

Methodology for rapid evidence reviews of pro-equity interventions

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I. Overall approach:

The overall goal of this activity is to synthesize existing evidence on the effectiveness and implementation considerations of a select list of pro-equity interventions. Given time constraints, the reviews will be rapid in nature, which will require relatively narrow, well-defined scopes. Evidence pertaining to both intervention effectiveness and implementation will be included, thus creating a need for dual sets of inclusion criteria and a differentiated data extraction approach. Evidence from the reviews will be synthesized into Evidence Briefs, which will be made available digitally on a website that includes an online Evidence Map.

General vs. topic specific methods

The methodology outlined in this document is applicable across topics. In addition, topic-specific methodologies are included in Appendices 1-12 and include descriptions of:

1. The intervention definition and scope, including whether only direct evidence pertaining to the topic will be included (i.e., use within the immunization sector), or whether indirect evidence across sectors outside of immunization will also be searched/included
2. Topic-specific inclusion and exclusion criteria
3. Topic-specific search terms and databases to search
4. Relevant outcomes of interest
5. Dates of inclusion

Development of each topic-specific methodology will occur in two stages. During the first stage, a working topic definition will be developed, using both existing resources, such as prior definitions outlined in existing reports or guidelines, and inductive team discussions. Following development of a definition, preliminary searching may occur during which several test search strategies will be run, including gauging how searching beyond the immunization sector would impact the number of citations identified, as this would factor into discussions on scope and feasibility. Additionally, during the preliminary period, search terms will be refined and used to identify any existing systematic or otherwise comprehensive reviews on the topic, as the existence of a prior review would impact the search strategy moving forward. For example, if an existing review was identified that included relevant citations through 2015, the team may decide to only search 2015-present and use results from the existing review to cover earlier interventions. This preliminary information, relevant to each topic's scope and search strategy, will be compiled and shared with Gavi to finalize plans for each review.

Once decisions have been reached, the topic-specific methodology document will be finalized and the topic-specific search will commence.

II. Searching, screening, and eligibility:

Searching

For each topic (or clusters of topics), we will potentially utilize up to four methods to inform a comprehensive search, including: 1) Scoping search across several electronic databases of the published literature, 2) Grey literature search, 3) Use of existing systematic or comprehensive reviews, and 4) Contacting experts in the field.

1. **Search of electronic databases:** For each topic, three of the following electronic databases will be searched:
 - PubMed
 - Global Health
 - Embase
 - The Cumulative Index to Nursing and Allied Health Literature (CINAHL)
 - PsycINFO

Across topics, PubMed and Global Health will always be searched, given the breadth of indexed literature on PubMed and the focus on research conducted in low- and middle-income countries for Global Health. The third database selected will be topic specific. For example, if an intervention topic has a behavioral component, PsycINFO will be added given its focus on behavioral and social interventions. FHI 360 Librarians will conduct the electronic database searches and will enter results into a reference and/or systematic review software program, such as EndNote or Covidence. Details on database searches, including dates searched, search terms used, and use of any filers will be catalogued and kept in the project records.

2. **Grey literature:** The FHI 360 team will search grey literature for relevant articles, including searching the existing Gavi repository of relevant grey literature, in addition to key websites, including:
 - Gavi
 - UNICEF
 - World Health Organization
 - Bill and Melinda Gates Foundation
 - Zero-Dose Community of Practice
 - Technet 21
 - Sabin Boost
 - ERG resources
 - Other organization-specific websites, as deemed relevant per topic

Members of the FHI 360 team will conduct the grey literature searches, keeping track of websites searched and relevant results identified within each source.

3. **Search for prior systematic reviews:** If prior, relevant systematic and comprehensive reviews are identified, results from these reviews will be used for the Evidence Brief as appropriate (i.e., as evidence to inform discussions on effectiveness or implementation), with evidence potentially bolstered through adding results from the grey literature search and/or updating search dates from the prior review. Decisions about how to incorporate results from an existing systematic review will be made during the development of the topic-specific methodology as described above. Given time and resource constraints, quality assessments of the rigor of reviews identified will not be undertaken, which is a limitation of the methodology. Additionally, although the reference lists of identified reviews will not be systematically searched, if relevant citations for primary research or other reviews are identified during data extraction, these references may also be included.

4. **Contacting experts:** When appropriate, the FHI 360 team will reach out to experts, identified through Gavi or FHI 360, who have specific expertise relevant to a specific topic. This option will only be used when deemed relevant and appropriate during topic specific discussion and may arise during the review process as Evidence Briefs are shared with topical experts for their feedback.

Of note, there will be a trade-off between comprehensiveness of the overall search and volume of citations identified, and the timeline on which it will be feasible to conduct the rapid review. To address this concern, prior to commencing the final search, several “test” searches will be run with varying search strings, to strike a balance between comprehensiveness and feasibility.

Screening

Initial search results will be screened by one reviewer; citations deemed potentially eligible for inclusion will undergo assessment by another reviewer, with differences resolved through consensus when feasible, or through decisions made by the lead reviewer when infeasible.

A disposition of citations for each review will be tracked and reported as an Appendix in the Evidence Briefs.

Eligibility

There will be two tiers of eligible articles/reports, including: 1) Evidence of effectiveness and 2) Relevant to implementation. Eligibility assessments for either or both categories will be made simultaneously during the screening process. Articles/reports can be eligible for inclusion across both categories, or for just one or the other. Definitions of the categories are as follows:

- **Evidence of effectiveness:** To be eligible for this category, studies must meet the following criteria:
 - Takes place in a low-, middle-income, and/or high-income country as determined by the topic-specific inclusion criteria
 - Meets the topic specific intervention definition
 - Presents data relevant to at least one outcome of interest
 - Uses a multi-arm design OR reports on pre-post assessment of outcomes OR assesses time trends following the introduction of an intervention assuming three criteria are met as outlined in [Victora et al., 2003](#): (a) short and simple causal pathway, (b) relatively large expected impact, and (c) unlikely confounding.
- **Relevant to implementation:** To be eligible for this category, studies must meet the following criteria:
 - Takes place in a low-, middle-income, and/or high-income country as determined by the topic-specific inclusion criteria
 - Describes an intervention that meets the topic specific definition
 - Contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation as defined by the Proctor taxonomy of implementation outcomes¹, including:

¹ Proctor E, Silmere H, Raghavan R, Hovmand P, Aarons G, Bunger A, Griffey R, Hensley M. Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. *Adm Policy Ment Health*. 2011 Mar;38(2):65-76. doi: 10.1007/s10488-010-0319-7.

- Acceptability
- Feasibility
- Adoption
- Appropriateness
- Cost
- Sustainability
- Penetration
- Fidelity

A full list of eligible articles/reports will be kept in an Excel file, noting for which category(s) an article/report meets the eligibility criteria as these citations will be listed within the online evidence map.

III. Data extraction and synthesis

Data extraction

Relevant data from eligible articles/reports will be extracted into structured forms in Excel, with sections relevant to all articles and sections specific to effectiveness and implementation. It is possible that an effectiveness study might include information relevant to implementation. When this occurs, all relevant sections of the extraction form will be completed, and the dual eligibility will be noted.

One reviewer will extract data; data will be spot checked by another for completeness and accuracy.

Data extraction for effectiveness and implementation studies: Across all included studies, we will extract the following information:

- Citation information (author, year of publication, title)
- Study goals/objectives
- Whether equity was directly addressed (Y/N) and if yes, description
- Intervention rationale
- Location
 - Country
 - ERG setting
 - Specific context
- Population description
- Description of activities related to the intervention
- Study article/report description
- Specific to immunization

For effectiveness studies, we additionally included:

- Main study outcomes
- Narrative description of study findings
- Study characteristics relevant to rigor (e.g., design, participant representativeness, and equivalence of comparison groups when relevant)
- Notes

Data extraction for implementation studies: For studies covering aspects of intervention implementation, we will extract the following information:

- Aspects of implementation covered in the article/report (Y/N)
 - Acceptability
 - Feasibility
 - Adoption
 - Appropriateness
 - Cost
 - Sustainability
 - Penetration
 - Fidelity
- General summary of study findings relevant to the implementation considerations listed above, where applicable (i.e., findings related to cost, feasibility, acceptability, sustainability, etc.)
- Findings related to service delivery, such as number of individuals identified, number of ZD children vaccinated, etc.
- Barriers/challenges to implementation
- Enabling factors for implementation
- Notes

Quality of evidence

We will use the [Evidence Project’s Risk of Bias Tool](#) for effectiveness studies, when relevant and appropriate, given its applicability to a wide range of study designs and relative brevity. This tool will not be appropriate for all review topics. We will not assess quality of implementation studies given the anticipated diversity in types of studies, but we will extract data on major risks of bias/quality concerns as noted by study authors and/or reviewers.

Synthesis

Synthesis: Most likely we will employ narrative synthesis and will divide results and summarize by the two types of eligible articles, effectiveness and implementation.

Categorization scheme: Interventions will be categorized based on a four-tier categorization scheme, described below. Implementation considerations will be summarized descriptively.

Potential categories for effectiveness

Effectiveness category	Definition
Potentially ineffective	At least one study of relatively good quality found the intervention had no significant impact on outcome(s) of interest, and no additional studies were found showing effectiveness. Conclusions related to ineffectiveness would be relative to the number of studies identified, consistency in results across studies, and quality.
Inconclusive	Used across several scenarios, including: <ul style="list-style-type: none"> • Only studies of low-quality have evaluated the intervention

	<ul style="list-style-type: none"> • More than one study has evaluated the intervention, but findings are inconsistent (i.e., some show benefit, others show no benefit or harm) • No studies were identified that evaluated the intervention’s effectiveness
Promising	At least one study of relatively good quality found the intervention to be beneficial, but more evidence is needed to determine impact and guide implementation.
Proven	Sufficient evidence exists to recommend widespread implementation of the intervention, assuming no major concerns regarding implementation have been identified.

Of note, while the goal of this categorization scheme is to standardize decisions, it is likely that determinations will remain somewhat subjective and will be made with the consensus of the review team and Gavi, given the available evidence and eligible sources.

In addition to the categorization scheme mentioned above, we will also note any implementation considerations associated with the intervention, such as noting whether implementation seems favorable across a range of contexts, more favorable in some more than others, inconclusive, or unfavorable.

IV. Limitations

It is important to view this methodology considering several limitations. Firstly, this methodology draws upon established methodologies for the conduct of rapid reviews, scoping reviews, and systematic reviews but does not fall neatly into one category or another. The overarching purpose of this series of reviews was to provide the field a rapid understanding of selected interventions’ relevance to achieving health-related, pro-equity health outcomes—both within the field of immunization and beyond (when applicable)—a general characterization of the effectiveness of the intervention, and an assessment of major implementation considerations. The rapid nature of the reviews and definitional ambiguities relevant to many intervention topics also led to limitations, including the potential omission of relevant citations, either due to constraints within the search strategy or definitional ambiguities. Additionally, this methodology did not evaluate the rigor of included reviews or implementation studies. However, the methodology did evaluate the rigor of effectiveness studies across some topics, although its use was mainly to understand whether interventions within a topic had been tested using rigorous designs, or whether rigorous evaluations were generally lacking. Often interventions reviewed in this series did not lend themselves well to traditional intervention evaluations, which complicated determinations of quality and rigor.

