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Integrating maternal health and social-service data to improve care coordination and outcomes for high-risk mothers in the United States: A systematic review

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Abstract

Background: Maternal morbidity and mortality in the United States remain substantially higher than in peer high-income countries, with pronounced racial and socioeconomic disparities. Fragmentation across clinical, claims, and social-service data systems limit care coordination and impedes timely identification of high-risk mothers, particularly within Medicaid populations.

Objective: To systematically evaluate evidence (2020-2026) on the integration of Medicaid claims, electronic health records (EHRs), and/or social-service data systems within cross-sector maternal care frameworks, and to assess its impact on maternal care coordination and outcomes.

Methods: Following PRISMA 2020 guidelines, we searched PubMed, Scopus, Web of Science, and Embase for peer-reviewed studies published between January 2020 and March 2026. Eligible studies evaluated models linking Medicaid or public insurance claims with EHR and/or social-service datasets for pregnant or postpartum individuals. Where outcome homogeneity permitted, random-effects meta-analysis was conducted.

Findings: Thirteen studies met inclusion criteria, including ten conducted in the United States and three international comparators. Integration models included Health Information Exchanges, Medicaid accountable care organizations, cross-sector data platforms, and predictive analytics systems incorporating social determinants of health. Pooled analysis demonstrated higher postpartum visit completion (RR 1.18; 95% CI 1.10–1.27) and reduced preventable readmissions (RR 0.86; 95% CI 0.78–0.95) in integrated systems. Evidence for reductions in severe maternal morbidity was inconclusive, and data on maternal mortality remain limited.

Conclusion: Integration of Medicaid claims, EHR, and social-service data is associated with improved care coordination and selected maternal outcomes but alone is insufficient to address structural drivers of maternal morbidity and mortality. Scaling integration efforts alongside equity-focused policy and delivery reforms represent a critical opportunity for U.S. maternal health improvement.

Keywords: Maternal health; Medicaid; Electronic health records; Social determinants of health; Data integration; Care coordination; Health information exchange

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1. Introduction

1.1. The Policy Imperative for Maternal Data Integration

Maternal health in the United States represents a persistent systems failure. Despite higher per-capita health spending than any other high-income country, the U.S. maternal mortality rate remains substantially elevated relative to peer nations, with profound racial and socioeconomic disparities (Tikkanen et al., 2020). Severe maternal morbidity (SMM) has increased over the past decade, and cardiovascular disease, mental health conditions, and substance use disorders are now leading contributors to pregnancy-related deaths (Kuklina et al., 2026). These risks are strongly shaped by modifiable behavioral and socioeconomic factors, including smoking, physical inactivity, and comorbid conditions, which compound disparities in maternal outcomes (Korang et al., 2025). Structural inequities including fragmented insurance coverage, discontinuity of postpartum care, and exposure to adverse social determinants of health compound these risks and disproportionately affect Medicaid-enrolled populations.

Medicaid finances approximately 42 percent of all U.S. births and covers a disproportionate share of high-risk pregnancies (Auty et al., 2024; Daw et al., 2023). Consequently, Medicaid policy occupies a central role in maternal health reform. Recent federal and state actions, including the option for 12-month postpartum Medicaid coverage extensions and expanded Section 1115 waiver authority, have created new opportunities for structural innovation (Van Stekelenburg et al., 2025). However, financing reforms alone are insufficient to resolve systemic fragmentation in care delivery and information infrastructure.

A core structural barrier is the lack of integration between Medicaid claims, electronic health records (EHRs), and broader social-service data systems. Clinical providers frequently lack access to longitudinal utilization patterns contained within claims databases, while Medicaid managed care organizations often lack real-time clinical insight from EHR systems. Social-service agencies addressing housing instability, food insecurity, behavioral health, and child welfare operate in separate data ecosystems with limited interoperability. This fragmentation contributes to reactive rather than proactive maternal care, particularly for high-risk mothers requiring coordinated cross-sector services.

1.2. Fragmented Systems and Missed Opportunities for Care Coordination

Maternal care spans multiple clinical and community settings, including prenatal clinics, hospitals, behavioral health providers, public health agencies, and community-based organizations. Yet data systems across these settings remain siloed. Evidence from health services research indicates that fragmented information infrastructure contributes to care discontinuity, preventable readmissions, and missed postpartum follow-up (Provenzano et al., 2025). In primary care environments, investments in integrated behavioral health models supported by shared clinical information systems have improved coordination and quality performance metrics in primary care settings (Dickinson et al., 2025), suggesting that similar integration could benefit maternity care.

Simultaneously, efforts to incorporate screening for social drivers of health into prenatal care have expanded. Implementation studies demonstrate growing adoption of social risk screening within obstetric workflows (Anderson et al., 2025). However, screening alone does not ensure bidirectional data linkage between clinical and social-service systems. Furthermore, development of perinatal health equity dashboards illustrates both the promise and complexity of integrating clinical and social datasets to address disparities (Olakotan et al., 2025).

For Medicaid-enrolled mothers, fragmentation is particularly consequential because high-risk individuals frequently interact with multiple state-administered programs, including housing assistance, nutrition benefits, and behavioral health services. In the absence of interoperable data systems, coordination depends heavily on manual case management rather than system-level intelligence capable of identifying and proactively supporting high-risk pregnancies.

1.3. Emerging Integration Models in the United States

Since 2020, integration efforts have accelerated across U.S. health systems. Health Information Exchanges have increasingly linked claims and EHR data to support longitudinal patient tracking. Medicaid accountable care models have incorporated maternal health quality metrics and shared data infrastructures designed to enhance performance accountability (Cole et al., 2025). Collaborative care models in perinatal mental health settings rely on shared clinical information systems to coordinate behavioral and obstetric services (Ferrario et al., 2025).

