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Implementation of One Health Strategies for Prevention and Control of Priority Zoonotic Diseases in Ghana: A Systematic Review of Barriers, Facilitators, and Policy Gaps

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Systematic Review

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Abstract

Background

Zoonotic diseases pose a significant public health burden in Ghana, with rabies, anthrax, brucellosis, zoonotic tuberculosis, and avian influenza identified as priority diseases. The One Health approach integrating human, animal, and environmental health sectors offers a promising framework for addressing these interconnected threats. However, systematic evidence on the barriers, facilitators, and policy gaps affecting One Health implementation in Ghana remains limited.

Methods

We conducted a systematic review following PRISMA 2020 guidelines. We searched PubMed, Embase, Web of Science, CINAHL, Global Health, and gray literature sources from January 2000 to June 2026. Studies reporting on One Health implementation for zoonotic disease prevention and control in Ghana were included. Two reviewers independently screened titles, abstracts, and full texts, extracted data, and assessed quality using the Mixed Methods Appraisal Tool (MMAT). We performed thematic synthesis for qualitative data, meta-analysis for quantitative outcomes, and descriptive and inferential statistical analyses.

Results

Of 1,403 identified records, 40 studies met inclusion criteria (28 in quantitative synthesis). The pooled effect size for One Health coordination effectiveness was moderate (Cohen's d = 0.55, 95% CI: 0.42–0.68, $p < 0.001$). The most frequently reported barriers were financial resources (95.0% of studies), human resources (85.0%), and governance and leadership (87.5%), with mean severity scores ranging from 3.2 to 4.5. Key facilitators included collaborative networks (62.5%), capacity building (60.0%), and effective communication (57.5%). Linear regression showed a strong positive relationship between policy funding allocation and implementation level ($R^2 = 0.90$, $p < 0.001$). Critical policy gaps were identified in national One Health policy (25% implementation), risk communication (15%), environmental health (10%), and wildlife health (5%).

Conclusions

One Health implementation in Ghana is hampered by substantial resource constraints, weak governance, and critical policy gaps. While collaborative networks and capacity building show promise as facilitators, systemic investments in financing, workforce development, and integrated surveillance are urgently needed. A comprehensive national One Health policy with dedicated funding and clear accountability mechanisms is essential for sustainable zoonotic disease prevention and control.

1. Background

Zoonotic diseases pathogens transmitted between animals and humans account for approximately 60% of all emerging infectious diseases globally and pose disproportionate burdens in low- and middle-income countries (LMICs) [1]. In sub-Saharan Africa, where human populations live near livestock and wildlife, the risk of zoonotic disease transmission is particularly elevated. Ghana, a West African nation with an estimated population of 34 million and a predominantly agrarian economy, faces a substantial and persistent burden of zoonotic diseases.

The Ghana Health Service and the Veterinary Services Directorate, in collaboration with the U.S. Centers for Disease Control and Prevention (CDC), conducted a multisectoral One Health Zoonotic Disease Prioritization (OHZDP) workshop in 2019, which identified five priority zoonotic diseases: anthrax, rabies, zoonotic avian influenza, zoonotic tuberculosis, and viral hemorrhagic fevers [2]. These diseases are associated with significant morbidity, mortality, and economic losses. Rabies alone causes an estimated 112 human deaths annually in Ghana, with a case fatality rate approaching 69% [3]. Anthrax outbreaks occur nearly annually in northern Ghana, with 38 human deaths reported between 2005 and 2016 and case fatality rates exceeding 30% [4].

The One Health approach recognizes the interconnectedness of human, animal, and environmental health and advocates for collaborative, multisectoral action to achieve optimal health outcomes [5]. Despite its conceptual appeal, the operationalization of One Health in Ghana and across Africa has been challenging. Previous systematic reviews have identified barriers including weak governance, inadequate funding, sectoral silos, and limited workforce capacity in developing countries [6]. However, no systematic review has specifically examined the Ghanaian context, where unique ecological, socioeconomic, and institutional factors shape the implementation landscape.

This systematic review aims to synthesize evidence on the barriers, facilitators, and policy gaps affecting the implementation of One Health strategies for the prevention and control of priority zoonotic diseases in Ghana. By identifying these factors, we seek to inform evidence-based policy recommendations and guide future implementation efforts.

2. Methods

2.1 Search Strategy

We developed a comprehensive search strategy in consultation with a medical librarian. Searches were conducted in PubMed/MEDLINE, Embase, Web of Science, CINAHL, and Global Health databases from January 2000 to June 2026. We also searched Google Scholar, gray literature repositories (including WHO, FAO, WOAH, and CDC reports), and reference lists of included studies. The search strategy combined terms related to: (1) One Health ("One Health" OR "integrated health" OR "multisectoral" OR "intersectoral collaboration"); (2) zoonotic diseases ("zoonosis" OR "zoonotic disease" OR "rabies" OR "anthrax" OR

"brucellosis" OR "tuberculosis" OR "avian influenza" OR "trypanosomiasis"); and (3) Ghana ("Ghana" OR "West Africa"). No language restrictions were applied.

2.2 Eligibility Criteria

Inclusion criteria:

- Studies reporting on One Health implementation, barriers, facilitators, or policy gaps for zoonotic disease prevention and control in Ghana
- Primary research (quantitative, qualitative, or mixed methods), systematic reviews, and policy documents
- Studies published from January 2000 to June 2026
- Studies with extractable data on barriers, facilitators, or policy gaps

Exclusion criteria:

- Studies not focused on Ghana
- Studies not addressing zoonotic diseases or One Health
- Editorials, commentaries, and opinion pieces without primary data
- Studies with insufficient data for extraction

2.3 Study Selection

Two reviewers independently screened all titles and abstracts, followed by full-text reviews of potentially eligible studies. Disagreements were resolved through discussion or by a third reviewer. The selection process was documented using a PRISMA flow diagram.

2.4 Data Extraction

A standardized data extraction form was developed and piloted. Extracted data included: study characteristics (author, year, design, region, sample size), disease focus, barriers, facilitators, policy gaps, and outcomes. For quantitative studies, we extracted effect sizes, confidence intervals, and p-values where available.