Additionally, this methodology included only relevant peer-reviewed publications and available grey literature sources. It is possible that more evidence exists, especially programmatic data that might not be available through the sources searched. Publication bias, although not formally assessed, might be of relevance, especially if successful interventions for certain topics were more likely to be written about and published than unsuccessful ones.

Also, despite the use of standardized forms and trained staff members, interpretation of data in this methodology—including from screening, eligibility determination, data extraction, and synthesis—was somewhat subjective, especially given that formal, quantitative synthesis of outcomes was infeasible. When possible, decisions were made as a team through consensus to minimize the subjective nature of the decision-making process, but methods were not as rigorous as traditional systematic reviews in this regard due to time and resource constraints.

Despite these limitations, application of this methodology resulted in the development of a series of evidence briefs that will hopefully help guide decisions in the field regarding intervention implementation to address equity gaps in immunization. Updating these briefs will be critical as new evidence becomes available, and as topics evolve. The topic-specific methods used for each brief are presented as appendices below so that these methods and search terms may be used as the basis for future iterations of reviews pertaining to these topics.

V. Acknowledgements

For questions regarding these briefs, please contact Ginny Fonner at FHI 360: gfonner@fhi360.org or Gustavo Caetano Correa at Gavi: gcorrea@gavi.org.

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Appendix 1. Surveillance

Topic: Using information from surveillance systems and/or outbreak responses to identify zero dose children or missed communities

Phase 1: Exploratory phase

Research questions of interest:

1. Are interventions involving the use of surveillance data and/or data gathered as part of an outbreak response effective in identifying zero dose children and/or missed communities? What types of surveillance data and analyses are being used to inform identification of these communities?
2. What are the implementation considerations for carrying out a review/analysis of surveillance and/or outbreak response data with the purpose of identifying zero dose children or missed communities?

Intervention Definition: Any activity that involves the use of surveillance data or data collected during an outbreak to identify zero dose children and/or missed communities. Outside of using data routinely collected for surveillance, these activities can also include development of epidemiological models based on surveillance data or the conduct of seroprevalence studies that result in identification of under-immunized populations.

This review focused on diseases included in the World Health Organization's routine immunization schedule², as well as diseases that could serve as a proxy for poverty and other vulnerabilities/inequities often faced by zero-dose children and missed communities, including yellow fever, cholera, typhoid fever, and diarrheal disease. Efforts to identify individuals at-risk for these diseases could point to novel solutions for how surveillance could be utilized for identification of zero-dose children or missed communities. Other diseases, including Ebola and dengue fever, were excluded as these were considered less relevant, zoonotic, and not widely circulating.

Outcomes of interest:

Effectiveness: 1) Identification of ZD, missed communities, or otherwise under vaccinated populations, OR 2) characteristics of ZD, missed communities, or otherwise under vaccinated populations identified due to the intervention as compared with some alternative

Implementation: Any description of implementing the intervention, including factors related to adoption, feasibility, acceptability, fidelity, appropriateness, implementation cost, penetration, or sustainability particularly as related to specific underserved geographic areas or communities.

Search terms

(surveillance OR "surveillance system" OR "surveillance data" OR "outbreak response" OR "disease outbreak response" OR disease outbreak[Mesh])

² WHO recommendations for routine immunization - summary tables. <https://www.who.int/teams/immunization-vaccines-and-biologicals/policies/who-recommendations-for-routine-immunization---summary-tables>. 2023.

AND

("zero dose" OR unvaccinated OR "under vaccinated" OR "under immunized" OR "under immunised" OR "not immunized" OR "not immunised" OR "low coverage" OR "at risk" OR vulnerabl* OR "missed communi*" OR "immunity gap" OR "vaccination gap")

AND

(vaccination[Mesh] OR vaccin* OR immunization[Mesh] OR immuni* OR immuniz* OR immunis* OR "neglected tropical disease"[Mesh])

AND

Search string for low- and middle-income countries (see Appendix 13)

Inclusion criteria:

1. Took place in a low- or middle-income country (as defined by World Bank)
2. Describes an intervention that includes using surveillance data or data collected during an outbreak to identify zero dose children and/or missed communities
3. Presents data relevant to one of the outcomes of interest listed above
4. Meet one of the following study design criteria:
 - To be considered eligible for an effectiveness study, the article must also use a multi-arm design OR reports on pre-post assessment of outcomes OR assesses time trends following the introduction of an intervention assuming (a) short and simple causal pathway; (b) relatively large, expected impact; and (c) unlikely confounding.
 - To be considered eligible for an implementation study, the article must contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation.

Databases searched: PubMed, Global Health, and EMBASE

Dates of inclusion: 1 January 2010– 2 November 2022

Phase 2: Plans for brief development

An exploratory search of the literature was conducted, using the parameters listed above. To make the search results more manageable, additional terms were added, including a series of terms that restricted the results to studies related to human (i.e., animal studies were excluded) and a series of terms that restricted the search to low- and middle-income countries only (see full list of terms above). Once these terms were added, the search yielded 148 unique reviews and 2060 primary research articles. An initial search of the titles of reviews identified found none that were directly relevant to the topic. Of primary research citations identified, a spot check of results between 2010-2014 yielded very few relevant articles. Specific procedures for constructing the evidence brief will proceed as follows:

- A full search of the literature, using the methods outlined in phase 1, will be conducted using the following search dates: Jan 1 2010- Nov 1 2022. Grey literature will also be searched as well as outlined in our general methodology.
- Based on preliminary screening of search results, few effectiveness studies are expected to be identified; however, multiple studies describing the development of a model or analysis that

identified under-immunized communities exist. For this reason, we will also employ secondary screening (i.e., finding relevant articles in already identified articles) and contacting experts in the field.

- No systematic review will inform results as none appear to exist that are relevant to this topic.

Notably, literature relating to VDP surveillance and outbreak response is vast. To make the search more manageable and relevant, additional steps will be taken, including:

- Focusing on studies that provided evidence of “effectiveness” or “implementation” of using surveillance and/or outbreak response data. “Effectiveness” studies will be defined as studies or reports that either compared identification using surveillance to identification using other data sources, a pre/post comparison of identification efforts before and after utilizing surveillance, or a multi-arm comparison.
- Modeling studies will be included if methods compared surveillance to non-surveillance means of identifying un/underimmunized populations.
- Studies that simply described the use of surveillance data without any implicit or explicit comparison will be excluded given the vast literature that reports descriptively on surveillance data.
- “Implementation” studies will be defined as studies that reported on the implementation of efforts to use surveillance and/or outbreak response data to actively identify susceptible populations.

Appendix 2. Microplanning

Topic: Microplanning (cross-cutting topic involving both “identify” and “reach” components of IRMMA)

Phase 1: Exploratory phase

Research questions of interest:

1. To what extent are current microplanning practices and policies effective in identifying and/or reaching zero dose children or missed communities?
2. What are the main implementation considerations for carrying out microplanning, specific to reaching zero dose or missed communities?

Intervention Definition: The development of an integrated set of components to support the activities performed during a health campaign or in the context of routine immunization, at the facility and/or district level.³ According to UNICEF, microplanning is used “to identify priority communities, to address barriers, and to develop workplans with solutions.”⁴ Microplanning might involve activities such as creating a district or health center map or identifying priority health centers and communities. Microplans include technical details and require population and health facility data to be effective.⁵

Outcomes of interest:

Effectiveness:

- 1) Underserved populations or priority groups, especially related to ERG settings, reached with immunization services/vaccine coverage of priority communities increased
- 2) Priority populations, especially related to ERG settings, identified through microplanning
- 3) Barriers to immunization for underserved populations or priority groups, especially related to ERG settings, addressed through microplanning

Implementation: Any description of implementing the intervention, including factors related to adoption, feasibility, acceptability, fidelity, appropriateness, implementation cost, penetration, or sustainability, particularly as related to specific underserved geographic areas or communities. This includes what components were often implemented through micro-planning to reach missed or communities facing vulnerabilities.

Search terms

Microplanning: (“microplan” OR “micro plan” OR “micro-plan” OR “microplanning” OR “micro planning” OR “micro-planning”)

³ King MH, Martodipoero S. Health microplanning in the developing countries: A systems approach to appropriate technology. *International Journal of Health Services*. 1978 Oct;8(4):653-64.

⁴ UNICEF. “Microplanning for Immunization: How to Strengthen Every Step of Your Process.” *Summary of Microplanning for Immunization: How to Strengthen Every Step of Your Process*,

⁵Thiago Augusto Hernandez Rocha, Dante Grapiuna de Almeida, Arthi Shankar Kozhumam, Núbia Cristina da Silva, Erika Bárbara Abreu Fonseca Thomaz, Rejane Christine de Sousa Queiroz, Luciano de Andrade, Catherine Staton, João Ricardo Nickenig Vissoci. Microplanning for designing vaccination campaigns in low-resource settings: A geospatial artificial intelligence-based framework. *Vaccine*. 2021;39(42):6276-6282.

Test PubMed search yielded 95 results. When restricted to review/systematic review, there were 9 results.

Inclusion criteria:

1. Took place in a low- or middle-income country (as defined by World Bank)
2. Describes an intervention that includes the development of an integrated set of components prepared to support the activities performed during a health campaign or in the context of routine immunization, at the facility and/or district level
3. Presents data relevant to one to one of the outcomes of interest listed above
4. Meet one of the following study design criteria:
 - To be considered eligible for an effectiveness study, the article must also use a multi-arm design OR reports on pre-post assessment of outcomes OR assesses time trends following the introduction of an intervention assuming three criteria are met as outlined in [Victora et al., 2003](#): (a) short and simple causal pathway, (b) relatively large expected impact, and (c) unlikely confounding.
 - To be considered eligible for an implementation study, the article must contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation.

Databases searched: PubMed, Global Health, CINAHL, and EMBASE

Dates of inclusion: 1 January 2010 – 28 November 2022

Other relevant reviews identified: None in initial searches

Phase 2: Plans for brief development

Based on an initial PubMed search using the terms above, relatively few studies (<100) were identified, suggesting a full search (not restricted to immunization) from 2010-present is feasible. Additionally, no relevant existing systematic reviews exist on this topic, so the evidence brief will be conducted based on individual studies and reports identified through the published and grey literature searches.

As there seems to be some evidence on microplanning from before 2010, a more historical search for systematic reviews will be conducted. The same search strategy will be used from 1980-2010 to identify relevant systematic reviews.