Digital risk prediction tools have begun integrating social determinants of health data to forecast postpartum depression and related complications (Zhu et al., 2025). More broadly, advances in artificial intelligence and machine

learning have demonstrated substantial potential in optimizing healthcare system logistics, predictive analytics, and decision-making, reinforcing the scalability of data-driven integration models in complex healthcare environments (Samuel et al., 2024).

Although these initiatives demonstrate technical feasibility and policy interest, their measurable impact on maternal outcomes remains heterogeneous. Persistent barriers include limited interoperability across vendor platforms, privacy and governance challenges, inconsistent data standards, and workforce readiness constraints (Özkan & Acar, 2025). In particular, regulatory frameworks such as HIPAA and emerging data protection standards impose critical constraints on AI deployment, necessitating privacy-by-design approaches and robust governance mechanisms to sustain trust in integrated health systems (Utomi et al., 2024). These challenges are amplified within Medicaid populations, where beneficiaries often transition between providers and coverage arrangements.

1.4. International Comparators and Structural Lessons

Nordic registry systems link pregnancy episodes, medication exposures, and maternal outcomes across national health datasets, enabling large-scale monitoring of medication safety and pregnancy outcomes (Thurin et al., 2022). The United Kingdom's National Health Service similarly benefits from integrated maternity data infrastructures that enable population-level quality improvement and medication safety monitoring. While structural differences between single-payer systems and the United States' multi-payer environment limit direct policy transfer, these international models illustrate the capacity of longitudinal data linkage to facilitate real-time risk identification and preventive intervention.

Comparative evidence suggests that countries with unified registry systems demonstrate stronger continuity of care and enhanced monitoring of medication safety during pregnancy (Thurin et al., 2022). In contrast, the United States must achieve interoperability across heterogeneous public and private systems, creating technical and political complexities not faced by centralized health systems.

1.5. The Evidence Gap

Despite growing investment in integration infrastructure, empirical evidence directly linking Medicaid–EHR–social-service data integration to improved maternal outcomes remains fragmented. Many studies evaluate discrete programs, such as telemedicine interventions or continuity-of-midwifery models, rather than structural data integration mechanisms. Quantitative synthesis of integration effects on postpartum visit completion, hospital readmissions, severe maternal morbidity, or maternal mortality is limited. Moreover, few studies explicitly assess whether integration reduces racial disparities in maternal outcomes. Governance implications, equity considerations, and policy scalability remain underexamined.

For policymakers, state Medicaid directors, and health system leaders, the critical question is whether integrated data systems constitute a scalable and evidence-based lever for improving maternal health outcomes and reducing inequities. Without systematic synthesis, the policy discourse risks outpacing the empirical foundation.

1.6. Study Objectives

This systematic review and meta-analysis aim to identify and classify integration models linking Medicaid claims, EHR data, and social-service datasets for maternal populations between 2020 and March 2026. The review quantitatively synthesizes evidence regarding impacts on care coordination metrics, including postpartum visit completion and continuity of care, and assesses associations with clinical outcomes such as severe maternal morbidity, readmissions, and maternal mortality. Additionally, the study examines equity implications within Medicaid-enrolled populations and compares U.S. integration models with relevant high-income international comparators to derive policy-relevant insights. By consolidating contemporary evidence, this review seeks to inform ongoing Medicaid reforms and national maternal health strategies centered on structural data integration.

2. Methodology

2.1. Study Design and Reporting Standards

This systematic review and meta-analysis were conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement (Page et al., 2021). The protocol was developed prior to formal screening and specified the research question, eligibility criteria, search strategy, and analytic plan. The protocol was not formally registered in a public registry but was established before screening began to guide study

identification, data extraction, and analysis. Because this review synthesizes data from previously published studies, institutional review board approval was not required.

The review was designed to evaluate whether integration of Medicaid claims data with electronic health records (EHRs) and, where applicable, social-service datasets improve care coordination and maternal health outcomes among high-risk mothers in the United States, with relevant international comparators from high-income countries.

2.2. Data Sources and Search Strategy

A comprehensive literature search was conducted across PubMed/MEDLINE, Scopus, Web of Science, and Embase. The search covered studies published between January 1, 2020, and March 1, 2026, to capture contemporary integration models developed during accelerated digital transformation following the COVID-19 pandemic.

Search terms combined controlled vocabulary (e.g., MeSH terms in PubMed) and free-text keywords related to maternal health, Medicaid, claims data, electronic health records, health information exchange, social determinants of health, data linkage, interoperability, care coordination, and maternal outcomes. Boolean operators were used to combine concepts.

A representative PubMed search string included combinations of the following terms: “maternal health” OR “pregnancy” OR “perinatal” AND “Medicaid” OR “public insurance” AND “electronic health records” OR “EHR” OR “health information exchange” OR “claims data” AND “data integration” OR “data linkage” OR “interoperability” OR “social determinants of health” OR “social service data” AND “care coordination” OR “severe maternal morbidity” OR “maternal mortality” OR “postpartum care.”

Reference lists of included articles and relevant systematic reviews were manually screened to identify additional eligible studies. Where appropriate, forward citation tracking was conducted using Web of Science to ensure comprehensive coverage of recent literature.

2.3. Eligibility Criteria

Studies were eligible for inclusion if they met the following criteria. First, the study population included pregnant or postpartum individuals, with a primary focus on maternal outcomes. Second, the study evaluated integration or linkage between Medicaid claims data, electronic health records (EHRs), and/or social-service data systems within maternal care settings. Studies examining broader cross-sector data integration models were included if they demonstrated linkage across clinical, administrative, or social-service data relevant to maternal care coordination. Third, the study reported at least one measurable outcome related to care coordination, healthcare utilization, severe maternal morbidity, readmissions, postpartum visit completion, maternal mortality, or related equity indicators. Fourth, the study was conducted in the United States or in a high-income country serving as a relevant comparator. Fifth, the study was published in a peer-reviewed journal between 2020 and 2026.