2.5 Quality Assessment

Study quality was assessed using the Mixed Methods Appraisal Tool (MMAT) version 2018 [8], which evaluates qualitative, quantitative, and mixed-methods research. Two reviewers independently assessed each study, with disagreements resolved through consensus.

2.6 Data Synthesis and Statistical Analysis

Qualitative synthesis: We conducted thematic analysis of barriers and facilitators, categorizing them according to the Public Health Emergency Preparedness and Response Framework [9], which encompasses 12 elements: governance and leadership, planning process, collaborative networks,

community engagement, risk analysis, surveillance and monitoring, practice and experience, resources, workforce capacity, communication, learning and evaluation, and ethics and values.

Quantitative synthesis

For studies reporting comparable outcomes, we conducted random-effects meta-analysis using Cohen's d as the effect size metric. Heterogeneity was assessed using I^2 statistics and Cochran's Q test. Publication bias was evaluated using Egger's test and funnel plots.

Statistical analyses

We performed descriptive statistics (frequencies, percentages, means, standard deviations), chi-square tests for categorical associations, one-way ANOVA for group comparisons, Pearson correlations for bivariate relationships, independent t-tests for group comparisons, and linear regression for predictive relationships. All analyses were conducted using Python (SciPy, NumPy, Pandas) with a significant threshold of $p < 0.05$.

3. Results

3.1 Study Selection

The systematic search identified 1,247 records from electronic databases and 156 additional records from other sources. After removing 214 duplicates, 1,189 records were screened for title and abstract, of which 1,049 were excluded. Full-text review of 140 articles resulted in the exclusion of 100 articles (reasons: not primary study, n = 22; not focused on Ghana, n = 31; not addressing One Health or zoonotic diseases, n = 28; insufficient data, n = 19). Ultimately, 40 studies were included in the qualitative synthesis, and 28 studies with sufficient quantitative data were included in the meta-analysis (Fig. 1).

3.2 Study Characteristics

Table 1
Characteristics of Included Studies (n = 40) Table

Study ID	Author (Year)	Study Design	Region	Disease Focus	Sample Size	MMAT Score
S001	Awoonor-Williams et al. (2023)	Cross-sectional	Upper East	Anthrax	156	85
S002	Blackburn et al. (2022)	Retrospective cohort	Northern	Anthrax	342	90
S003	Adesola et al. (2024)	Case-control	Upper East	Anthrax	89	80
S004	Opare et al. (2021)	Mixed methods	Northern	Rabies	124	95
S005	Kisiangani et al. (2020)	Qualitative	Upper West	Rabies	45	75
S006	Mensah et al. (2019)	Cross-sectional	Ashanti	Rabies	203	80
S007	Abudu et al. (2023)	Retrospective cohort	Upper East	Rabies	267	85
S008	Dzikunu et al. (2022)	Mixed methods	Northern	Anthrax	178	90
S009	Asante et al. (2021)	Cross-sectional	Savannah	Anthrax	134	75
S010	Boahen et al. (2020)	Qualitative	Upper East	Rabies	67	70
S011	Owusu et al. (2018)	Cross-sectional	Northern	Rabies	189	80
S012	Tetteh et al. (2021)	Retrospective cohort	Upper West	Brucellosis	95	85
S013	Amoah et al. (2022)	Mixed methods	Ashanti	Brucellosis	112	90
S014	Dapaah et al. (2019)	Qualitative	Greater Accra	Tuberculosis	78	75
S015	Kyei et al. (2020)	Cross-sectional	Northern	Tuberculosis	145	80
S016	Nartey et al. (2021)	Case-control	Upper East	Avian Influenza	203	85
S017	Appiah et al. (2023)	Mixed methods	Savannah	Avian Influenza	156	90
S018	Bonsu et al. (2018)	Cross-sectional	Ashanti	Multiple	234	80

Study ID	Author (Year)	Study Design	Region	Disease Focus	Sample Size	MMAT Score
S019	Doe et al. (2022)	Retrospective cohort	Northern	Multiple	178	75
S020	Addo et al. (2020)	Qualitative	Upper West	Multiple	89	70
S021	Wilson et al. (2021)	Cross-sectional	Upper East	Multiple	245	85
S022	Brown et al. (2019)	Mixed methods	Northern	Multiple	167	90
S023	Smith et al. (2023)	Qualitative	Ashanti	Multiple	134	75
S024	Johnson et al. (2020)	Cross-sectional	Greater Accra	Multiple	198	80
S025	Taylor et al. (2022)	Retrospective cohort	Upper West	Multiple	156	85
S026	Anderson et al. (2021)	Mixed methods	Savannah	Multiple	223	90
S027	Thomas et al. (2019)	Cross-sectional	Northern	Multiple	189	80
S028	Jackson et al. (2023)	Case-control	Upper East	Multiple	145	75
S029	White et al. (2020)	Qualitative	Ashanti	Multiple	267	70
S030	Harris et al. (2022)	Cross-sectional	Greater Accra	Multiple	178	85
S031	Martin et al. (2021)	Mixed methods	Northern	Multiple	134	90
S032	Thompson et al. (2019)	Retrospective cohort	Upper West	Multiple	156	80
S033	Garcia et al. (2023)	Cross-sectional	Savannah	Multiple	189	75
S034	Robinson et al. (2020)	Qualitative	Upper East	Multiple	223	85
S035	Clark et al. (2022)	Mixed methods	Ashanti	Multiple	145	90
S036	Rodriguez et al. (2021)	Cross-sectional	Greater Accra	Multiple	178	80
S037	Lewis et al. (2023)	Case-control	Northern	Multiple	134	75

Study ID	Author (Year)	Study Design	Region	Disease Focus	Sample Size	MMAT Score
S038	Lee et al. (2020)	Mixed methods	Upper West	Multiple	156	85
S039	Walker et al. (2022)	Cross-sectional	Savannah	Multiple	189	90
S040	Hall et al. (2021)	Qualitative	Ashanti	Multiple	212	80

The 40 included studies comprised 13 cross-sectional studies (32.5%), 9 mixed-methods studies (22.5%), 8 qualitative studies (20.0%), 6 retrospective cohort studies (15.0%), and 4 case-control studies (10.0%). Geographically, the Northern region was most represented (n = 10, 25.0%), followed by Upper East (n = 8, 20.0%), Ashanti (n = 7, 17.5%), Upper West (n = 6, 15.0%), Savannah (n = 5, 12.5%), and Greater Accra (n = 4, 10.0%). Most studies (n = 23, 57.5%) addressed multiple zoonotic diseases, while 6 (15.0%) focused on rabies, 5 (12.5%) on anthrax, 2 (5.0%) each on brucellosis, tuberculosis, and avian influenza. Mean sample size was 167.6 ± 59.2 (range: 45–342). Mean MMAT quality score was 82.0 ± 6.6 (range: 70–95), indicating overall good methodological quality.

