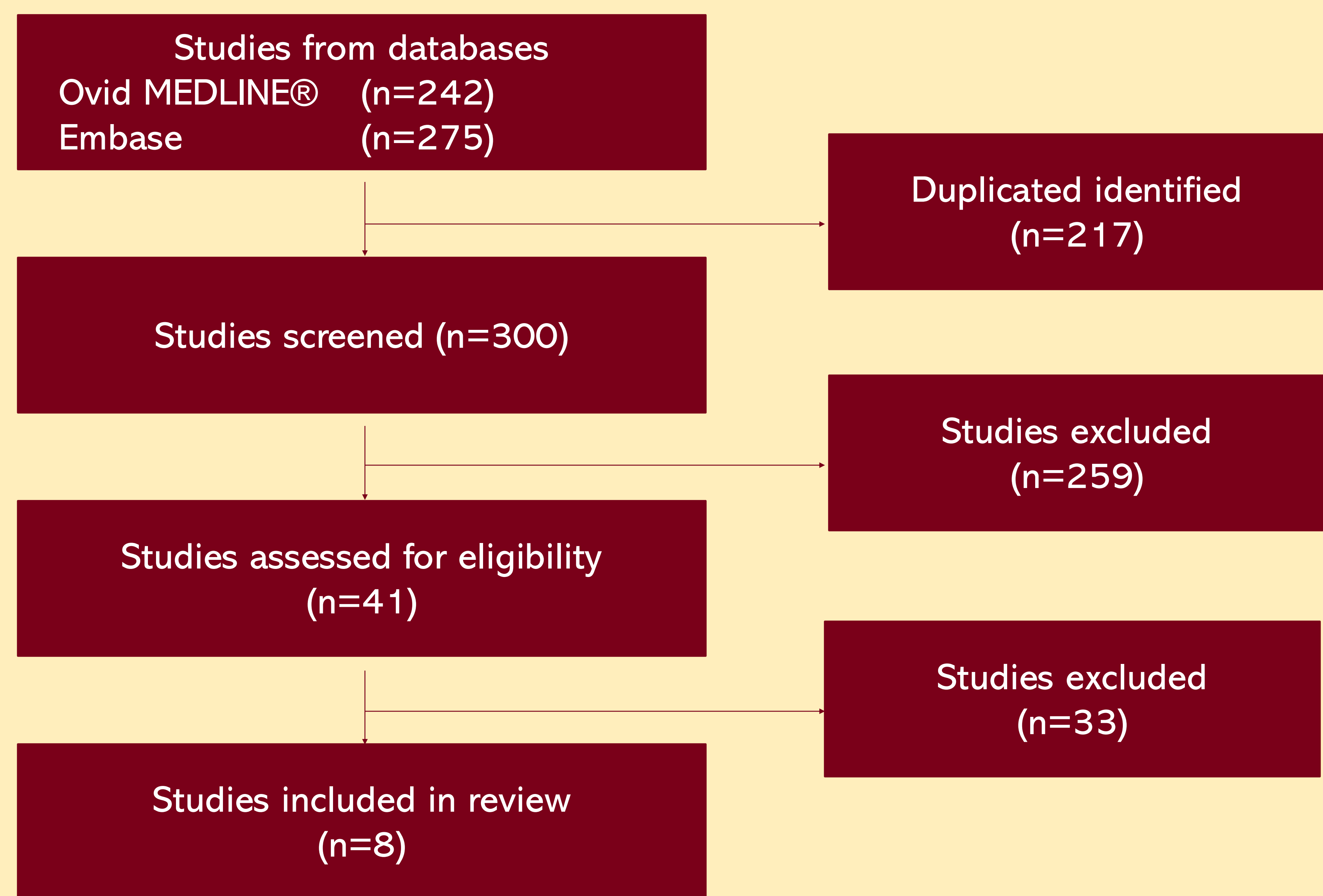
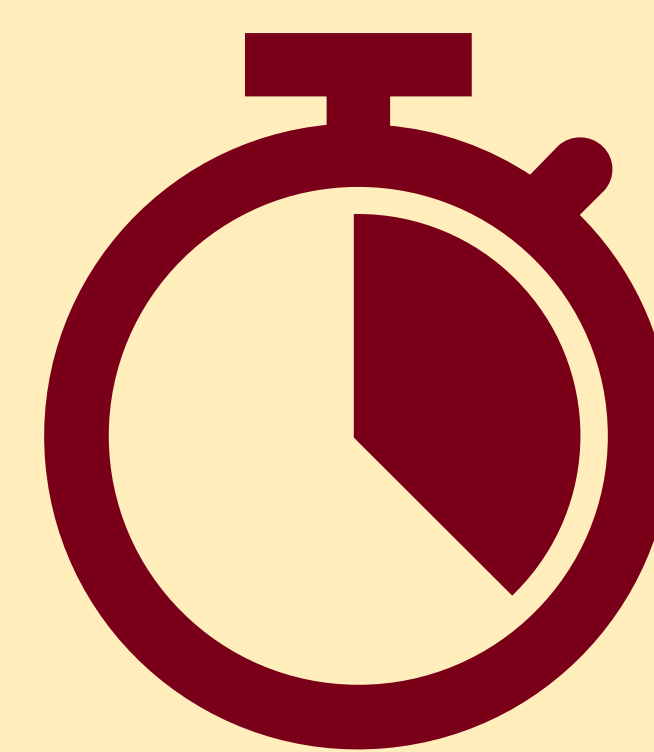


Figure 2. PRISMA Flowchart for Study Selection Process

- Studies consistently demonstrated that eCR enhanced the timeliness of disease reporting by reducing delays.
- Completeness was significantly improved as eCR systems ensured the inclusion of essential data elements, with notable success reported in chlamydia and COVID-19 cases.
- Several studies also emphasized the scalability of eCR, with increased volume of reported cases, particularly for high-priority diseases such as sexually transmitted infections and COVID-19.



Timeliness↑



Completeness↑



Volume↑

05. Conclusion

- eCR, grounded in the HL7 standard, represents a transformative advancement in infectious disease surveillance, addressing inefficiencies inherent in traditional methods.
- By automating case reporting and enhancing capacity, eCR enables public health systems to manage higher case volumes with greater efficiency and quality.
- Policymakers must invest in infrastructure, standards-based reporting and workforce training to fully leverage the full potential of eCR.

06. Future Plans

- Although this review identified meaningful studies, the limited number is not sufficient to fully establish the effectiveness of eCR. Additional implementation studies are needed to strengthen the evidence base.
- Case studies with practitioners who have adopted and are using eCR could provide valuable real-world insights.
- Future work may also expand beyond eCR to broader modernization projects in public health reporting.

07. References

- Center for Disease Control and Prevention (CDC). *Electronic Case Reporting (eCR)*. <https://www.cdc.gov/ecr/php/about/index.html>
- Centers for Medicare & Medicaid Services. (2024). *Promoting interoperability programs*. U.S. Department of Health and Human Services. Retrieved November 24, 2024, from <https://www.cms.gov/medicare/regulations-guidance/promoting-interoperability-programs>