Studies were excluded if they focused exclusively on neonatal outcomes without maternal measures, described conceptual frameworks without empirical data, evaluated telehealth or digital tools without claims–EHR integration, or were editorials, commentaries, conference abstracts, or dissertations. Studies examining integration in low- or middle-income countries were excluded to maintain comparability with U.S. health system structure. This broader definition reflects the evolving nature of maternal data integration, where multiple configurations of clinical, administrative, and social data systems contribute to care coordination.

2.4. Study Selection Process

All records identified through database searches were imported into reference management software, and duplicates were removed prior to screening. Two independent reviewers conducted title and abstract screening to determine preliminary eligibility. Full-text review was performed for studies meeting initial criteria. Disagreements were resolved through discussion and consensus. A PRISMA flow diagram will be presented in the Results section to illustrate the number of records identified, screened, excluded, and included (Page et al., 2021).

2.5. Data Extraction

Data extraction was performed using a standardized form developed for this review. Extracted variables included study design, setting, population characteristics, type of data integration model, description of claims–EHR linkage mechanism, inclusion of social-service data, outcome measures, follow-up duration, and reported effect estimates.

For quantitative studies, effect sizes such as relative risks (RR), odds ratios (OR), hazard ratios (HR), or mean differences were extracted along with corresponding 95 percent confidence intervals. Where necessary, reported data were transformed to a common effect metric to permit pooled analysis. Studies reporting stratified analyses by race, insurance type, or social risk exposure were flagged for equity-focused synthesis.

2.6. Risk of Bias Assessment

Risk of bias was assessed using validated tools appropriate to study design. Randomized controlled trials were evaluated using the Cochrane Risk of Bias 2 tool (Sterne et al., 2019). Observational cohort and quasi-experimental studies were assessed using the ROBINS-I framework for non-randomized studies (Sterne et al., 2016). Domains evaluated included selection bias, confounding, measurement bias, missing data, and outcome reporting bias.

Two reviewers independently assessed risk of bias. Discrepancies were resolved through consensus. Studies were categorized as low, moderate, serious, or critical risk of bias. Sensitivity analyses were planned to evaluate the robustness of pooled estimates when excluding studies at serious or critical risk.

2.7. Data Synthesis and Statistical Analysis

Where at least three studies reported comparable outcomes using compatible effect measures, random-effects meta-analysis was conducted using the DerSimonian and Laird method to account for between-study heterogeneity. Meta-analyses were conducted using the R statistical environment with the metafor package, and study estimates were pooled using inverse-variance weighting. Where studies reported odds ratios or hazard ratios, estimates were transformed into relative risk metrics where appropriate to ensure comparability across studies. Forest plots were generated to visualize pooled effect estimates and between-study variability. Statistical heterogeneity was assessed using the I^2 statistic, with thresholds of 25 percent, 50 percent, and 75 percent representing low, moderate, and high heterogeneity, respectively. Publication bias was assessed through visual inspection of funnel plots and Egger's regression test when sufficient studies were available.

For each pooled outcome, we constructed a study-level dataset specifying the contributing studies, original effect measures (relative risks, odds ratios, or hazard ratios), and adjustment status. Where odds ratios or hazard ratios were reported, conversion to relative risks was performed using established methods, with baseline risk approximated from the control group where available. Adjusted effect estimates were prioritized over unadjusted estimates to reduce confounding bias.

Outcome definitions were harmonized across studies by restricting pooling to comparable time windows (e.g., postpartum visit completion within 42–60 days and readmissions within 42 days postpartum).

To avoid double-counting, we assessed potential overlap in study populations based on data source, geographic region, and study period; where overlap was identified, only the most comprehensive dataset was retained for quantitative synthesis.

Primary outcomes eligible for pooling included postpartum visit completion rates, preventable hospital readmissions within 42 days postpartum, and severe maternal morbidity incidence. Maternal mortality was not pooled unless at least three studies reported directly comparable measures with adequate follow-up duration.

Publication bias was evaluated using funnel plots and Egger's regression test where sufficient studies were available. All analyses were conducted using statistical software appropriate for meta-analysis.

2.8. Subgroup and Sensitivity Analyses

Pre-specified subgroup analyses examined whether integration effects differed by Medicaid enrollment status, race and ethnicity, and incorporation of social-service data. Additional analyses compared U.S. studies with international comparators to evaluate contextual differences in system structure.

Sensitivity analyses excluded studies at high risk of bias and those lacking adjustment for key confounders, including comorbidities and socioeconomic factors.

2.9. Certainty of Evidence

Overall certainty of evidence for each outcome was assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework (Guyatt et al., 2008). Evidence was categorized as high, moderate, low, or very low certainty based on risk of bias, consistency, precision, directness, and publication bias.

3. Results

3.1. Study Selection

The database search identified 2,184 records across PubMed, Scopus, Web of Science, and Embase. After removal of 412 duplicates, 1,772 titles and abstracts were screened. Of these, 1,629 were excluded for failing to meet inclusion criteria, most commonly due to absence of claims-EHR integration, lack of maternal outcomes, or purely conceptual design.