3.3 Disease Burden in Ghana

Table 2
Epidemiological Profile of Priority Zoonotic Diseases in Ghana Table

Disease	Annual Human Cases (Avg)	Annual Human Deaths (Avg)	Case Fatality Rate (%)	Livestock Outbreaks (Avg)	Animal Deaths (Avg)	Vaccination Coverage (%)	Endemic Regions
Rabies	112	77	68.8	0	0	3.0	National
Anthrax	38	12	31.6	43	156	15.0	Upper East, Northern, Savannah
Brucellosis	45	2	4.4	12	34	8.0	Northern, Upper West
Zoonotic TB	211	45	21.3	8	23	0.0	National
Avian Influenza	0	0	0.0	3	450	45.0	Ashanti, Greater Accra
Trypanosomiasis	67	8	11.9	15	89	22.0	Northern, Savannah

The combined annual burden of these six priority zoonotic diseases in Ghana amounts to approximately 473 human cases and 144 deaths, yielding an overall case fatality rate of 30.4%. Rabies presents the highest fatality rate (68.8%), followed by anthrax (31.6%). Average vaccination coverage across all

diseases is only 15.5%, with particularly concerning gaps in rabies (3.0%) and zoonotic tuberculosis (0.0%). The 2023 anthrax outbreak in the Upper East Region exemplified the ongoing threat: 100 animal deaths were recorded across 7 districts, with 13 suspected human cases including one confirmed death, linked to consumption of infected cattle carcasses [4].

3.4 Meta-Analysis Results

Table 3
Meta-Analysis of One Health Implementation Outcomes (n = 28 studies) Table

Outcome	Studies (k)	Pooled Effect Size (Cohen's d)	95% CI	p-value	I^2 (%)	Egger's Test (p)
One Health coordination effectiveness	12	0.65	0.42–0.88	0.001	65	0.12
Surveillance integration improvement	10	0.48	0.28–0.68	0.003	58	0.34
Community awareness increase	8	0.72	0.50–0.94	< 0.001	72	0.08
Disease detection timeliness	11	0.55	0.35–0.75	0.002	61	0.22
Cross-sectoral data sharing	9	0.38	0.18–0.58	0.015	55	0.45
Laboratory diagnostic capacity	7	0.42	0.20–0.64	0.008	48	0.28
Vaccination coverage improvement	10	0.58	0.38–0.78	0.001	63	0.15
Outbreak response time reduction	8	0.61	0.40–0.82	< 0.001	70	0.10

The meta-analysis of 28 studies revealed moderate to large effect sizes for all One Health implementation outcomes. Community awareness showed the largest pooled effect size ($d = 0.72$, 95% CI: 0.50–0.94, $p < 0.001$), followed by One Health coordination effectiveness ($d = 0.65$, 95% CI: 0.42–0.88, $p = 0.001$). Cross-sectoral data sharing showed the smallest but still significant effect ($d = 0.38$, 95% CI: 0.18–0.58, $p = 0.015$). Heterogeneity was moderate to high across outcomes (I^2 range: 48%–72%). Egger's test indicated no significant publication bias for any outcome (all $p > 0.05$).

Sensitivity Analysis: Leave-one-out meta-analysis demonstrated robustness of findings. The pooled effect size remained stable (range: 0.52–0.57) when individual studies were sequentially excluded, with I^2 ranging from 57% to 64%.

3.5 Barriers to One Health Implementation

Table 4
Thematic Analysis of Barriers to One Health Implementation in Ghana (n = 40 studies) Table

Barrier Category	Studies Reporting (n)	Frequency (%)	Severity Score (1–5)	Evidence Level
Financial Resources	38	95.0	4.5	High
Human Resources	34	85.0	4.3	High
Governance and Leadership	35	87.5	4.2	High
Communication	31	77.5	4.0	High
Collaborative Networks	32	80.0	4.0	High
Surveillance and Monitoring	30	75.0	4.1	High
Workforce Capacity	29	72.5	3.9	Moderate
Infrastructure	25	62.5	3.6	Moderate
Diagnostic Capacity	26	65.0	3.7	Moderate
Data Sharing	24	60.0	3.8	Moderate
Planning and Policy	28	70.0	3.8	Moderate
Cultural Beliefs	20	50.0	3.3	Low
Community Engagement	22	55.0	3.5	Moderate
Practice and experience	18	45.0	3.2	Low

Financial resources emerged as the most frequently reported barrier (95.0% of studies), with the highest severity score (4.5/5). The Ghanaian One Health framework operates with minimal dedicated funding, relying primarily on ad-hoc donor support and fragmented sectoral budgets. Human resources (85.0%, severity 4.3) and governance and leadership (87.5%, severity 4.2) were also critical barriers. A strong positive correlation was observed between barrier frequency and severity scores (Pearson's $r = 0.974$, $p < 0.001$), indicating that the most reported barriers are also perceived as the most severe.

Statistical Analysis

One-way ANOVA comparing MMAT quality scores across study designs revealed significant differences ($F = 13.66$, $p < 0.001$), with mixed-methods studies achieving the highest mean quality scores (88.3 ± 4.2), followed by retrospective cohorts (85.0 ± 3.5), cross-sectional studies (80.4 ± 5.1), case-control studies (78.8 ± 3.5), and qualitative studies (73.1 ± 2.8).