Appendix 3. Provider incentives

Topic: Performance incentives (financial and non-financial) for health care providers

Phase 1: Exploratory phase

Research questions of interest:

1. Are interventions involving the use of performance incentives (financial and non-financial) for health workers effective in reaching communities in vulnerable contexts with essential health services? What type of performance incentive is being used and demonstrates effectiveness/promising results related to these communities in vulnerable contexts?
2. What are the main implementation considerations for utilizing performance incentives for staff involved in health services, specific to reaching communities in vulnerable contexts?

Intervention Definition: Interventions involving the use of incentives (either financial or non-financial) for staff involved in health programs to increase the coverage of essential health services to groups or communities in vulnerable contexts. Financial performance incentives, often known as pay for performance (P4P) schemes or performance-based financing (PBF), consist of paying healthcare workers for meeting pre-specified targets and are often used in health systems in low and middle-income countries (LMICs).⁶ Non-financial incentives are non-monetary forms of support and might include training, career advancement opportunities, social supports such as housing or childcare, transportation, regular or supportive supervision, improved working conditions, and others.^{7, 8}

Outcomes of interest:

Effectiveness: *Primary outcome:* Changes in health service coverage of priority communities, especially vaccine coverage

Secondary outcome: Changes in provider performance, motivation or satisfaction

Secondary outcome: Changes in quality, utilization or delivery of health services

Implementation: Any description of implementing the intervention, including factors related to adoption, feasibility, acceptability, fidelity, appropriateness, implementation cost, penetration, or sustainability, particularly as related to underserved or missed communities or geographic areas, or those in vulnerable contexts.

⁶Kovacs RJ, Powell-Jackson T, Kristensen SR, Singh N, Borghi J. How are pay-for-performance schemes in healthcare designed in low- and middle-income countries? Typology and systematic literature review. *BMC Health Serv Res.* 2020 Apr 7;20(1):291. doi: 10.1186/s12913-020-05075-y. PMID: 32264888; PMCID: PMC7137308.

⁷ Oladeji O, Brown A, Titus M, et al. Non-financial Incentives for Retention of Health Extension Workers in Somali Region of Ethiopia: A Discrete Choice Experiment. *Health Services Insights.* 2022;15. doi:10.1177/11786329221127151

⁸ Dambisya, Yoswa. (2007). A Review of non-financial incentives for health worker retention in east and southern Africa. EQUINET Discussion Paper, Number 44.

Search terms

A test search was run using the following terms on financial incentives as part of the exploratory phase. Conclusions and next steps are below.

Performance Incentives: (Incentiv* OR remunerat* OR reimburs* OR compensat* OR Motivat* OR Pay OR payment OR Reward* OR "performance-based" OR "Performance based" OR "Results based" OR "results-based" OR "PBF" OR "P4P" OR nonmonetary OR monetary OR financial OR Bonus)

AND

Healthcare providers: (provider or practitioner or "health personnel" or "health care personnel" or "healthcare personnel" or "health worker" or "health care worker" or "healthcare worker" or physician* or doctor or nurse or "health facilit*" or "health care facilit*" or "healthcare facilit*" or hospital or "health service" or "health care service" or "healthcare service" or "health sector" or "health care sector" or "healthcare sector")

AND

LMIC/countries list

Test PubMed search yielded 30,482 results. When restricted to review/systematic review, there were 2659 results.

Other relevant reviews identified?

Financial:

1. Diaconu K, Falconer J, Verbel A, Fretheim A, Witter S. Paying for performance to improve the delivery of health interventions in low- and middle-income countries. *Cochrane Database of Systematic Reviews* 2021, Issue 5. Art. No.: CD007899. DOI: 10.1002/14651858.CD007899.pub3. Accessed 25 October 2022.
2. de Walque, Damien, Eeshani Kandpal, Adam Wagstaff, Jed Friedman, Sven Neelsen, Moritz Piatti-Fünfkirchen, Anja Sautmann, Gil Shapira, and Ellen Van de Poel. 2022. *Improving Effective Coverage in Health: Do Financial Incentives Work? Policy Research Report*. Washington, DC: World Bank. doi:10.1596/978-1-4648-1825-7. License: Creative Commons Attribution CC BY 3.0 IGO

Non-financial:

1. Dambisya, Yoswa. (2007). A Review of non-financial incentives for health worker retention in east and southern Africa. *EQUINET Discussion Paper*, Number 44.

Both:

1. Gadsden T, Mabunda SA, Palagyi A, et al. Performance-based incentives and community health workers' outputs, a systematic review. *Bull World Health Organ*. 2021;99(11):805-818. doi:10.2471/BLT.20.285218

Conclusions from Step 1:

- Much literature has been published on this topic (both financial and non-financial). Given the high number of results from the search string for only financial incentives, this topic is likely too broad.
- There are existing systematic reviews on pay-for-performance (financial performance incentives), with searches through 2018.

Phase 2: Plans for brief development

- To avoid duplication of work, we propose a 2-part rapid review and evidence brief.
- The first part will involve conducting a “review of reviews” for financial incentives, as much existing work focuses on this topic. This will consist of 2 steps:
 1. Review the existing systematic reviews that exist on this topic and summarize their findings, particularly as related to communities in vulnerable contexts and ERG settings.
 2. Review the articles included in each systematic review to identify any studies relevant to our research question and eligible under our search criteria, and include them in the data extraction process.
- The second part will involve a full review on non-financial incentives, as there may be less existing evidence on this topic
- The same research questions and outcomes of interest (above) will apply to both.

Financial (review of reviews):

Inclusion criteria:

1. Took place in a low- or middle-income country (as defined by World Bank)
2. A systematic review of articles/studies/interventions that include the use of financial incentives for staff involved in health programs to reach underserved or missed communities, or those in vulnerable contexts.
3. Presents data relevant to one of the outcomes of interest listed above
4. Meet one of the following study design criteria:
 - To be considered eligible for an effectiveness study, the review must include articles that use a multi-arm design OR report on pre-post assessment of outcomes OR assess time trends following the introduction of an intervention assuming three criteria are met as outlined in Victora et al., 2003: (a) short and simple causal pathway, (b) relatively large expected impact, and (c) unlikely confounding.
 - To be considered eligible for an implementation study, the review must contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation.

Revised search terms:

Performance Incentives: (Incentiv*[tiab] OR remunerat*[tiab] OR reimburs*[tiab] OR compensat*[tiab] OR Motivat*[tiab] OR Pay[tiab] OR payment[tiab] OR Reward*[tiab] OR "performance-based" [tiab] OR "Performance based"[tiab] OR "Results based"[tiab] OR "results-based"[tiab] OR monetary[tiab] OR financial[tiab] OR Bonus[tiab] OR "pay-for-performance" [tiab] OR salary[tiab] OR top-up[tiab])

AND

Healthcare providers: (**healthcare** or "**health care**" or provider or practitioner or "health personnel" or "health care personnel" or "healthcare personnel" or "health worker" or "health care worker" or "healthcare worker" or physician* or doctor or nurse or "health facilit*" or "health care facilit*" or "healthcare facilit*" or hospital or "health service" or "health care service" or "healthcare service" or "health sector" or "health care sector" or "healthcare sector" or "community health worker" or "CHW" or "village health worker" or "lay worker" or "volunteer worker" or "community health volunteer" or midwi* or vaccinator)

AND

Vulnerability: ("zero dose" OR "low coverage" OR "at risk" OR vulnerable OR marginalized OR marginalised OR underserved OR disadvantaged OR neglected OR "conflict setting" OR community OR rural OR remote OR "urban poor" OR gender OR "missed community" OR poor OR poverty OR equity)

AND

LMIC country list (see Appendix 13)

Filters: Review, Systematic Review

Databases searched: PubMed, Global Health and CINAHL

Dates of inclusion: 1 January 2010-14 December 2022

Non-financial (full review):

Inclusion criteria:

1. Took place in a low- or middle-income country (as defined by World Bank) and involves communities, populations, or geographic areas described as vulnerable, marginalized, underserved, or otherwise disadvantaged.
2. Describes an intervention that includes the use of non-financial incentives for staff involved in health programs to reach underserved or missed communities or those in vulnerable contexts.
3. Presents data relevant to one to one of the outcomes of interest listed above.
4. Meet one of the following study design criteria:
 - To be considered eligible for an effectiveness study, the article must also use a multi-arm design OR reports on pre-post assessment of outcomes OR assesses time trends following the introduction of an intervention assuming three criteria are met as outlined in [Victoria et al., 2003](#): (a) short and simple causal pathway, (b) relatively large expected impact, and (c) unlikely confounding.
 - To be considered eligible for an implementation study, the article must contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation.

Search terms:

Non-monetary: (nonmonetary[tiab] OR "non-monetary"[tiab] OR "non monetary"[tiab] OR "non-financial"[tiab] OR "non financial"[tiab] OR nonfinancial[tiab])

AND

Incentives: (Incentiv*[tiab] OR Motivat*[tiab] OR benefits[tiab] OR fringe[tiab] OR reward[tiab])

AND

Healthcare providers: (healthcare or health care or provider or practitioner or "health personnel" or "health care personnel" or "healthcare personnel" or "health worker" or "health care worker" or "healthcare worker" or physician* or doctor or nurse or "community health worker" or "CHW" or "village health worker" or "lay worker" or "volunteer worker" or "community health volunteer" or midwi* or vaccinator)

AND

Vulnerability: ("zero dose" OR "low coverage" OR "at risk" OR vulnerable OR marginalized OR marginalised OR underserved OR disadvantaged OR neglected OR "conflict setting" OR community OR rural OR remote OR "urban poor" OR gender OR "missed community" OR poor OR poverty OR equity)

AND

LMIC country list (see Appendix 13)

Databases searched: PubMed, Global Health, and CINAHL

Dates of inclusion: 1 January 2010 – 14 December 2022

Appendix 4. Integrated campaigns

Topic: Integrated campaigns to reach zero-dose children or missed communities

Phase 1: Exploratory phase

Research questions of interest

- (1) What are the best approaches to integrate immunization campaigns with other health services to reach zero-dose children and missed communities or those in vulnerable contexts?
- (2) Are immunization campaigns integrating with other health services effective (including cost and efficiency) in reaching zero-dose children or missed communities?
- (3) What are the main barriers, enablers, gaps, and implementation considerations for carrying integrated immunization campaigns with other health services with the purpose of reaching zero dose or missed communities?
- (4) How is integration defined, in terms of immunization service delivery, and how might these definitions affect how services are planned and implemented?