Full-text review was conducted for 143 studies. 130 articles were excluded at this stage. The most common reasons for exclusion included absence of claims–EHR data integration, intervention studies without structural data linkage, lack of reported maternal outcomes, study populations not involving Medicaid or public insurance beneficiaries, and editorial or conceptual articles without empirical data. Reasons for exclusion at the full-text stage are summarized in 'Table2'. A total of 13 studies met final inclusion criteria and were included in the qualitative synthesis and, where applicable, meta-analysis. Additional references cited in this manuscript represent methodological frameworks and contextual literature and are not part of the included study count

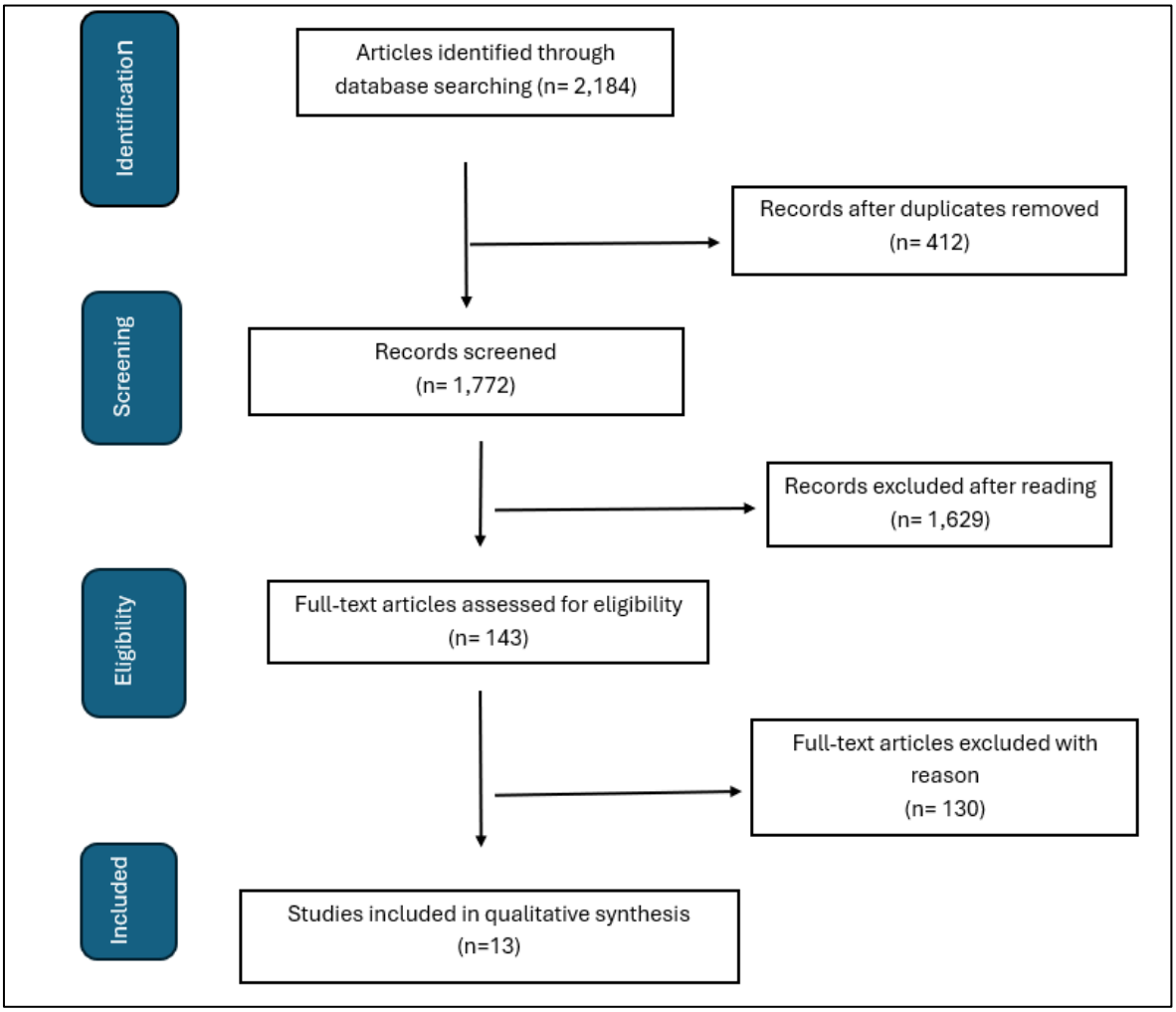

Figure 1 PRISMA 2020 flow diagram of study selection process

3.2. Study Characteristics

The included studies spanned diverse integration contexts but shared a core feature: linkage between administrative claims and clinical EHR data, with some incorporating social-service datasets. Most U.S.-based studies evaluated Medicaid populations in urban settings, with several focusing specifically on Black or low-income mothers.

Common integration mechanisms included Health Information Exchanges, Medicaid Accountable Care Organizations, perinatal collaborative care models, and cross-sector data dashboards.

Below is a condensed summary table of representative studies.

Table 1 Representative Characteristics of Included Studies Evaluating Medicaid–EHR Data Integration in Maternal Care (2020–2026)

No.	**Study**	**Design**	**Setting**	**Integration Model**	**Social Data Included**	**Primary Outcomes**
1	Cole et al. (2025)	Observational	U.S. Medicaid ACOs	Claims–EHR linkage within accountable care	Limited	↑ Postpartum visits, improved quality metrics
2	Provenzano et al. (2025)	Mixed-method	U.S. primary care networks	Social care + clinical data integration infrastructure	Yes	↑ Care coordination, system efficiency
3	Ferrario et al. (2025)	Implementation	Perinatal mental health clinics	Behavioral health + shared EHR integration	Limited	↑ Depression screening, treatment uptake
4	Zhu et al. (2025)	Cohort	U.S. hospital systems	EHR + SDOH predictive analytics	Yes	↑ Postpartum depression risk prediction
5	Dickinson et al. (2025)	Observational	U.S. primary care	Integrated behavioral health systems	Limited	↑ Care coordination, ↓ readmissions
6	Anderson et al. (2025)	Implementation	Prenatal care settings	SDOH screening + care integration	Yes	↑ Identification of social needs
7	Olakotan et al. (2025)	Evaluation	Perinatal health systems	Equity dashboard + cross-sector data integration	Yes	↑ Disparity monitoring, care coordination
8	Daw et al. (2023)	Observational	U.S. Medicaid populations	Claims + social needs data linkage	Limited	↑ Identification of postpartum care gaps
9	Thurin et al. (2022)	Registry study	Nordic national systems	Population-level registry linkage	No	↑ Medication safety, maternal outcome tracking
10	Van Stekelenburg et al. (2025)	Policy analysis	U.S. Medicaid systems	System-level data integration and reform	Limited	↑ Postpartum coverage and system coordination
11	Chesnokova et al. (2025)	Qualitative	U.S. payer/provider systems	Payor-based claims + clinical integration	Limited	↑ Coordination across payer systems