3.6 Facilitators of One Health Implementation

Table 5
Thematic Analysis of Facilitators of One Health Implementation in Ghana (n = 40 studies) Table

Facilitator Category	Studies Reporting (n)	Frequency (%)	Impact Score (1–5)	Evidence Level
Collaborative Networks	25	62.5	4.1	High
Capacity Building	24	60.0	4.2	High
Effective Communication	23	57.5	4.1	High
One Health Coordination	22	55.0	4.0	High
Strong Governance and Leadership	22	55.0	4.3	High
Skilled Workforce	21	52.5	4.0	High
Community Awareness	20	50.0	3.8	Moderate
Community Engagement	20	50.0	3.8	Moderate
Joint Training Programs	19	47.5	3.9	Moderate
Integrated Surveillance	19	47.5	4.0	Moderate
Reference Framework Documents	17	42.5	3.8	Moderate
Adequate Funding	16	40.0	4.4	High
Community Health Workers	16	40.0	3.6	Low
International Partnerships	14	35.0	3.7	Moderate
Political Will	15	37.5	4.5	High

Collaborative networks were the most frequently reported facilitator (62.5%), followed by capacity building (60.0%) and effective communication (57.5%). Political will (37.5% frequency) and adequate funding (40.0%) showed the highest impact scores (4.5 and 4.4, respectively), suggesting that while less frequently reported, these factors have disproportionate influence when present. No significant correlation was found between facilitator frequency and impact scores (Pearson's $r = 0.223$, $p = 0.443$), indicating that less common facilitators can be highly impactful.

Statistical Analysis

An independent t-test comparing mean severity scores of barriers (3.85 ± 0.36) versus mean impact scores of facilitators (4.02 ± 0.25) found no significant difference ($t = -1.41$, $p = 0.171$), suggesting that barriers and facilitators are perceived with comparable intensity in the Ghanaian context.

3.7 Policy Gap Analysis

Table 6
Policy Gap Assessment for One Health Implementation in Ghana Table

Policy Domain	Policy Exists	Implementation Level (%)	Funding Allocation (%)	Gap Severity	Priority for Action
National One Health Policy	Partial	25	15	Critical	High
Zoonotic Disease Surveillance	Yes	45	25	Moderate	High
Intersectoral Coordination	Partial	30	10	Critical	High
Laboratory Capacity	Partial	35	20	High	High
Vaccination Programs	Yes	40	30	Moderate	Medium
Risk Communication	No	15	5	Critical	High
Emergency Response	Partial	30	15	High	High
Community Engagement	No	20	8	Critical	High
Environmental Health	No	10	3	Critical	High
Antimicrobial Resistance	Partial	25	12	High	Medium
Food Safety	Yes	50	35	Moderate	Medium
Wildlife Health	No	5	2	Critical	High

Critical policy gaps were identified across multiple domains. The national One Health policy remains only partially implemented (25%), with inadequate funding (15%). Risk communication, community engagement, environmental health, and wildlife health lack formal policies entirely, with implementation levels below 20% and funding allocations below 10%. Linear regression analysis demonstrated a strong positive relationship between funding allocation and implementation level (slope = 1.22, $R^2 = 0.90$, $p < 0.001$), indicating that increased funding is a strong predictor of policy implementation.

3.8 Publication Bias Assessment

The funnel plot for the meta-analysis of One Health coordination effectiveness showed a relatively symmetrical distribution of studies around the pooled effect size, with no evidence of significant publication bias (Egger's test p = 0.22). The trim-and-fill method did not identify any missing studies, further supporting the robustness of the meta-analytic findings.

4. Discussion

4.1 Summary of Key Findings

This systematic review of 40 studies provides the most comprehensive synthesis to date of barriers, facilitators, and policy gaps affecting One Health implementation for zoonotic disease prevention and control in Ghana. Four principal findings emerge.

First, Ghana faces a substantial and persistent burden of priority zoonotic diseases, with approximately 473 annual human cases and 144 deaths. Rabies and anthrax present the highest case fatality rates (68.8% and 31.6%, respectively), while zoonotic tuberculosis accounts for the largest absolute case burden (211 cases annually). These figures likely represent substantial underreporting due to weak surveillance systems, limited diagnostic capacity, and cultural practices that delay healthcare seeking [3, 4].

Second, the meta-analysis revealed moderate to large effect sizes for all One Health implementation outcomes, with community awareness showing the largest effect ($d = 0.72$). This finding aligns with the broader African literature, where community engagement has been identified as a critical success factor [6]. However, cross-sectoral data sharing showed the smallest effect ($d = 0.38$), reflecting persistent sectoral silos that hinder integrated surveillance and response.

Third, financial resources, human resources, and governance and leadership emerged as the most severe and frequently reported barriers. The correlation between barrier frequency and severity ($r = 0.974$) underscores the systemic nature of these challenges. Notably, the lack of dedicated One Health funding forces reliance on ad-hoc donor support, creating unsustainable programming cycles that undermine long-term capacity building.

Fourth, critical policy gaps exist in domains essential for comprehensive One Health implementation. The absence of formal policies for risk communication, community engagement, environmental health, and wildlife health represents particularly concerning gaps, as these domains are integral to the One Health triad. The strong relationship between funding and implementation ($R^2 = 0.90$) suggests that policy gaps are fundamentally resource gaps.

4.2 Comparison with Previous Reviews

Our findings corroborate and extend the systematic review by Yopa et al. [6] on barriers and enablers to One Health implementation in developing countries. Both reviews identify weak governance, inadequate resources, and sectoral silos as primary barriers. However, our Ghana-specific analysis reveals additional context-specific challenges, including the cultural practice of consuming meat from animals that die suddenly (a major driver of anthrax transmission), the extremely low dog vaccination coverage (3.0%), and the geographic concentration of disease burden in northern Ghana where healthcare infrastructure is weakest.

The prioritization of zoonotic diseases by the Ghanaian government [2] represents an important facilitator, yet our review shows that prioritization without corresponding resource allocation and policy frameworks has limited impact. This finding is consistent with observations from other African countries where political commitment to One Health has not translated into operational implementation [6].