Intervention Definition: Interventions seeking to deliver immunization services with other healthcare services to increase coverage by enhancing convenience and strengthening Universal Primary Care. The WHO definition of integrated services is: “health services that are managed and delivered so that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease-management, rehabilitation and palliative care services, coordinated across the different levels and sites of care within and beyond the health sector, and according to their needs throughout the life course”. For this activity, we are focusing specifically on campaigns directed at increasing immunization (for one vaccine or more) that are coupled with the promotion of health-related education, other health services or products, especially those that focus on reaching marginalized or missed communities or those facing other vulnerabilities. Integrated campaigns include both integration of immunization with other health services, as well as integration of multiple vaccines into one campaign.

According to WHO, there are 5 main uses of the term “integration”⁹:

1. Package of prevention and curative health interventions for a particular population group
2. Multi-purpose service delivery points (e.g., multi-purpose clinics)
3. Continuity of care over time (either for chronic conditions or life cycle approach), e.g., antenatal, postnatal, newborn, and childcare
4. Vertical integration of different level of service, e.g., district hospital, health center, and health posts (different services at each level but with referrals, clinical supervision, and shared health information across the levels)
5. Integrated policymaking, planning and management, e.g., integrated supervisory visits, shared supply chain, and logistics

⁹ Working together: an integration resource guide for immunization services throughout the life course. Geneva: World Health Organization; 2018. Licence: CC BY-NCSA 3.0 IGO.

Additionally, the Health Campaign Effectiveness Coalition has noted the potential of interventions delivered together as a means to enhance the effectiveness of health campaigns.¹⁰

Types of maternal and child health interventions that have been jointly delivered with immunization using routine, campaign, or other strategies¹¹¹²:

- Family planning (including products, counseling, and promotion)
- Antenatal Care (integrating vaccine services into ANC visits for children who attend with their mothers)
- Health education
- Infant hearing screening
- HIV testing and referral for counseling
- Malaria (bed net distribution, bed net vouchers, bed net promotion, bed net retreatment, IPTi)
- Neglected tropical diseases (Deworming, mass drug administration)
- Nutrition (Vitamin A supplementation, growth monitoring, complementary feeding practices, nutritional screening, IEC materials on breastfeeding, nutrition promotion)

Integrated delivery strategies can include both routine services and campaigns. For the purpose of this activity, we are focusing solely on campaign-based delivery strategies, including:

- Periodic Intensification of routine immunization (PIRI)
- Supplementary immunization activities (SIA)
- Immunization campaigns

Outcomes of interest:

Effectiveness:

- *Primary*: Changes to vaccination coverage, especially in missed communities or those in vulnerable contexts
- *Secondary*: Changes in user satisfaction
- *Secondary*: Changes in demand for vaccination through cross-promotion
- *Secondary*: Improved system efficiency, including reduced redundancy/cost

Implementation:

Any description of implementing the integrated service, including factors related to adoption, feasibility, acceptability, fidelity, appropriateness, implementation cost, resources needed for implementation and delivery, penetration, or sustainability, particularly as related to underserved or missed communities or geographic areas or communities facing vulnerabilities.

¹⁰ Health Campaign Effectiveness Coalition: The Campaign Integration Workgroup (CIWG)
<https://campaigneffectiveness.org/campaign-integration-working-group/>

¹¹ Working together: an integration resource guide for immunization services throughout the life course. Geneva: World Health Organization; 2018. Licence: CC BY-NCSA 3.0 IGO.

¹² Intervention guidebook for implementing and monitoring activities to reduce Missed Opportunities for Vaccination. Geneva: World Health Organization; 2019. Licence: CC BY-NCSA 3.0 IGO.

Search terms

(integrate OR integration OR synergy OR synergistic OR combination OR collaborate OR collaboration OR joint OR join OR linkage)

AND

(campaign OR SIA OR “supplementary immunization activities” OR “supplementary immunisation activities” OR “National Immunization Days” OR “National Immunisation Days” OR NID OR “periodic intensification of routine immunization” OR “periodic intensification of routine immunisation” OR PIRI)

AND

(vaccination[Mesh] OR vaccinat* OR immunization[Mesh] OR OR immuniz* OR immunis*)

AND (“family planning” OR deworm OR “vitamin A” OR “nutrition” or “malaria” OR “bednet” OR ITN OR MC OR “maternal and child health” OR IPTi OR animal OR “child health week” OR “child health days” OR HIV OR “health education” OR “MDA” OR “IRS” OR “polio” OR “measles” OR “cholera” OR “typhoid” OR “meningitis”)

AND

("zero dose" OR "low coverage" OR "at risk" OR vulnerable OR marginalized OR marginalised OR underserved OR disadvantaged OR neglected OR “conflict setting” OR community OR rural OR remote OR “urban poor” OR “gender”)

NOT (animal[Mesh] NOT human[Mesh])

Inclusion criteria:

5. Took place in a low- or middle-income country (as defined by World Bank)
6. Describes an intervention that integrates immunization campaigns with other health services.
7. Presents data relevant to one of the outcomes of interest listed above
8. Meet one of the following study design criteria:
 - To be considered eligible for an effectiveness study, the article must also use a multi-arm design OR reports on pre-post assessment of outcomes OR assesses time trends following the introduction of an intervention assuming (a) short and simple causal pathway; (b) relatively large, expected impact; and (c) unlikely confounding.
 - To be considered eligible for an implementation study, the article must contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation.

Databases searched: PubMed, Global Health, and CINAHL

Dates of inclusion: 1 January 2010 - 6 December 2022

Phase 2: [Plans for brief development](#)

It is important to note that there are many different definitions and interpretations of what a campaign is, and there is no consensus on this. The evidence brief will summarize these various definitions and interpretations.

An exploratory search of the literature was conducted, using the parameters listed above. To make the search results more manageable, additional terms were added, including a series of terms that restricted the results to studies related to human (i.e., animal studies were excluded). Once these terms were added, the search yielded 105 reviews and 785 primary research articles (from PubMed). Specific procedures for constructing the evidence brief will proceed as follows:

- A full search of the literature, using the methods outlined in Step 1, will be conducted using the following search dates: Jan 1, 2010- December 6, 2022. Grey literature will also be searched as well as outlined in our general methodology.
- Based on preliminary screening of search results, few effectiveness studies are expected to be identified.
- Additionally, findings from relevant existing systematic reviews will also be included in the evidence brief.

Appendix 5. Community-based monitoring

Topic: Community-based monitoring (including through digital means) for measuring and monitoring health-related outcomes among communities in vulnerable contexts

Phase I: Exploratory phase

Research Questions of Interest:

1. Are community-based monitoring (CBM) interventions among communities in vulnerable contexts effective at monitoring health-based outcomes?
2. What types of CBM activities are occurring among communities in vulnerable contexts regarding health, and which models and/or key components work better than others to monitor health-related outcomes, including immunization outcomes?
3. What are the implementation considerations for CBM activities among communities in vulnerable contexts?

Community-based monitoring (CBM) definition

According to The Global Fund to Fight AIDS, Tuberculosis and Malaria, Community-based monitoring (CBM) refers to “service-users assessing the effectiveness, availability, accessibility, acceptability, equity, quality, and impact of health programs and services which they receive.”¹³

Outcomes of interest:

- **Effectiveness for CBM:** Measurement and/or monitoring results of health outcomes or service delivery, including but not limited to immunization-related outcomes, within marginalized groups and/or communities using some form of CBM as compared to some other form of measuring/monitoring, or compared over time.
- **Implementation for CBM:** Any description of implementing CBM, including types of tools used (including any digital tools), factors related to adoption, feasibility, acceptability, fidelity, appropriateness, implementation cost, penetration, or sustainability particularly as related to specific underserved or marginalized populations, geographic areas, or communities in vulnerable contexts.

Search terms

(“Community-based monitoring” [tiab] OR “community-led monitoring” [tiab] OR “peer-led monitoring” [tiab] OR “peer-based monitoring” [tiab] OR “client-led monitoring” [tiab] OR “client-based monitoring” [tiab] OR “citizen monitoring” [tiab] OR “health facility committee” [tiab] OR “clinic committee*” [tiab] OR “health committee*” [tiab] OR “hospital board*” [tiab] OR “citizen report card*” [tiab] OR “score card*” [tiab] OR scorecard* [tiab] OR “health observat*” [tiab] OR “treatment observat*” [tiab] OR “community observat*” [tiab] OR “social audit*” [tiab] OR “social accountability” [tiab] OR “citizen-led accountability” [tiab] OR “citizen voice” [tiab] OR “complaint mechanism” [tiab] OR grievance* [tiab])

¹³ The Global Fund. Community-based monitoring.
https://www.theglobalfund.org/media/9622/core_css_overview_en.pdf

AND

("zero dose" OR "low coverage" OR "at risk" OR vulnerable OR marginalized OR marginalised OR underserved OR disadvantaged OR neglected OR "conflict setting" OR community OR rural OR remote OR "urban poor" OR "gender")

Inclusion criteria:

9. Involved CBM among a community, population, or geographic area described as marginalized, underserved, or otherwise disadvantaged or facing vulnerabilities. CBM interventions can take place in either high-, middle-, or low-income countries (as defined by the World Bank) as long as the CBM involves and is set-up to benefit members of groups in vulnerable contexts in some health-related aspect.
10. Describes CBM as defined above
11. Presents data relevant to one of the outcomes of interest listed above
12. Meet one of the following study design criteria:
 - To be considered eligible for an effectiveness study, the article must also use a multi-arm design OR reports on pre-post assessment of outcomes OR assesses time trends following the introduction of an intervention assuming (a) short and simple causal pathway; (b) relatively large, expected impact; and (c) unlikely confounding.
 - To be considered eligible for an implementation study, the article must contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation.

Databases searched: PubMed, Global Health, and CINAHL

Dates of inclusion: 1 January 2010 – 28 November 2022

Phase 2: Plans for brief development

- A preliminary search in PubMed yielded 938 citations, which is a feasible number to screen.
- A preliminary review of reviews identified several relevant reviews, including:
 - Baptiste S, Manouan A, Garcia P, Etya'ale H, Swan T, Jallow W. Community-Led Monitoring: When Community Data Drives Implementation Strategies. *Curr HIV/AIDS Rep.* 2020 Oct;17(5):415-421. doi: 10.1007/s11904-020-00521-2. PMID: 32734363; PMCID: PMC7497354.

Given the existence of a relatively recent review for CBM, but non-specific to communities in vulnerable contexts, our plan for the evidence brief is as follows:

- Review and include results from relevant systematic reviews, specifically highlighting results relevant to communities in vulnerable contexts.
- Conduct a review of primary citations related to CBM among communities in vulnerable contexts from 2010-present.
- If available, specifically highlight any immunization-specific CBM studies that were identified in the search.

Appendix 6. Supportive supervision

Topic: Supportive Supervision (Monitor and Measure component of the IRMMA framework)

Phase 1: Exploratory phase

Research questions of interest:

1. Is supportive supervision effective in improving performance monitoring of immunization activities and the use of data for decision making related to immunizations? What factors contribute to making supportive supervision effective in these ways?
2. What are the main considerations of carrying out supportive supervision to improve monitoring and data use, specific to reaching zero dose or missed communities?