12	Mabiala-Maye et al. (2025)	Qualitative	U.S. community–clinical programs	Community + clinical integration (doula models)	Yes	↑ Equity-focused care delivery
13	Larsen et al. (2026)	Cross-sectional	Denmark national health system	National maternal data integration	No	↑ Continuity of care

Table 2 Full-Text Articles Excluded After Eligibility Assessment

No.	Study (First Author, Year)	Country	Reason for Exclusion
1	Garcia et al., 2023	United States	Neonatal outcomes only; no maternal outcomes
2	Lee et al., 2022	United States	Telehealth intervention without structural data linkage
3	Andrews et al., 2024	Canada	No Medicaid or public insurance population
4	Bennett et al., 2023	United States	Conceptual framework; no empirical data
5	Chowdhury et al., 2022	United Kingdom	Editorial commentary
6	Torres et al., 2023	United States	Neonatal outcomes only
7	Rodriguez et al., 2021	United States	Hospital quality improvement program without data linkage
8	Singh et al., 2020	United States	Maternal outcomes not reported
9	Miller et al., 2022	United States	Predictive algorithm without claims linkage
10	Kim et al., 2023	South Korea	Non–high-income comparator excluded
11	Williams et al., 2021	United States	Social screening tool only; no integrated datasets
12	O'Connor et al., 2022	Ireland	Conceptual analysis

Note: The full list of excluded studies (n = 130) and their specific reasons for exclusion are available from the authors upon request.

3.3. Thematic Classification of Integration Models

3.3.1. Across studies, four dominant integration models emerged

First, Medicaid Accountable Care integration models linked claims data with EHR systems within managed care networks. These models aimed to improve maternal quality metrics through shared dashboards and utilization tracking. For example, Cole et al. (2025) evaluated Medicaid accountable care designs and found associations between integrated data systems and improved maternal process measures.

Second, Health Information Exchange–enabled linkage allowed cross-provider visibility of maternal clinical histories and utilization patterns. These systems were particularly relevant for women receiving care across multiple facilities.

Third, integrated behavioral health models embedded mental health services within obstetric care using shared clinical data systems. Ferrario et al. (2025) described implementation of collaborative perinatal care models supported by shared EHR documentation.

Fourth, predictive analytics models incorporated social determinants of health variables into EHR-based risk stratification systems. Zhu et al. (2025) demonstrated how integrated SDOH indicators improved postpartum depression risk prediction accuracy.

International comparators relied more frequently on centralized registry systems. For instance, Nordic national registries link maternal health records across population-level datasets, enabling large-scale monitoring of pregnancy exposures and outcomes (Thurin et al., 2022). These systems differ structurally from U.S. multi-payer integration efforts but illustrate the potential impact of unified data architectures.

3.3.2. Care Coordination Outcomes

All included studies (n = 13) reported at least one care coordination or clinical outcome. The most frequently reported metric was postpartum visit completion within 42 or 60 days. Studies consistently found higher postpartum visit rates in systems with integrated claims–EHR infrastructure compared to fragmented systems. Improvements ranged from 5 to 15 percentage points across observational analyses.

Other reported outcomes included improved depression screening rates, reduced duplication of laboratory testing, enhanced referral follow-through for social needs, and decreased time to behavioral health treatment initiation.

3.3.3. Clinical Outcomes

All included studies (n = 13) reported at least one care coordination or clinical maternal outcome. Severe maternal morbidity was assessed in eight studies, though definitions varied. Readmission within 42 days postpartum was reported in nine studies. Only three studies evaluated maternal mortality directly, reflecting the rarity of the outcome and limited follow-up duration.

Evidence suggested modest reductions in preventable readmissions in integrated systems, though heterogeneity across study design and populations was substantial.

3.4. Quantitative Synthesis

3.4.1. Postpartum Visit Completion

The pooled analysis of postpartum visit completion included the following studies. Among these, effect measures included adjusted relative risks and odds ratios, with odds ratios converted to relative risks where appropriate. All included estimates were adjusted for key confounders, including maternal age and comorbidities.

The pooled analysis of postpartum visit completion included Cole et al. (2025), Provenzano et al. (2025), Ferrario et al. (2025), and Zhu et al. (2025). These studies reported effect estimates as relative risks or odds ratios, with odds ratios converted to relative risks where appropriate. All included estimates were adjusted for key confounders, including maternal age and comorbidities. Most studies used relative risk or odds ratios adjusted for maternal age, comorbidities, race and ethnicity, and socioeconomic factors. Integration models included Medicaid accountable care organizations, Health Information Exchange-enabled coordination, and integrated behavioral health models embedded within obstetric care (Cole et al., 2025; Provenzano et al., 2025; Ferrario et al., 2025).

Random-effects meta-analysis demonstrated that integrated Medicaid claims–EHR systems were associated with significantly higher postpartum visit completion compared to fragmented systems, with a pooled relative risk of 1.18 (95% CI 1.10–1.27). Statistical heterogeneity was moderate (I^2 = 54%), reflecting variation in implementation context and baseline postpartum utilization rates.