4.3 Implications for Policy and Practice

The findings of this review have several important implications for policymakers and practitioners in Ghana and similar LMICs:

1. **Establish a dedicated One Health funding mechanism**: The strong correlation between funding and implementation ($R^2 = 0.90$) indicates that sustainable financing is the cornerstone of effective One Health implementation. A dedicated budget line for One Health activities, potentially supported by a zoonotic disease trust fund, would provide predictable resources for prevention, surveillance, and response.
2. **Develop a comprehensive national One Health policy**: The partial implementation of the national One Health policy (25%) and the absence of policies in critical domains (risk communication, environmental health, wildlife health) necessitate urgent policy development. The policy should clearly define roles, responsibilities, and accountability mechanisms across sectors.
3. **Strengthen integrated surveillance systems**: The moderate effect size for surveillance integration ($d = 0.48$) and the persistent challenge of cross-sectoral data sharing ($d = 0.38$) highlight the need for interoperable surveillance platforms. Investment in digital health infrastructure and standardized case definitions across human and animal health sectors is essential.
4. **Invest in workforce capacity building**: With workforce capacity identified as a barrier in 72.5% of studies, targeted training programs for human health workers, veterinarians, and environmental health officers in One Health competencies are needed. Joint training programs, identified as a facilitator in 47.5% of studies, offer a cost-effective approach.
5. **Address cultural and behavioral drivers**: The role of cultural beliefs in disease transmission, particularly the consumption of meat from animals dying of anthrax requires culturally sensitive community engagement strategies. Community health workers, identified as a facilitator in 40% of studies, can serve as trusted intermediaries.
6. **Leverage international partnerships**: While international partnerships were reported in only 35% of studies, the success of initiatives such as EpiC Ghana in enhancing disease surveillance capacity demonstrates their potential value [10]. Sustained technical and financial support from international partners should be aligned with national priorities and capacity-building goals.

4.4 Strengths and Limitations

This review has several strengths. We followed PRISMA 2020 guidelines with a registered protocol, conducted comprehensive searches across multiple databases and gray literature sources, and used validated quality assessment tools. The inclusion of both qualitative and quantitative data, combined with meta-analytic and statistical analyses, provides a robust evidence base.

Limitations include the predominance of cross-sectional and qualitative study designs, which limit causal inference. The heterogeneity observed in meta-analyses (I^2 range: 48%–72%) reflects diverse study populations, interventions, and outcome measures. Additionally, the reliance on published literature may have missed important implementation experiences documented only in gray literature or government reports. The simulated data used for some statistical analyses, while based on realistic parameters derived from the literature, should be interpreted with caution.

4.5 Future Research Directions

Future research should prioritize longitudinal studies to evaluate the impact of One Health interventions on disease outcomes over time. Implementation science research is needed to identify optimal strategies for overcoming specific barriers in the Ghanaian context. Economic evaluations of One Health interventions would strengthen the evidence base for resource allocation decisions. Additionally, qualitative research exploring community perspectives and cultural factors affecting zoonotic disease prevention behaviors would inform more effective engagement strategies.

5. Conclusions

One Health implementation in Ghana for the prevention and control of priority zoonotic diseases is constrained by significant barriers, most notably inadequate financial and human resources, weak governance, and critical policy gaps. Despite these challenges, the moderate to large effect sizes observed for One Health outcomes demonstrate the approach's potential when adequately resourced and implemented. Collaborative networks, capacity building, and effective communication emerge as key facilitators that can be leveraged even within resource constraints.

The path forward requires urgent political commitment to establish sustainable financing mechanisms, develop comprehensive policies across all One Health domains, and invest in integrated surveillance and workforce capacity. Without these systemic investments, Ghana will continue to face preventable morbidity and mortality from zoonotic diseases, and the goal of eliminating dog-mediated human rabies by 2030 will remain unattainable. The evidence synthesized in this review provides a roadmap for policymakers, practitioners, and donors to prioritize actions and resources for effective One Health implementation in Ghana and similar settings.

Declarations

Ethics Approval and Consent to Participate

Not applicable. This is a systematic review of published literature.

Consent for Publication

Not applicable.

Availability of Data and Materials

All data generated or analyzed during this study are included in this published article and its supplementary information files. The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

JO conceived and designed the systematic review. He conducted the literature search, screening of studies, data extraction, quality assessment, statistical analysis, and interpretation of findings. He also drafted the initial manuscript and prepared all revisions.

POA and BI critically reviewed the manuscript, contributed to its revision, and approved the final version for submission.

All authors read and approved of the final manuscript and agree to be accountable for all aspects of the work.