Intervention Definition: Many definitions for supportive supervision exist. The World Health Organization defines supportive supervision as “a process of helping staff to improve their own work performance continuously. It is carried out in a respectful and non-authoritarian way with a focus on using supervisory visits as an opportunity to improve knowledge and skills of health staff. Supportive supervision encourages open, two-way communication, and building team approaches that facilitate problem-solving. It focuses on monitoring performance towards goals, and using data for decision-making, and depends upon regular follow-up with staff to ensure that new tasks are being implemented correctly.”¹⁴

For purposes of this literature search, any intervention that self-identifies as supportive supervision will be included. Additionally, interventions that use similar terms, such as “enhanced supervision” or describes supervision that is supportive, focused on two-way communication and problem-solving, will also be included. This definition might evolve over the course of the screening process as decisions are made by the study team regarding inclusion and exclusion. Any amendments will be noted in this document.

Outcomes of interest:

Effectiveness: Any outcome relevant to changes to monitoring of immunization activities or their data use as a result of the supervision of staff involved in the delivery of immunization services directly or indirectly.

Implementation: Any description of implementing the intervention, including factors related to adoption, feasibility, acceptability, fidelity, appropriateness, implementation cost, penetration, or sustainability.

Effectiveness and implementation outcomes related to missed communities, or to underserved geographic areas/communities in vulnerable contexts, will be prioritized in the screening process and evidence summary.

Search terms

(“supportive supervision”[tiab] OR “facilitative supervision”[tiab] OR “formative supervision”[tiab] OR “enhanced supervision”[tiab] OR “clinical supervision” [tiab] OR (mentor* [tiab] AND supervis*))

¹⁴ World Health Organization. Training for mid-level managers (MLM): module 4: supportive supervision. 2020.

AND

(vaccination[Mesh] OR vaccinat* OR immunization[Mesh] OR immuniz* OR immunis*)

Inclusion criteria:

5. Took place in a low- or middle-income country (as defined by World Bank)
6. Describes a supportive intervention (as defined above) related to immunization
7. Presents data relevant to one to one of the outcomes of interest listed above
8. Meet one of the following study design criteria:
 - To be considered eligible for an effectiveness study, the article must also use a multi-arm design OR reports on pre-post assessment of outcomes OR assesses time trends following the introduction of an intervention assuming three criteria are met as outlined in [Victora et al., 2003](#): (a) short and simple causal pathway, (b) relatively large expected impact, and (c) unlikely confounding.
 - To be considered eligible for an implementation study, the article must contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation.

Databases searched: PubMed, Global Health, and CINAHL

Dates of inclusion preliminary search: 1 January 2010 – 18 November 2022

Other relevant reviews and documents identified in preliminary searching:

- Deussom, R., Mwarey, D., Bayu, M. *et al.* Systematic review of performance-enhancing health worker supervision approaches in low- and middle-income countries. *Hum Resour Health* **20**, 2 (2022).
- Bailey C, Blake C, Schriver M, Cubaka VK, Thomas T, Martin Hilber A. A systematic review of supportive supervision as a strategy to improve primary healthcare services in Sub-Saharan Africa. *Int J Gynaecol Obstet.* 2016 Jan;132(1):117-25. doi: 10.1016/j.ijgo.2015.10.004. Epub 2015 Nov 6. PMID: 26653397.

Phase 2: Plans for brief development

Based on initial searching, several relevant reviews were identified (see above) that comprehensively discuss supportive supervision within the larger context of healthcare delivery in low- and middle-income countries (although the review specific to supportive supervision was restricted to sub-Saharan Africa). Because of this, we proposed a hybrid model for the evidence brief which will:

- Summarize results from these two reviews (and others if more relevant reviews are identified during the search)
- Conduct a new search from 2015- present that focuses specifically on the use of supportive supervision within immunization programs to improve monitoring and data use, particularly related to missed communities or those facing vulnerabilities.

Appendix 7. GIS mapping

Topic: GIS Mapping for identifying zero dose or missed communities (Identify component of IRMMA)

Phase 1: Exploratory phase

Research questions of interest:

1. How are GIS mapping activities used to identify zero-dose children, missed communities, or otherwise under-immunized populations?
2. To what extent are current GIS mapping practices effective in identifying zero-dose children, missed communities, or otherwise under-immunized populations?
3. What are the main implementation considerations for carrying out GIS mapping, specific to identifying zero-dose children, missed communities, or otherwise under-immunized populations?

Intervention Definition: Geographic information systems (GIS) can be defined as “a collection of computer software and data used to view and manage information about geographic objects, analyze spatial relationships, and model spatial processes.”¹⁵ GIS systems can be used to gather and organize spatial data and related information for both display and analytic purposes.

For this evidence brief, we are interested in searching the literature to find studies that either assess the effectiveness of using GIS mapping to identify zero dose, missed communities or other under-immunized populations, or that describe implementation challenges and facilitators of using GIS mapping for identification purposes.

Outcomes of interest:

Effectiveness: Identification (who, where, why, and how many) of zero dose children, missed communities, or otherwise under-immunized populations using GIS mapping, either alone or in conjunction with other data sources

Implementation: Any description of implementing the intervention, including factors related to adoption, feasibility, acceptability, fidelity, appropriateness, implementation cost, penetration, or sustainability, particularly as related to specific underserved geographic areas or communities. This includes descriptions or classifications of the types and/or use cases of GIS mapping that were implemented (specifically to identify missed communities or those facing vulnerabilities).

¹⁵ Sarah Cunard Chaney and Patricia Nagi Mechael. Improving Immunisation Coverage and Equity through the Effective Use of Geospatial Technologies and Data. The Gavi Alliance, September 2020.

Search terms

(Geospatial OR GIS OR “Geographic information system” OR “geographical analysis” OR “spatial analysis”)

AND

(“zero dose” OR under-immunized OR underimmunized OR unimmunized OR unvaccinated OR under-immunised OR underimmunised OR unimmunised OR “low coverage” OR “at risk” OR vulnerable OR marginalized OR marginalised OR underserved OR disadvantaged OR neglected OR “conflict setting” OR displaced OR nomad OR nomadic OR “missed community” OR “missed settlements” OR rural OR remote OR “urban poor” OR gender OR poor OR poverty OR equity)

AND

(vaccination[Mesh] OR vaccinat* OR immunization[Mesh] OR immuniz* OR immunis*)

AND

LMIC country search string (see Appendix 13)

The test PubMed search yielded 237 results. When restricted to review/systematic review, there were 9 results. When the search string related to vaccination was removed, the search contained over 3,700 hits, meaning if the search was not restricted to immunization, some limits on the health areas searched would need to be developed to make this a feasible search. As the topics of microplanning and surveillance also include many studies related to GIS mapping, and microplanning is not limited to immunization, a wide range of evidence related to GIS mapping will be collected across evidence briefs. To make this specific topic feasible and non-duplicative, we will restrict it to the immunization sector.

Inclusion criteria:

1. Involved GIS mapping in a low- or middle-income country (as defined by the World Bank) AND among a community, population, or geographic area in vulnerable contexts. National-level GIS mapping efforts will be included as long as the national efforts involved looking for or identifying missed communities or those in vulnerable contexts.
2. Describes GIS mapping activities that were used to identify zero dose children, missed communities, or otherwise un/under-vaccinated populations.
3. Presents data relevant to one of the outcomes of interest listed above
4. Meet one of the following study design criteria:
 - To be considered eligible for an effectiveness study, the article must also use a multi-arm design OR reports on pre-post assessment of quantitative outcomes OR assesses time trends following the introduction of an intervention assuming three criteria are met as outlined in [Victora et al., 2003](#): (a) short and simple causal pathway, (b) relatively large expected impact, and (c) unlikely confounding.
 - To be considered eligible for an implementation study, the article must contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation.

Databases searched: PubMed, Global Health, and EMBASE

Dates of inclusion: 1 January 2010 – 30 January 2023

Other relevant reviews identified: The landscape analysis recently published on Gavi’s website provides the most comprehensive review of the topic thus far. However, the landscape review was not specific to identification of zero dose children, missed communities, or un/under-vaccinated populations.

Phase 2: Plans for brief development

Based on an initial PubMed search using the terms above, relatively few studies (<100) were identified, suggesting a full search from 2010-present is feasible, as long as the search parameters remain within the field of immunization. Additionally, no relevant existing systematic reviews exist on this topic, so the evidence brief will be conducted based on individual studies and reports identified through the published and grey literature searches. However, the team will search through the reference list of the Gavi landscape analysis on GIS mapping to ensure any relevant citations included in the review are also included in the literature synthesis for the evidence brief.

Appendix 8. Incentives for caregivers/users to increase demand

Topic: Incentives for caregivers/users to increase demand (financial and non-financial) (REACH component of IRMMA)

Phase I: Exploratory phase

Research questions of interest:

1. Are interventions involving the use of financial incentives for caregivers/users effective in increasing demand and reaching communities in vulnerable contexts with immunization services? What types of user incentives demonstrate effectiveness or promising results related to communities in vulnerable contexts across different ERG settings?
2. Are interventions involving the use of non-financial incentives for caregivers/users effective in increasing demand and reaching communities in vulnerable contexts with immunization services? What types of user incentives demonstrate effectiveness or promising results related to communities in vulnerable contexts across different ERG settings?
3. What are the main implementation considerations for utilizing financial incentives for caregivers/users to increase demand for immunization services, specific to reaching communities in vulnerable contexts, across different ERG settings?
4. What are the main implementation considerations for utilizing non-financial incentives for caregivers/users to increase demand for immunization services, specific to reaching communities in vulnerable contexts, across different ERG settings?

Intervention Definition: This intervention includes the use of either financial or non-financial incentives for caregivers to increase demand for immunization services for their children. Certain incentives have been linked with improved immunization coverage for children in low- and middle-income countries.¹⁶ Financial incentives for users may include small mobile cash incentives, airtime for mobile phones, vouchers, conditional and unconditional cash transfers, or payment for children that receive vaccinations.¹⁷ Non-financial incentives for users may include hygiene kits, food (for example, a bag of lentils), a set of plates, employment and skill training, or knowledge transfer.¹⁸ In this review, we are focused solely on conditional financial and non-financial incentives.

Outcomes of interest:

Effectiveness:

Primary outcome: Changes in immunization coverage of priority communities

¹⁶ Johri M, Pérez MC, Arsenault C, Sharma JK, Pai NP, Pahwa S, Sylvestre MP. Strategies to increase the demand for childhood vaccination in low- and middle-income countries: a systematic review and meta-analysis. *Bull World Health Organ.* 2015 May 1;93(5):339-346C. doi: 10.2471/BLT.14.146951. Epub 2015 Mar 23. PMID: 26229205; PMCID: PMC4431517.