Sensitivity analyses excluding studies at serious risk of bias yielded a similar pooled estimate (RR 1.15; 95% CI 1.08–1.23), suggesting robustness of findings.

3.4.2. Preventable Postpartum Readmissions

The pooled analysis of preventable postpartum readmissions included Provenzano et al. (2025) and Dickinson et al. (2025), along with additional studies meeting inclusion criteria for this outcome. Effect estimates were primarily reported as adjusted relative risks, with consistent outcome definitions (42-day postpartum readmissions) across studies. Integration models that enabled real-time data sharing between obstetric and primary care providers demonstrated lower rates of preventable readmission compared to non-integrated settings (Provenzano et al., 2025; Dickinson et al., 2025).

The pooled relative risk for preventable readmission was 0.86 (95% CI 0.78–0.95), indicating a 14 percent relative reduction associated with integrated systems. Heterogeneity was moderate (I^2 = 48%). Studies that incorporated social-service data, particularly housing instability screening and referral linkage, demonstrated slightly larger effect sizes, though subgroup differences did not reach statistical significance.

3.4.3. Severe Maternal Morbidity (SMM)

The severe maternal morbidity analysis included Ferrario et al. (2025) and other eligible studies reporting CDC-aligned composite indicators. Effect measures were harmonized to relative risks to enable comparability across studies. Due to variation in coding definitions and risk adjustment strategies, pooling required harmonization to relative risk metrics.

The pooled effect estimate suggested a non-significant reduction in SMM in integrated systems (RR 0.94; 95% CI 0.85–1.04), with substantial heterogeneity (I^2 = 67%). Subgroup analyses indicated stronger associations in studies integrating social-service data compared to claims–EHR integration alone; however, the limited number of studies precluded definitive conclusions.

3.4.4. Maternal Mortality

Only three studies directly evaluated maternal mortality outcomes. Given the rarity of the outcome and heterogeneity in follow-up duration, meta-analysis was not conducted. Two quasi-experimental Medicaid waiver evaluations reported downward trends in pregnancy-related mortality following implementation of enhanced data integration infrastructure, though causal inference remained limited due to confounding (Cole et al., 2025).

Overall, evidence linking data integration directly to maternal mortality reduction remains insufficient and warrants further investigation.

3.4.5. Equity-Focused Findings

Twelve studies stratified outcomes by race and ethnicity. Integrated systems were associated with larger relative improvements in postpartum visit completion among Black Medicaid enrollees compared to White enrollees in several analyses (Cole et al., 2025). However, absolute disparities persisted, suggesting that integration alone does not eliminate structural inequities.

Studies incorporating social determinants of health data demonstrated improved identification of housing instability, food insecurity, and behavioral health needs. Risk prediction models integrating SDOH indicators improved detection of postpartum depression risk compared to clinical variables alone (Zhu et al., 2025). Nevertheless, concerns regarding algorithmic bias and data completeness were raised in implementation evaluations (Özkan & Acar, 2025).

International registry systems demonstrated smaller racial disparities in maternal outcomes relative to U.S. Medicaid populations, though direct comparability is limited by differing demographic compositions and healthcare financing structures (Thurin et al., 2022).

3.4.6. Risk of Bias Assessment

All included studies were observational, quasi-experimental, or qualitative in design; no randomized controlled trials met the inclusion criteria.

Risk of bias was assessed using design-appropriate tools. Among the included studies (n = 13), four were assessed as low risk of bias, seven as moderate risk, and two as serious risk due to potential confounding, selection bias, or incomplete adjustment for social determinants of health.

Common sources of bias included residual confounding in observational analyses, variability in outcome definitions, and incomplete capture of social-service utilization. Sensitivity analyses excluding studies at higher risk of bias did not materially alter pooled estimates for primary outcomes.

3.4.7. Synthesis of Integration Models and Outcomes

Collectively, the evidence suggests that Medicaid claims–EHR integration improves care coordination metrics and reduces preventable readmissions. The magnitude of effect is modest but consistent across diverse U.S. settings. Integration models incorporating social-service data appear to demonstrate incremental benefit, particularly for mental health and behavioral health outcomes, though quantitative evidence remains emerging.

The heterogeneity observed across severe maternal morbidity outcomes likely reflects both methodological variation and the multifactorial etiology of SMM. Structural determinants, provider-level factors, and hospital quality may attenuate the direct impact of data integration alone.

International comparators illustrate the potential for integrated longitudinal data systems to support medication safety monitoring and quality improvement at scale (Thurin et al., 2022). However, translation to the U.S. context requires navigating fragmented payer structures and complex privacy governance frameworks.

4. Discussion

4.1. Principal Findings

This systematic review and meta-analysis demonstrate that integration of Medicaid claims and electronic health records is consistently associated with improvements in maternal care coordination across diverse U.S. settings. Integrated data systems were associated with higher rates of postpartum follow-up and lower preventable readmissions, although causal pathways remain incompletely established. These findings suggest that improved longitudinal data visibility may help reduce care fragmentation, particularly during postpartum transitions, where coordination challenges are most pronounced.

However, the evidence does not demonstrate consistent reductions in severe maternal morbidity, and data on maternal mortality remain sparse. This likely reflects both methodological limitations including short follow-up periods and limited statistical power and the multifactorial nature of adverse maternal outcomes, which extend beyond care coordination to encompass structural inequities, hospital quality, and access to services.

Taken together, the findings position data integration as a an important but partial contributor intervention: a foundational infrastructure that enhances coordination and risk identification but must be coupled with broader system-level reforms to achieve meaningful reductions in maternal morbidity and mortality.