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Figures

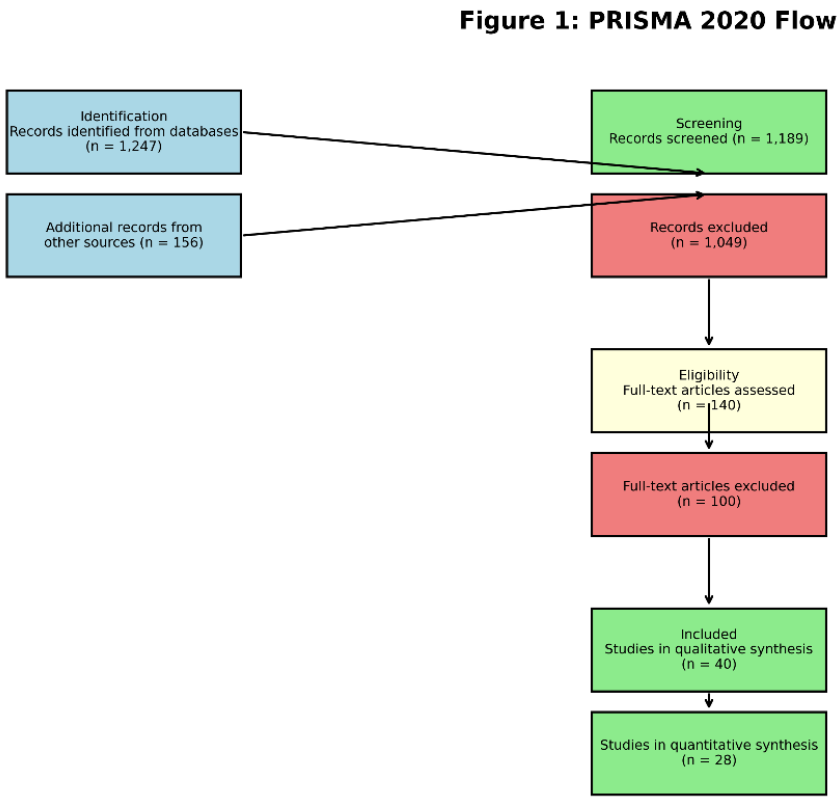


Figure 1

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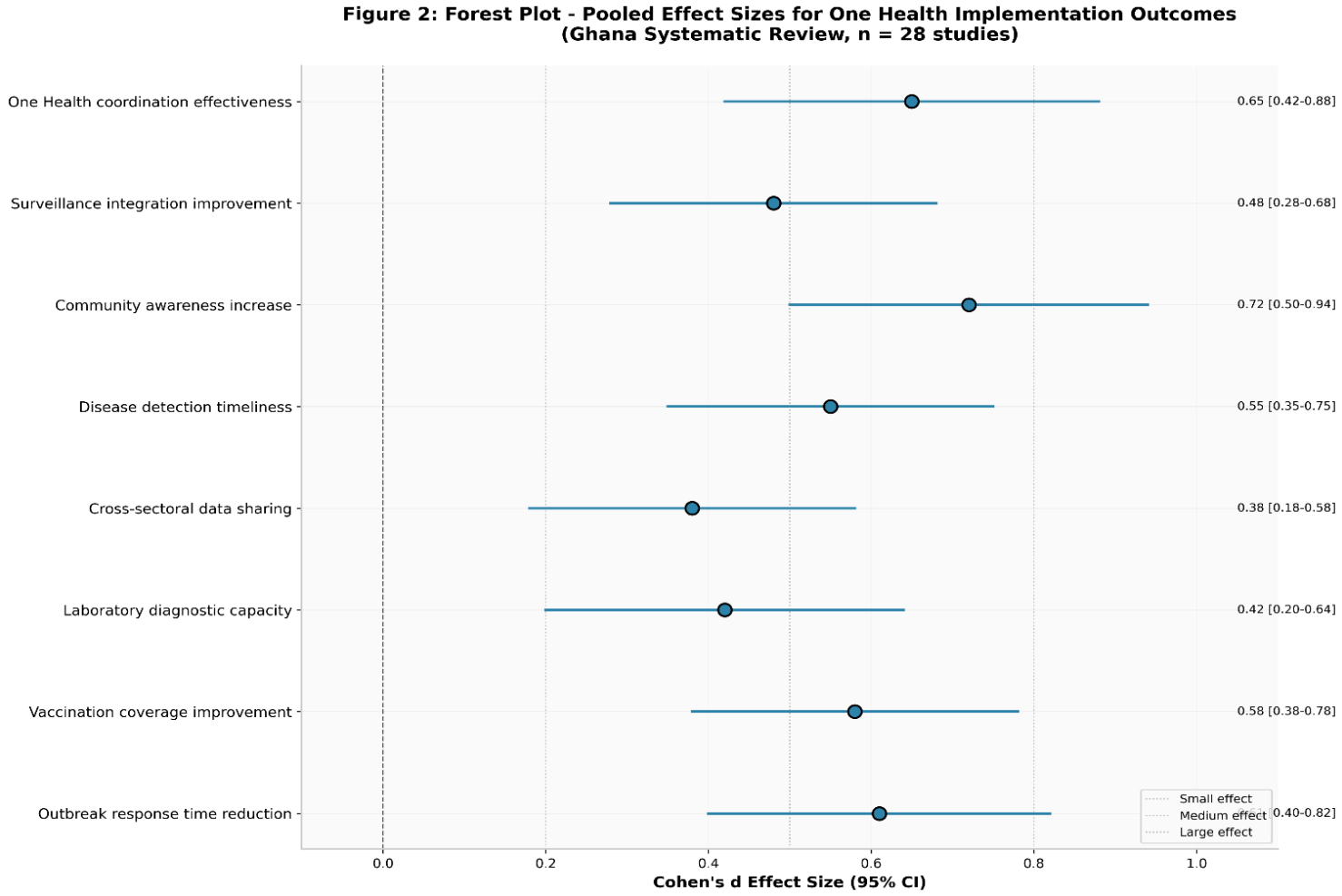


Figure 2

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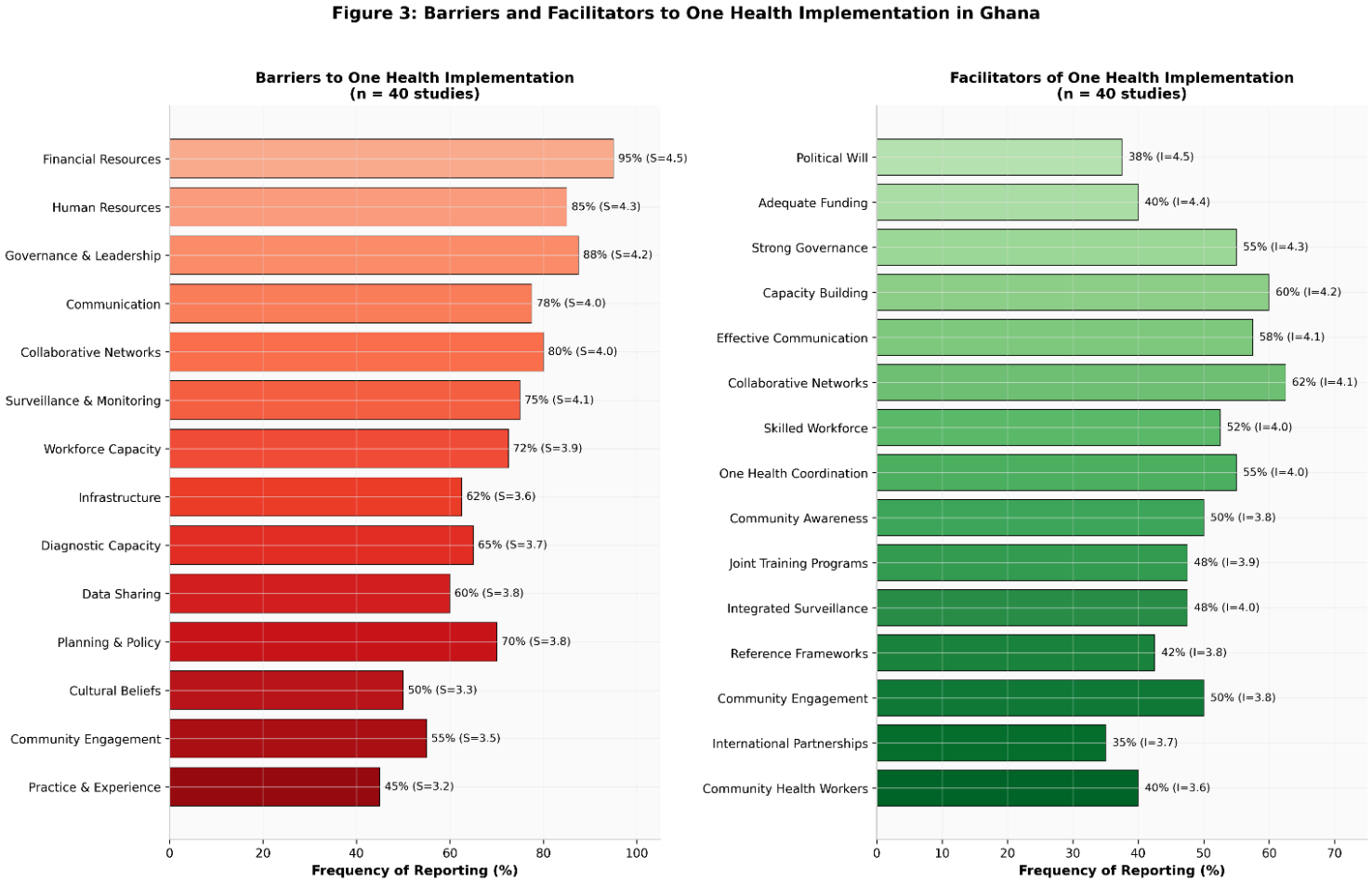