¹⁷ [Increasing routine child immunization coverage in low- and middle-income countries | The Abdul Latif Jameel Poverty Action Lab](#)

¹⁸ Johri M, Pérez MC, Arsenault C, Sharma JK, Pai NP, Pahwa S, Sylvestre MP. Strategies to increase the demand for childhood vaccination in low- and middle-income countries: a systematic review and meta-analysis. *Bull World Health Organ.* 2015 May 1;93(5):339-346C. doi: 10.2471/BLT.14.146951. Epub 2015 Mar 23. PMID: 26229205; PMCID: PMC4431517.

Secondary outcome: Changes in demand or utilization for immunization services for children that are not directly measured through increased immunization coverage (i.e., changes in interest for vaccination within communities or changes in intention to immunize).

Implementation: Any description of implementing the intervention, including factors related to adoption, feasibility, acceptability, fidelity, appropriateness, implementation cost, penetration, or sustainability, particularly as related to underserved or missed communities or geographic areas in vulnerable contexts.

Search terms:

(Incentiv* OR voucher* OR “in-kind” OR “cash transfer” OR “cash transfers” OR “social transfer” OR subsidies OR reward* OR microcredit OR coupon* OR “knowledge translation” OR “knowledge transfer”)

AND

(demand OR use OR care-seeking OR “care seeking” OR seek OR utilize* OR utilis* or coverage)

AND

(vaccination[Mesh] OR vaccin* OR immunization[Mesh] OR immuniz* OR immunis*)

AND

LMIC country list

Inclusion criteria:

1. Took place in a low- or middle-income country (as defined by World Bank) and involves communities, populations, or geographic areas described as marginalized, underserved, or otherwise facing vulnerabilities.
2. Describes an intervention that includes the use of financial or non-financial incentives for caregivers/ users to increase demand of immunization services for children.
3. Presents data relevant to one of the outcomes of interest listed above.
4. Meet one of the following study design criteria:
 - To be considered eligible for an effectiveness study, the article must also use a multi-arm design OR reports on pre-post assessment of outcomes OR assesses time trends following the introduction of an intervention assuming three criteria are met as outlined in [Victora et al., 2003](#): (a) short and simple causal pathway, (b) relatively large expected impact, and (c) unlikely confounding.
 - To be considered eligible for an implementation study, the article must contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation.

Databases searched: PubMed, Global Health, and CINAHL

Dates of inclusion: 1 January 2010 – 1 March 2023

Other reviews identified:

1. Engelbert M, Jain M, Bagai A, Parsekar SS. Improving routine childhood immunisation outcomes in low-income and middle-income countries: an evidence gap map. *BMJ Open*. 2022 Nov 10;12(11):e058258. doi: 10.1136/bmjopen-2021-058258. PMID: 36356993; PMCID: PMC9660714. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9660714/>
2. Ranganathan M, Lagarde M. Promoting healthy behaviours and improving health outcomes in low and middle income countries: a review of the impact of conditional cash transfer programmes. *Prev Med*. 2012;55 Suppl:S95-S105. doi:10.1016/j.ypmed.2011.11.015. <https://pubmed.ncbi.nlm.nih.gov/22178043/>
3. Kremer et al. Pricing and Access: Lessons from Randomized Evaluations in Education and Health. Center for Global Development, 2009.

Potential primary studies:

- a. Chandir S, Siddiqi DA, Abdullah S, Duflo E, Khan AJ, Glennerster R. Small mobile conditional cash transfers (mCCTs) of different amounts, schedules and design to improve routine childhood immunization coverage and timeliness of children aged 0-23 months in Pakistan: An open label multi-arm randomized controlled trial. *EClinicalMedicine*. 2022;50:101500. Published 2022 Jun 25. doi:10.1016/j.eclinm.2022.101500
- b. Ostermann J, Hair NL, Moses S, et al. Is the intention to vaccinate enough? Systematic variation in the value of timely vaccinations and preferences for monetary vs non-monetary incentives among pregnant women in southern Tanzania. *Vaccine X*. 2023;13:100266. Published 2023 Jan 23. doi:10.1016/j.jvacx.2023.100266
- c. Gibson DG, Ochieng B, Kagucia EW, et al. Mobile phone-delivered reminders and incentives to improve childhood immunisation coverage and timeliness in Kenya (M-SIMU): a cluster randomised controlled trial. *Lancet Glob Health*. 2017;5(4):e428-e438. doi:10.1016/S2214-109X(17)30072-4
- d. Seth R, Akinboyo I, Chhabra A, et al. Mobile Phone Incentives for Childhood Immunizations in Rural India. *Pediatrics*. 2018;141(4):e20173455. doi:10.1542/peds.2017-3455
- e. Chandir S, Khan AJ, Hussain H, et al. Effect of food coupon incentives on timely completion of DTP immunization series in children from a low-income area in Karachi, Pakistan: a longitudinal intervention study. *Vaccine*. 2010;28(19):3473-3478. doi:10.1016/j.vaccine.2010.02.061

Phase 2: Plans for brief development

Given the findings from our preliminary findings, our plan for the evidence brief is as follows:

- Review and include results from relevant reviews that are directly related to immunization and conditional financial or non-financial incentives for caregivers/users
- Conduct a review of primary citations related to conditional financial and non-financial incentives among communities facing vulnerabilities from 2010-present that measure effectiveness regarding immunization or describe factors related to implementation

Appendix 9. Targeted surveys

Topic: Targeted surveys to monitor immunization programming for zero dose children, missed communities, or otherwise under-vaccinated populations (Measure & Monitor component of IRMMA)

Phase 1: Exploratory phase

Research questions of interest:

1. What types of targeted surveys—and sampling methodologies—are being used to monitor health outcomes resulting from delivery of intervention services related to immunization, nutrition, malaria, or neglected tropical diseases, specifically among zero-dose children, missed communities, or communities in vulnerable contexts?
2. To what extent are targeted surveys effective in monitoring immunization activities and activities in relevant health sectors, specifically among zero dose children, missed communities, or communities in vulnerable contexts?
3. What are the main implementation considerations for carrying out targeted surveys to monitor health service delivery, specific to monitoring zero dose children, missed communities, or communities in vulnerable contexts?

Intervention Definition:

According to the recently developed Targeted Survey Implementation Guide¹⁹, a targeted survey, when applied in the immunization field, can be interpreted as “a survey where the eligible respondents are a targeted subset of everyone who should receive vaccination services – e.g., a population living in urban slums or in hard-to-reach urban areas, who are nomadic, refugees or have been displaced, or belong to ethnic minorities and religious closed communities, among other high risk populations.” Surveys can also be targeted to districts or other subnational administrative units where health inequities are known to exist (i.e., areas with persistently low vaccination coverage). For this particular topic, we are interested in surveys that use some sort of probability sampling to identify respondents. While targeted surveys may be of limited utility to monitoring immunization programs where coverage is relatively high, they potentially play a larger role in monitoring and measuring vaccination activities among communities where coverage is generally low, as targeted surveys have the potential to relatively quickly ascertain whether progress is being made.

Innovative work has been conducted on this topic outside of immunization. For example, a recent multi-country study compared survey methodologies for neglected tropical diseases (NTDs) and found that probability sampling with segmentation (PSS) was deemed the best form of coverage survey as compared to lot quality assurance sampling (LQAS) and the 30 x 7 cluster sampling methodology.²⁰ Additionally, novel adaptive sampling approaches, including respondent-driven-sampling, have been

¹⁹ The World Health Organization (WHO) and Gavi, the Vaccine Alliance. Practical Guide: Targeted survey to assess non- and under-immunized communities and zero-dose children. In draft form, 2022.

²⁰Gass K, Deming M, Bougma R, Drabo F, Tukahebwa EM, Mkwanda S, Velasquez RT, Mejia RE, Mbabazi PS. A Multicountry Comparison of Three Coverage Evaluation Survey Sampling Methodologies for Neglected Tropical Diseases. *Am J Trop Med Hyg.* 2020 Oct;103(4):1700-1710. doi: 10.4269/ajtmh.19-0946. PMID: 32840202; PMCID: PMC7543869.

used in other fields, including HIV, to identify, measure, and monitor hard-to-reach populations for prevention and treatment purposes.²¹

Our goal for this scoping review is to identify targeted survey approaches that have been used for monitoring purposes within immunization or within health programs that could be adapted for use within the immunization sector (e.g., programs within the nutrition, malaria, and neglected tropical disease sectors), among hard-to-reach or hard-to-vaccinate populations to inform the field of what is working and to identify research gaps.

Outcomes of interest:

Effectiveness:

1) *Primary outcome:* Changes in immunization coverage/uptake of hard-to-reach or hard-to-vaccinate populations monitored by targeted surveys or changes in coverage outcomes relevant to non-immunization interventions of interest, including those related to malaria, nutrition, and neglected tropical diseases.

To be eligible, quantitative results must be presented that demonstrate measurement across at least two time points (i.e., articles that use targeted surveys to only identify missed or communities in vulnerable contexts will be excluded). The measuring and monitoring aspect must involve something beyond identification of these populations by either reporting on repeat measures or some other marker of change. Studies that directly compare two or more types of surveys should be included as effectiveness studies, assuming relevant outcomes of interest are included as defined above.

Implementation:

Any description of implementing a targeted survey, including factors related to adoption, feasibility, acceptability, fidelity, appropriateness, implementation cost, penetration, or sustainability, particularly as related to monitoring specific hard-to-reach or hard-to-vaccinate communities. To be eligible for implementation, studies need to present or describe the use of targeted surveys to monitor intervention implementation (i.e., implementation of surveys across at least two time points).

Search terms

("targeted survey"[tiab] OR "rapid convenience"[tiab] OR "rapid assessment"[tiab] OR "rapid monitoring"[tiab] OR LQAS[tiab] OR LQA[tiab] OR "lot quality assurance sampling"[tiab] OR "coverage survey"[tiab] OR "rapid coverage"[tiab] OR "household survey"[tiab] OR "house-to-house monitoring"[tiab] OR "cluster survey" [tiab] OR "EPI survey"[tiab] OR "gridded population survey"[tiab] OR "grid sampling"[tiab] OR "sampling grid"[tiab] OR "coverage monitoring"[tiab] OR "30 x 7" OR "coverage evaluation survey"[tiab] OR "adaptive sampling" [tiab] OR "respondent driven sampling" [tiab] OR "network scale-up" [tiab] OR "time location sampling" [tiab] OR "chain referral sampling" [tiab])

²¹ Magnani R, Sabin K, Saidel T, Heckathorn D. Review of sampling hard-to-reach and hidden populations for HIV surveillance. AIDS. 2005 May;19:S67.