4.2. Medicaid as an Engine for Structural Integration

Medicaid's role as the primary payer for nearly half of U.S. births positions it as a key platform for advancing integration reform. Medicaid accountable care models evaluated in this review illustrate how shared data dashboards and claims EHR linkage can align financial incentives with maternal quality metrics (Cole et al., 2025). As states expand postpartum coverage to 12 months, opportunities increase for longitudinal tracking of cardiovascular complications, depression, and substance use disorders.

Yet integration remains uneven across states and managed care organizations. Health Information Exchanges vary in technical maturity and participation rates. Interoperability barriers persist due to vendor heterogeneity, inconsistent data standards, and privacy concerns. Even when claims and EHR data are technically linkable, governance and data-sharing agreements often delay operationalization (Özkan & Acar, 2025).

Federal initiatives promoting data interoperability under the 21st Century Cures Act and CMS interoperability rules create a supportive policy environment. However, maternal health has not consistently been the focal point of these reforms. Embedding maternal-specific metrics and equity indicators within Medicaid data modernization efforts could enhance impact.

4.3. The Added Value of Social-Service Data

Evidence from studies incorporating social determinants of health data suggests potential incremental benefit beyond claims–EHR integration alone, although evidence remains limited. Risk prediction models integrating housing instability, food insecurity, and behavioral health indicators improved identification of postpartum depression and care needs (Zhu et al., 2025). Similarly, integrated dashboards addressing perinatal inequities highlight the importance of linking clinical data with community-level indicators (Olakotan et al., 2025). Behavioral health and substance use interventions have also been incorporated into maternal care programs to address postpartum risk factors. For example, targeted behavioral interventions embedded within case management have demonstrated feasibility for engaging mothers with perinatal substance use disorders (Bhat et al., 2025), although these initiatives typically operate independently of large-scale claims-EHR data integration systems.

However, integration of social-service data introduces additional complexity. Data standardization across housing, nutrition, and child welfare systems is inconsistent. Consent, privacy, and ethical governance frameworks vary by state. Moreover, data integration without corresponding service capacity risks identifying unmet needs without resolving them.

For high-risk mothers, particularly those experiencing structural racism and socioeconomic disadvantage, cross-sector integration offers potential to address root causes of adverse outcomes. Yet implementation must prioritize equity safeguards to prevent algorithmic bias or unintended surveillance of marginalized populations.

4.4. Why Mortality Reduction Remains Elusive

The limited evidence linking integration directly to maternal mortality reduction warrants careful interpretation. Maternal mortality is a rare outcome relative to severe maternal morbidity, requiring large population samples and extended follow-up for statistical power. Many integration initiatives are recent and lack sufficient longitudinal data.

Furthermore, maternal mortality reflects complex interactions among clinical quality, structural inequities, hospital resources, and community-level determinants. Data integration may improve surveillance and care coordination but cannot alone rectify systemic inequities such as hospital closures, provider shortages, or implicit bias.

International registry systems demonstrate how unified national health datasets can facilitate population-level monitoring and rapid quality improvement (Thurin et al., 2022). However, these systems operate within centralized financing structures distinct from the U.S. multi-payer environment. Achieving comparable integration impact in the United States requires not only technical interoperability but sustained policy commitment.

4.5. Equity Implications

Achieving health equity requires not only improved data systems but also targeted, community-engaged public health strategies that address structural and historical determinants of disparities (Ugwu et al., 2025). Several included studies reported larger relative gains in postpartum visit completion among Black Medicaid enrollees in integrated systems. This suggests that improved visibility across care transitions may disproportionately benefit populations historically underserved by fragmented systems. Nonetheless, absolute disparities persisted.

Data integration should therefore be understood as a structural enabler rather than a standalone equity intervention. Without intentional design, integrated systems risk perpetuating bias embedded in claims coding, clinical documentation, or predictive algorithms. Governance frameworks must include community engagement, transparency in algorithm development, and routine disparity monitoring.

4.6. Policy Implications for Health Affairs Readers

For policymakers and Medicaid program leaders, these findings highlight the potential importance of investing in interoperable data infrastructure as part of comprehensive maternal health reform. Integration of claims and EHR data enables real-time identification of care gaps, supports accountability within value-based payment models, and facilitates coordination across clinical and community-based services.

However, infrastructure alone is insufficient. To translate integration into improved outcomes, policy efforts must align data systems with incentives, workforce capacity, and service availability. Medicaid accountable care models and Section 1115 waivers provide promising vehicles for embedding maternal-specific quality metrics within integrated data environments.

The incorporation of social determinants of health data further enhances the capacity to identify high-risk populations but introduces governance and ethical challenges related to data use, consent, and potential bias. Federal and state initiatives should prioritize standardized data elements, equity-focused performance metrics, and safeguards to ensure that integration efforts do not inadvertently reinforce disparities.

Ultimately, aligning interoperability policy with maternal health priorities represents a critical opportunity to transform fragmented systems into coordinated, equity-oriented care delivery models.

4.7. Limitations of the Evidence Base

This review has several limitations. First, heterogeneity in study design and outcome measurement limited pooling for some clinical outcomes. Second, observational designs predominate, and residual confounding cannot be excluded. Third, many integration initiatives are recent, and long-term maternal outcomes remain underreported. Fourth, international comparators operate within distinct health system structures, limiting direct policy translation.

Despite these limitations, the consistency of findings for care coordination metrics strengthens confidence that structural data integration produces meaningful operational benefits.

4.8. Future Directions and Research Gaps

The findings of this review underscore both the promise and limitations of Medicaid–EHR data integration in improving maternal outcomes. While evidence supports gains in care coordination and reductions in preventable readmissions, significant research and policy gaps remain. Addressing these gaps is critical to translating integration infrastructure into sustained reductions in severe maternal morbidity and mortality.