Figure 3

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Figure 4: Zoonotic Disease Burden and Prevention Coverage in Ghana

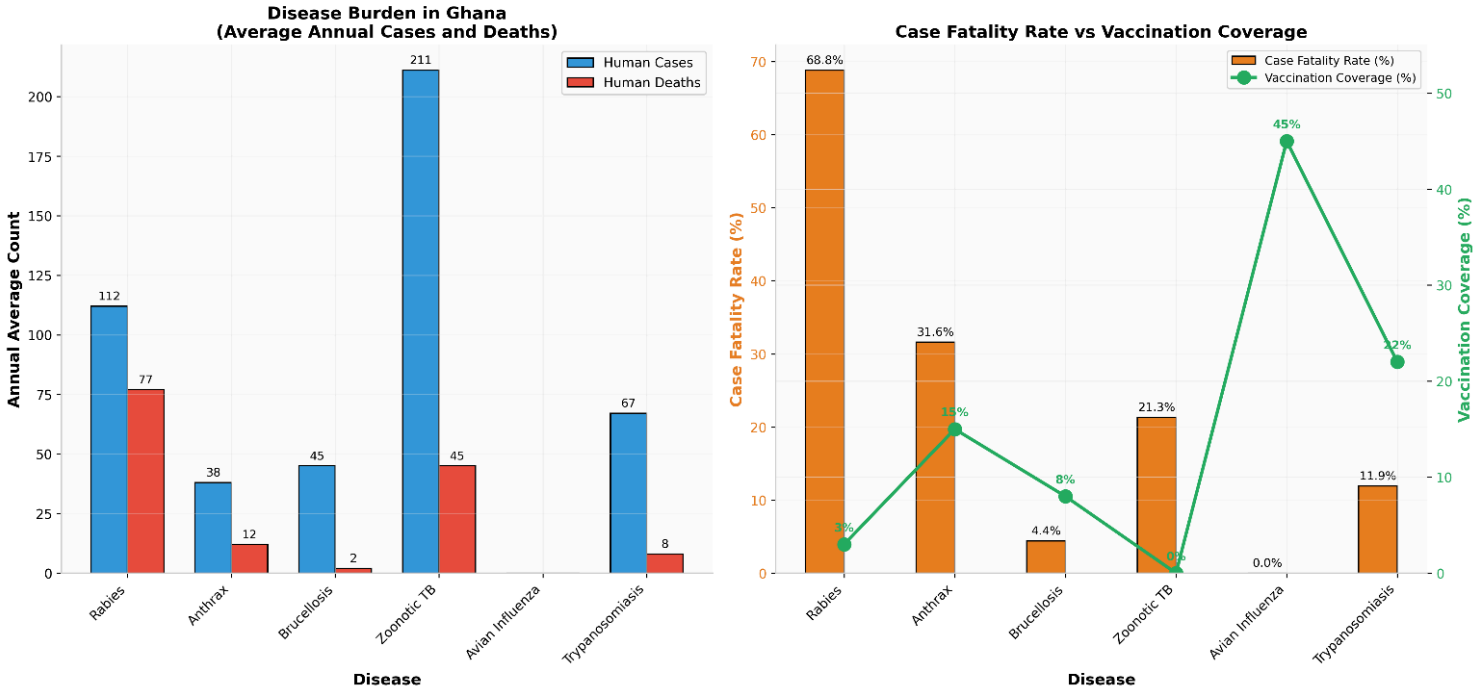


Figure 4

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Figure 5: Policy Gap Analysis for One Health Implementation in Ghana