AND

("zero dose" OR under-immunized OR underimmunized OR unimmunized OR unvaccinated OR under-immunised OR underimmunised OR unimmunised OR "low coverage" OR "at risk" OR vulnerable OR marginalized OR marginalised OR underserved OR "under-represented" OR disadvantaged OR neglected OR "conflict setting" OR "missed community" OR "missed settlements" OR rural OR remote OR "urban poor" OR migrant OR "hidden population" OR poor OR poverty OR equity OR inequit* OR nomad OR nomadic OR displaced OR "hard to reach")

AND

(vaccination[Mesh] OR vaccin* OR immunization[Mesh] OR immuniz* OR immunis OR polio OR Measles OR DTP OR tetanus OR inoculation OR "neglected tropical disease" OR helminthiasis OR leprosy OR lymphatic filariasis OR onchocerciasis OR schistosomiasis OR trachoma OR nutrition OR diet OR meal* OR "nutritional status" OR "fortified food" OR micronutrient* OR malnutri* OR malaria[Mesh] OR plasmodium)

AND

LMIC country search string (see Appendix 13)

Inclusion criteria:

1. Took place in a low- or middle-income country as defined by the World Bank.
2. Involved the use of targeted surveys, based on probability sampling, to monitor coverage outcomes related to immunization, nutrition, malaria, or neglected tropic disease interventions implemented, specifically among zero dose children, missed communities, or communities in vulnerable contexts. To be considered "measuring" or "monitoring", outcomes from at least two time points must be presented to be eligible. We will mainly focus on studies that used probability sampling to identify respondents, although some studies that used non-probability methods might be included.
3. Presents data relevant to one of the outcomes of interest listed above
4. Meet one of the following study design criteria:
 - To be considered eligible for an effectiveness study, the article must also use a multi-arm design OR reports on pre-post assessment of quantitative outcomes OR assesses time trends following the introduction of an intervention assuming three criteria are met as outlined in [Victora et al., 2003](#): (a) short and simple causal pathway, (b) relatively large expected impact, and (c) unlikely confounding.
 - To be considered eligible for an implementation study, the article must contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation.

For effectiveness studies, when relevant we included studies that directly compared different types of targeted surveys, including modeling studies that used simulated data to demonstrate which designs work best. We also included studies that directly described how results of targeted surveys led to changes in coverage. For implementation studies, we included several

studies that were specific to implementing immunization coverage surveys that were not specifically targeted given their relevance to the topic.

Exclusion criteria:

- Studies that use targeted surveys to assess changes over time in health-related outcomes in the absence of an intervention will be excluded.
- Surveys that do not use probability-based sampling will be excluded.

Databases searched: PubMed, Global Health, and EMBASE

Dates of inclusion: 1 January 2010 – 6 March 2023

Phase 2: Plans for brief development

Based on an initial PubMed search using the terms above, a feasible number of citations were identified (n=532), suggesting a full search from 2010-present is feasible, as long as the search parameters remain within the field of immunization, malaria, nutrition, and neglected tropical diseases. Based on our preliminary searches, there are a few existing reviews that are relevant; results from these will be summarized in the brief. The remaining evidence will be original from primary research identified in the search.

Appendix 10. Social accountability

Topic: Social accountability (Advocacy component of IRMMA)

Phase I: Exploratory phase

Research questions of interest:

1. Are social accountability interventions effective in advocating for essential health services, particularly immunization services, for communities in vulnerable contexts?
2. What types of social accountability activities are occurring among communities in vulnerable contexts regarding health, and which models and/or key components work better than others to advocate for health services, particularly immunization services?
3. What are the implementation considerations for social accountability activities among communities in vulnerable contexts?

Intervention definition: Social accountability has been defined as “citizens’ efforts at ongoing meaningful collective engagement with public institutions for accountability in the provision of public goods”.²² Social accountability is grounded within human rights discourse through focusing on the relationship between “rights holders” (citizens or non-citizens—anyone who holds rights) and “duty bearers” (governments).²³ Social accountability can involve a multitude of difference processes and activities that can potentially lead to diverse outcomes.² At its core, however, social accountability involves collective action on the part of rights holders and a response from the duty bearers. The ultimate goal of social accountability is to improve services and health outcomes for particular groups. Therefore, this review will attempt to distinguish between actions taken as part of the advocacy activities (i.e., the collective action), the response from governments as a result of the advocacy efforts, and, if reported, any reported health benefits received as a result of changes made to services and/or systems.

Outcomes of interest:

- **Effectiveness:** Results from using social accountability to influence/advocate for changes to some aspects of essential health service provision, especially immunization-related services, within marginalized groups and/or communities as compared to some other form of advocacy or no advocacy efforts, or compared over time (i.e., pre-to-post implementation of social accountability). “Results” can include responses from the duty bearers (i.e., making changes to resources, personnel, or other aspects of service provision to address demands from rights holders), and/or any downstream effects on health services or health outcomes as a result of the actions taken (i.e., improvements to immunization coverage, quality of services, etc.), especially among communities in vulnerable contexts. We will also track any negative consequences arising from social accountability interventions as reported by included studies, as well as document processes related to social accountability (i.e., activities undertaken to hold duty bearers accountable, such as social audits, public hearings, participatory budgeting).

²²Joshi A. Legal empowerment and social accountability: complementary strategies toward rights-based development in health? *World Dev.* 2017;99:160–72.

²³Boydell, V., McMullen, H., Cordero, J. et al. Studying social accountability in the context of health system strengthening: innovations and considerations for future work. *Health Res Policy Sys* 17, 34 (2019).

- **Implementation:** Any description of implementing social accountability, including factors related to adoption, feasibility, acceptability, fidelity, appropriateness, implementation cost, penetration, or sustainability, particularly as related to communities or geographic areas in vulnerable contexts.

Search terms*

("Community-based monitoring" [tiab] OR "community-led monitoring" [tiab] OR "peer-led monitoring" [tiab] OR "peer-based monitoring" [tiab] OR "client-led monitoring" [tiab] OR "client-based monitoring" [tiab] OR "citizen monitoring" [tiab] OR "health facility committee" [tiab] OR "clinic committee*" [tiab] OR "health committee*" [tiab] OR "hospital board*" [tiab] OR "citizen report card*" [tiab] OR "score card*" [tiab] OR scorecard* [tiab] OR "health observat*" [tiab] OR "treatment observat*" [tiab] OR "community observat*" [tiab] OR "social audit*" [tiab] OR "social accountability" [tiab] OR "citizen-led accountability" [tiab] OR "citizen voice" [tiab] OR "complaint mechanism" [tiab] OR grievance* [tiab])

AND

("zero dose" OR "low coverage" OR "at risk" OR vulnerable OR marginalized OR marginalised OR underserved OR disadvantaged OR neglected OR "conflict setting" OR community OR rural OR remote OR "urban poor" OR "gender" OR equity)

** Of note, tools used for social accountability can often overlap with community-based monitoring (CBM), such as results from CBM used to advocate for improved health services, but they can also be broader. For this reason, the same search terms will be used for the community-based monitoring and social accountability topics. However, following the search, screening will categorize and separate community-based monitoring studies from social accountability studies, noting that some citations might qualify for both reviews.*

Inclusion criteria:

1. Involved social accountability among a community, population, or geographic area described as marginalized, underserved, or otherwise facing vulnerabilities. Social accountability can take place in either high-, middle-, or low-income countries (as defined by the World Bank) as long as the social accountability involves and is set-up to benefit members of marginalized, vulnerable, or otherwise disadvantaged groups in some health-related aspect.
2. Describes an intervention that includes social accountability as defined above.
3. Presents data relevant to one of the outcomes of interest listed above.
4. Meet one of the following study design criteria:
 - To be considered eligible for an effectiveness study, the article must also use a multi-arm design OR reports on pre-post assessment of outcomes OR assesses time trends following the introduction of an intervention assuming (a) short and simple causal pathway; (b) relatively large, expected impact; and (c) unlikely confounding.
 - To be considered eligible for an implementation study, the article must contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation.

Databases searched: PubMed, Global Health, and CINAHL

Dates of inclusion: 1 January 2010 – 23 November 2023

Phase 2: Plans for brief development

- A preliminary search in PubMed yielded 938 citations, which is a feasible number to screen.
- Preliminary searching identified several relevant reviews:
 - Molyneux S, Atela M, Angwenyi V, Goodman C. Community accountability at peripheral health facilities: a review of the empirical literature and development of a conceptual framework. *Health Policy Plan.* 2012;27:541–54.
- Preliminary searching also identified one relevant commentary summarizing work that has been done by the WHO and others (useful for reflecting on how to conceptualize SA interventions)
 - Boydell, V., McMullen, H., Cordero, J. *et al.* Studying social accountability in the context of health system strengthening: innovations and considerations for future work. *Health Res Policy Sys* **17**, 34 (2019).

Given the existence of relatively recent reviews for social accountability, but non-specific to communities in vulnerable contexts, our plan for the evidence brief is as follows:

- Review and include results from relevant systematic reviews, specifically highlighting results relevant to communities in vulnerable contexts.
- Conduct a review of primary citations related to social accountability among communities in vulnerable contexts from 2010-present.
- If available, specifically highlight any immunization-specific social accountability studies that were identified in the search.

In summary, the results section of the social accountability evidence brief would potentially involve three specific sections:

1. What is the evidence of social accountability effectiveness and/or implementation that is known from existing systematic reviews that have been conducted?
2. What is the existing evidence of social accountability effectiveness and implementation, specifically among social accountability activities that have been conducted among communities in vulnerable contexts, to address any health-specific outcome?
3. What is the existing evidence of social accountability effectiveness and implementation, specifically among social accountability activities that have been conducted among communities in vulnerable contexts to address immunization-related outcomes?

Appendix 11. Community health workers in community groups

Topic: Leveraging the role of community health workers in community groups to achieve equity in immunization²⁴ (REACH component of IRMMA)

Phase 1: Exploratory phase

Research questions of interest:

1. What types of pairings of community health workers (CHWs) and community groups have been used to inform health programs, including immunization programs, among communities in vulnerable contexts to achieve health-related outcomes?
2. To what extent is leveraging the role of CHWs in collaboration with community groups effective in reaching communities in vulnerable contexts, including those with high prevalence of zero dose children, in improving health outcomes, especially within immunization programs?
3. What are the main implementation considerations for carrying out interventions involving pairing a CHW with a community group to improve health equity, especially regarding their use to improve immunization outcomes among zero dose children, missed communities, or those facing other vulnerabilities?

Intervention Definition:

Our goal for this rapid review is to understand how interventions have leveraged the role of CHWs in collaboration with community groups to help reach populations in vulnerable contexts to achieve better health. Of note, CHWs can be challenging to define²⁵. For purposes of this review, we are defining CHWs as “healthcare workers who live in the community they serve and receive lower levels of formal education and training than professional health care workers such as nurses and doctors”²⁶. Other definitions have not only highlighted CHWs’ role in providing both preventive and curative health services but also their role fostering collective action and local accountability²⁷. CHWs often serve as a critical link between facility-based healthcare professionals and the communities they serve; communities that comprise volunteers and other members who participate in community groups or organizations to engage with and advocate for community improvements, including those related to health. Comprehensive reviews have been conducted on CHWs^{28,29}, which recognize the critical role this cadre plays on health system functionality and their impact on improving health. A paper by Sacks et al.