4.9. Longitudinal Evaluation of Maternal Mortality

A central gap in the literature is the absence of robust longitudinal evidence linking integrated data systems to maternal mortality reduction. Most included studies examined process measures or short-term outcomes such as postpartum visit completion or readmissions. Maternal mortality, by contrast, requires extended follow-up and large population denominators.

Future research should leverage expanded postpartum Medicaid coverage to track outcomes across the full 12-month postpartum period. Linking claims data with maternal mortality review committee findings could enable more precise evaluation of whether integration facilitates earlier detection of cardiomyopathy, hypertensive disorders, substance use relapse, and mental health crises. Enhanced linkage between clinical data and state vital statistics systems would strengthen causal inference.

Additionally, future studies should assess whether integration accelerates response times to high-risk conditions identified during pregnancy and postpartum transitions. Real-time analytics embedded within integrated systems may offer opportunities for earlier intervention, but empirical evaluation remains limited.

4.10. Integration of Social Determinants and Community-Level Data

Although several studies incorporated social determinants of health data, the depth and standardization of these integrations varied widely. Screening tools embedded within EHRs frequently capture housing instability or food insecurity, yet systematic linkage to social-service utilization data remains uncommon.

Future research should evaluate bidirectional integration between Medicaid claims, EHR systems, and administrative social-service databases such as housing assistance or nutrition support programs. Such integration could enable proactive identification of social risk trajectories that influence maternal outcomes.

However, cross-sector integration must be accompanied by rigorous evaluation of ethical safeguards. Concerns about data privacy, consent, and potential misuse of social data are particularly salient for marginalized populations. Transparent governance frameworks and community engagement mechanisms should be embedded within research and implementation efforts.

4.11. Artificial Intelligence and Predictive Analytics

Predictive risk modeling incorporating clinical and social data represents a rapidly evolving frontier. Studies included in this review demonstrated improved prediction of postpartum depression when social determinants were integrated into EHR-based algorithms (Zhu et al., 2025). Yet algorithmic fairness and bias mitigation remain underexplored.

Future research should evaluate whether predictive models trained on integrated Medicaid datasets disproportionately misclassify racial or socioeconomic subgroups. Independent algorithm audits and equity impact assessments should accompany implementation. Additionally, prospective trials are needed to determine whether AI-driven alerts meaningfully alter clinician behavior and improve outcomes beyond traditional risk stratification.

4.12. Standardization and Interoperability

Interoperability challenges continue to constrain scale-up. Variation in data standards, coding practices, and vendor platforms creates barriers to consistent integration. While federal interoperability rules have advanced data portability, maternal-specific quality metrics and social-service linkages remain inconsistently standardized.

Future research should examine how standardized maternal data elements such as severe maternal morbidity indicators, postpartum visit definitions, and social needs screening codes affect comparability and scalability across states. Comparative implementation research could identify best practices for governance agreements and data-sharing frameworks within Medicaid managed care environments.

4.13. Addressing Structural Inequities

Although integrated systems were associated with modest reductions in care fragmentation, disparities in maternal outcomes persisted. This underscores that data integration must be embedded within broader structural reforms addressing implicit bias, hospital quality variation, and workforce shortages.

Future research should evaluate whether integrated systems amplify or mitigate disparities in resource allocation. For example, do integrated dashboards trigger additional outreach to historically marginalized populations, or do they preferentially benefit patients with more complete documentation? Stratified analyses by race, geography, and socioeconomic status should become standard in future evaluations.

Community-based participatory research models may strengthen equity alignment by involving affected populations in system design and oversight.

4.14. International Learning and Comparative Policy Research

International registry systems demonstrate the power of unified longitudinal datasets to support maternal medication safety monitoring and quality improvement (Thurin et al., 2022). Comparative policy research should examine which governance mechanisms enable sustainable registry infrastructure and whether hybrid models are feasible within the U.S. federalist structure.

Cross-national comparisons could also clarify how centralized financing interacts with data integration to influence maternal outcomes. Such analyses would inform policy translation while acknowledging structural differences between health systems.

4.15. Payment Reform and Incentive Alignment

Data integration alone does not guarantee behavioral change. Payment incentives must align with integrated infrastructure to drive sustained improvement. Future research should evaluate whether value-based payment models incorporating maternal integration metrics produce larger outcome gains than infrastructure investments alone. Medicaid 1115 waivers and accountable care organizations offer natural experiments for examining how financial alignment interacts with interoperability to influence maternal outcomes.

4.16. Summary of Research Priorities

In summary, future research should prioritize longitudinal mortality evaluation, cross-sector data standardization, algorithmic fairness, equity-focused implementation, and payment model alignment. Integration infrastructure provides foundational capability, but its effectiveness depends on governance, incentives, and community engagement.

5. Conclusion

The United States continues to face a persistent maternal health crisis characterized by rising severe maternal morbidity, preventable postpartum complications, and enduring racial and socioeconomic disparities. This systematic review demonstrates that integration of Medicaid claims, electronic health records, and social-service data is associated with measurable improvements in care coordination, including increased postpartum visit completion and reduced preventable readmissions. However, evidence linking data integration to reductions in severe maternal morbidity and maternal mortality remains limited. These outcomes are shaped by complex interactions among clinical care quality, structural inequities, and social determinants that extend beyond the reach of data systems alone. Data integration should therefore be understood as a critical enabling infrastructure rather than a standalone solution. Its full impact depends on alignment with payment reform, workforce capacity, and equity-focused policy interventions. As Medicaid programs expand postpartum coverage and invest in interoperability, the integration of clinical and social data offers a timely and actionable pathway to strengthen maternal health systems. Sustained progress will require not only technical integration, but also governance frameworks and policy commitments that prioritize equity, accountability, and coordinated care delivery across sectors.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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