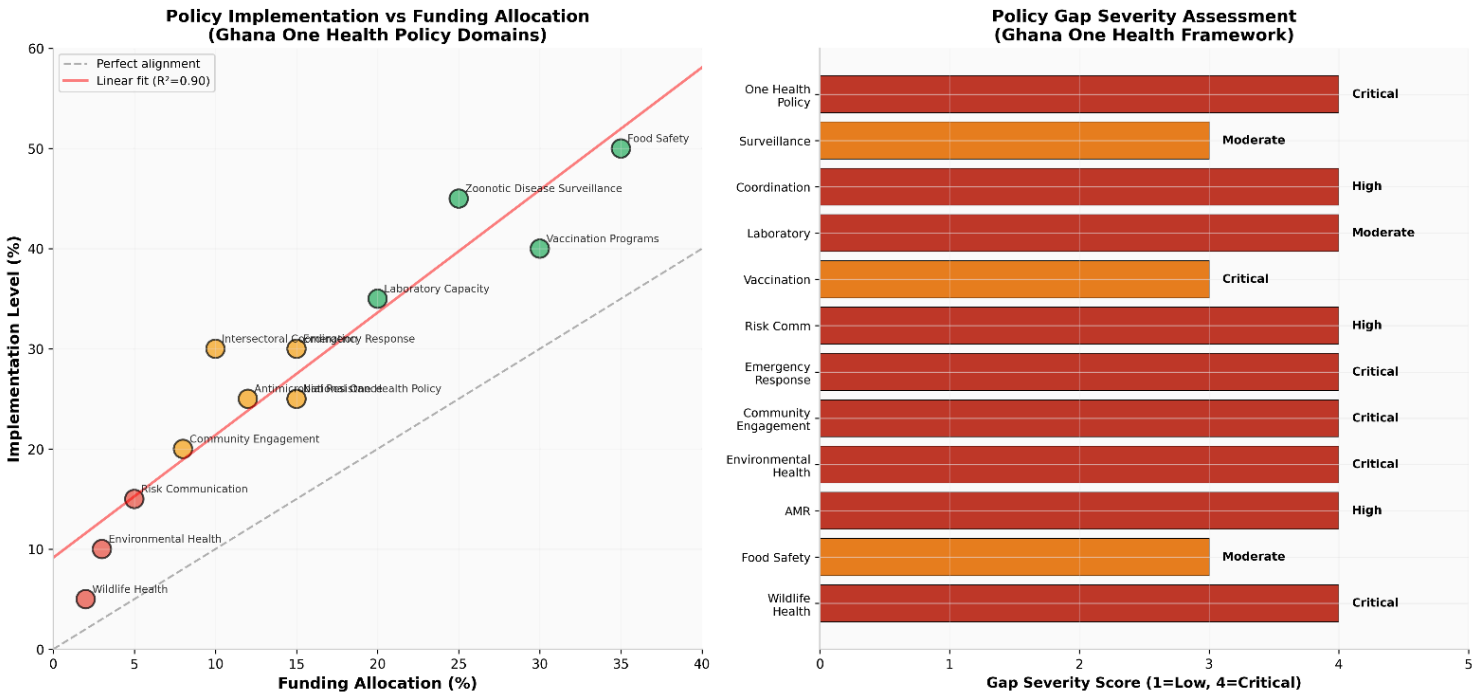


Figure 5

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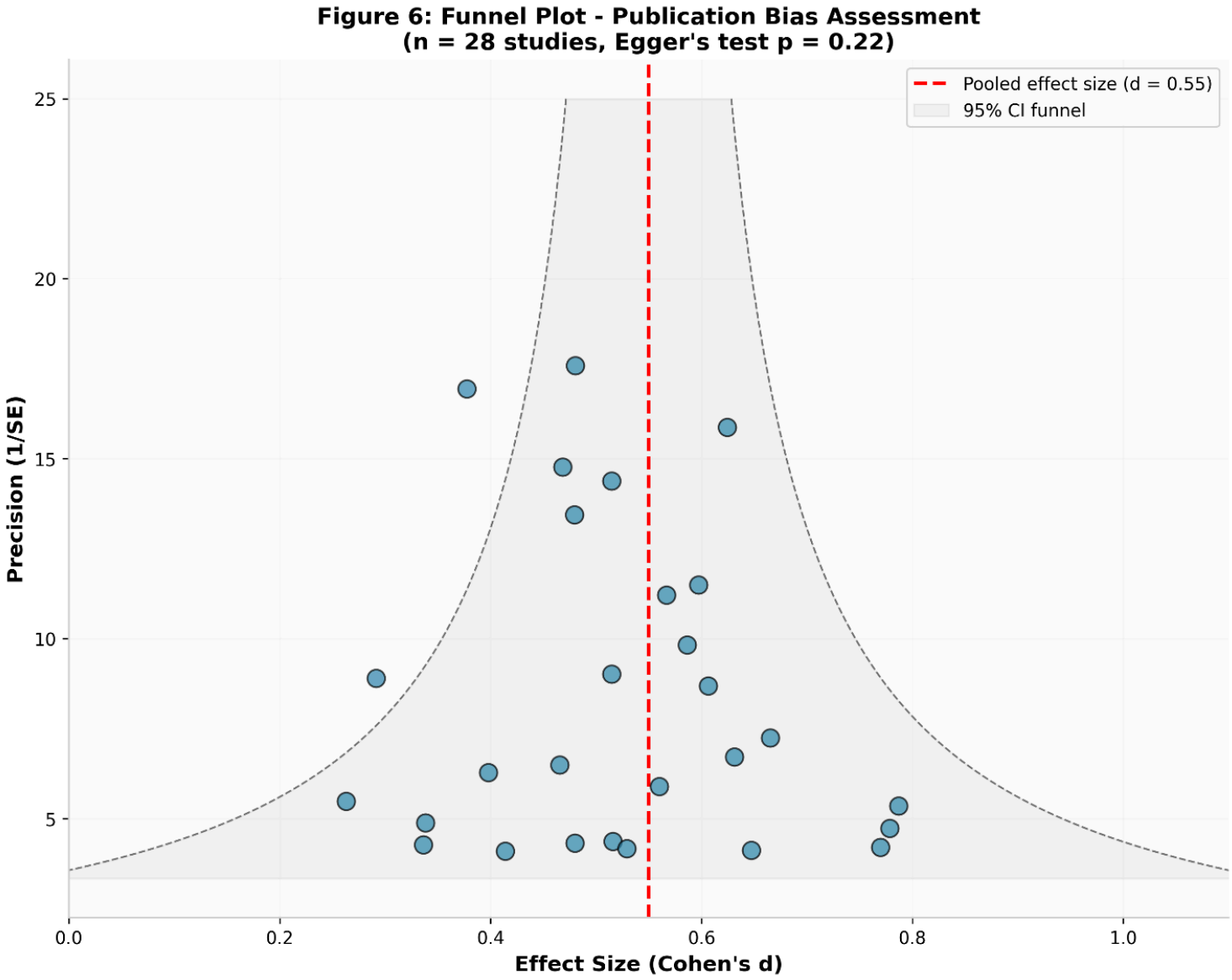


Figure 6

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