²⁴ Full immunisation coverage in the breadth of protection available against vaccine preventable diseases, with intentional equity-first strategic choices (progressive universalism)

²⁵ Perry H, Crigler L, Lewin S, Glenton C, LeBan K, Hodgins S. A new resource for developing and strengthening large-scale community health worker programs. *Hum Resour Health*.

²⁶ What do we know about community health workers? A systematic review of existing reviews. The World Health Organization, 2021: <https://www.who.int/publications/i/item/what-do-we-know-about-community-health-workers-a-systematic-review-of-existing-reviews>

²⁷ Zulu JM, Perry HB. Community health workers at the dawn of a new era. *Health Res Policy Syst*. 2021 Oct 12;19(Suppl 3):130. doi: 10.1186/s12961-021-00761-7.

²⁸ Perry H. Health for the People: National Community Health Programs from Afghanistan to Zimbabwe. Maternal and Child Survival Program; 2020. Accessed January 22, 2021. https://pdf.usaid.gov/pdf_docs/PA00WKKK.pdf

²⁹ Cometto G, Ford N, Pfaffman-Zambruni J, et al. Health policy and system support to optimise community health worker programmes: an abridged WHO guideline. *Lancet Glob Health*. 2018;6(12):e1397–e1404. doi:10.1016/S2214-109X(18)30482-0.

advocated to integrate community roles more formally into health systems to achieve health for all.³⁰ One way to achieve such integration is to link CHWs to communities themselves, specifically by linking CHWs to community action groups, volunteers, and/or local committees that are already striving to address community-related issues. The Sacks paper elaborates on this duality- the formal roles of CHWs (evolving toward the norms recommended by WHO for their professionalization) and the more social role of community volunteers- and describes how the two can be more integrated to achieve health equity. A commentary by Sarriot et al. elaborates on the dual social and institutional anchoring of CHWs and how this positioning could be better leveraged to harness the collective action potential of communities to improve health.³¹ The Care Group approach,³² which has been used to successfully expand child survival interventions across multiple countries, is one such example of pairing a community group with a community health worker, or “promotor” as they were described in evaluations.^{33,34,35}

To our knowledge, there has not been a review conducted to understand the types of partnerships between CHWs and community groups that exist, the effectiveness of such partnerships on reaching populations in vulnerable contexts to improve health outcomes, or factors relevant to successfully implementing such a partnership. The purpose of this rapid review is to address this gap in the literature.

Outcomes of interest:

Effectiveness: Changes in essential health service coverage among communities in vulnerable contexts, especially vaccine coverage, comparing a) communities that received the intervention to those that did not or b) health outcomes before and after intervention implementation.

³⁰ Sacks E, Morrow M, Story WT, Shelley KD, Shanklin D, Rahimtoola M, Rosales A, Ibe O, Sarriot E. Beyond the building blocks: integrating community roles into health systems frameworks to achieve health for all. *BMJ Glob Health*. 2019 Jun 22;3(Suppl 3):e001384. doi: 10.1136/bmjgh-2018-001384. PMID: 31297243; PMCID: PMC6591791.

³¹ Sarriot E, Davis T, Morrow M, Kabore T, Perry H. Motivation and Performance of Community Health Workers: Nothing New Under the Sun, and Yet.... *Glob Health Sci Pract*. 2021 Dec 21;9(4):716-724. doi: 10.9745/GHSP-D-21-00627. PMID: 34933969; PMCID: PMC8691878.

³² Perry, Henry, Melanie Morrow, Sarah Borger, Jennifer Weiss, Mary DeCoster, Thomas Davis, and Pieter Ernst. “Care Groups I: An Innovative Community-Based Strategy for Improving Maternal, Neonatal, and Child Health in Resource-Constrained Settings.” *Global Health: Science and Practice* 3, no. 3 (2015): 358–69.

³³ George CM, Vignola E, Ricca J, Davis T, Perin J, Tam Y, Perry H. Evaluation of the effectiveness of care groups in expanding population coverage of key child survival interventions and reducing under-5 mortality: a comparative analysis using the lives saved tool (LiST). *BMC Public Health*. 2015 Sep 2;15:835. doi: 10.1186/s12889-015-2187-2. PMID: 26329824; PMCID: PMC4556014.

³⁴ Perry, Henry, Melanie Morrow, Thomas Davis, Sarah Borger, Jennifer Weiss, Mary DeCoster, Jim Ricca, and Pieter Ernst. “Care Groups II: A Summary of the Child Survival Outcomes Achieved Using Volunteer Community Health Workers in Resource-Constrained Settings.” *Global Health: Science and Practice* 3, no. 3 (2015): 370–81.

³⁵ Davis, Thomas P., Carolyn Wetzell, Emma Hernandez Avilan, Cecilia de Mendoza Lopes, Rachel P. Chase, Peter J. Winch, and Henry B. Perry. “Reducing Child Global Undernutrition at Scale in Sofala Province, Mozambique, Using Care Group Volunteers to Communicate Health Messages to Mothers.” *Global Health: Science and Practice* 1, no. 1 (March 1, 2013): 35–51. <https://doi.org/10.9745/GHSP-D-12-00045>.

Implementation: Any description of implementing an intervention that involves pairing a CHW with a community group to improve health outcomes among populations in vulnerable contexts, including their appropriateness, implementation cost, penetration, or sustainability, particularly as related to specific hard-to-reach or hard-to-vaccinate communities.

Search terms:

("Community Health Workers"[Mesh] OR "outreach workers" OR "outreach worker" OR "lay health workers" OR "lay health worker" OR "village health workers" OR "village health worker" OR "community health agents" OR "community health agent" OR "community health aide" OR "community health aides" OR "community health officer" OR "community health officers" OR "community health assistant" OR "community health assistants" OR Promoter OR promoters OR "community health representative" OR "community health representatives" OR "health extension worker" OR "health extension workers")

AND

("community based organization" OR "community based organizations" OR "community based organisation" OR "community based organisations" OR "community-based organization" OR "community-based organizations" OR "community-based organisation" OR "community-based organisations" OR "community organization" OR "community organizations" OR "community organisation" OR "community organization" OR "community group" OR "community groups" OR "village group" OR "village groups" OR "community association" OR "community associations" OR "village association" OR "village associations" OR "Care Group" OR "Care Groups" OR "community coalition" OR "community coalitions" OR "village coalition" OR "village coalitions" OR "community engagement" OR "Health Development Army" OR "Women's Development Army" OR "peer counselor" OR "peer counselors" OR "village engagement" OR "community volunteer" OR "community volunteers" OR "village volunteer" OR "village volunteers" OR "grassroots organization" OR "grassroots organisation")

AND

("zero dose" OR under-immunized OR underimmunized OR unimmunized OR unvaccinated OR under-immunised OR underimmunised OR unimmunised OR "low coverage" OR "at risk" OR vulnerable OR marginalized OR marginalised OR underserved OR disadvantaged OR neglected OR "conflict setting" OR "missed community" OR "missed settlements" OR rural OR remote OR nomad OR nomadic OR displaced OR "urban poor" OR gender OR poor OR poverty OR equity)

Inclusion criteria:

1. Involved CHW and community group pairings within a community, population, or geographic area described as marginalized, underserved, or otherwise facing vulnerabilities.
CHW/community group interventions can take place in either high-, middle-, or low-income countries (as defined by the World Bank) as long as it involves and is set up to benefit members of communities in vulnerable contexts in some health-related aspect.
2. Involved an intervention that paired a community health worker with a community group, as defined above
3. Presents data relevant to one to one of the outcomes of interest listed above
4. Meet one of the following study design criteria:

- To be considered eligible for an effectiveness study, the article must also use a multi-arm design OR reports on pre-post assessment of quantitative outcomes OR assesses time trends following the introduction of an intervention assuming three criteria are met as outlined in [Victora et al., 2003](#): (a) short and simple causal pathway, (b) relatively large expected impact, and (c) unlikely confounding.
- To be considered eligible for an implementation study, the article must contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation.

Databases searched: PubMed, Global Health, and CINAHL

Dates of inclusion: 1 January 2010 – 2 February 2023

Relevant reviews identified in the exploratory phase:

1. Questa K, Das M, King R, Everitt M, Rassi C, Cartwright C, Ferdous T, Barua D, Putnis N, Snell AC, Huque R, Newell J, Eley H. Community engagement interventions for communicable disease control in low- and lower- middle-income countries: evidence from a review of systematic reviews. *Int J Equity Health*. 2020 Apr 6;19(1):51. doi: 10.1186/s12939-020-01169-5. PMID: 32252778; PMCID: PMC7137248.
2. Amazigo UV, Leak SGA, Zoure HGM, Okoronkwo C, Diop Ly M, Isiyaku S, Crump A, Okeibunor JC, Boatman B. Community-directed distributors-The "foot soldiers" in the fight to control and eliminate neglected tropical diseases. *PLoS Negl Trop Dis*. 2021 Mar 4;15(3):e0009088. doi: 10.1371/journal.pntd.0009088. PMID: 33661903; PMCID: PMC7932156.
3. Zulu JM, Kinsman J, Michelo C, Hurtig AK. Integrating national community-based health worker programmes into health systems: a systematic review identifying lessons learned from low-and middle-income countries. *BMC Public Health*. 2014 Sep 22;14:987. doi: 10.1186/1471-2458-14-987. PMID: 25245825; PMCID: PMC4192351.
4. Ahmed S, Chase LE, Wagnild J, Akhter N, Sturridge S, Clarke A, Chowdhary P, Mukami D, Kasim A, Hampshire K. Community health workers and health equity in low- and middle-income countries: systematic review and recommendations for policy and practice. *Int J Equity Health*. 2022 Apr 11;21(1):49. doi: 10.1186/s12939-021-01615-y. PMID: 35410258; PMCID: PMC8996551.
5. Gilmore B, McAuliffe E. Effectiveness of community health workers delivering preventive interventions for maternal and child health in low- and middle-income countries: a systematic review. *BMC Public Health*. 2013 Sep 13;13:847. doi: 10.1186/1471-2458-13-847. PMID: 24034792; PMCID: PMC3848754.
6. de Vries DH, Pool R. The Influence of Community Health Resources on Effectiveness and Sustainability of Community and Lay Health Worker Programs in Lower-Income Countries: A Systematic Review. *PLoS One*. 2017 Jan 17;12(1):e0170217. doi: 10.1371/journal.pone.0170217. PMID: 28095475; PMCID: PMC5240984.
7. Hartzler AL, Tuzzio L, Hsu C, Wagner EH. Roles and Functions of Community Health Workers in Primary Care. *Ann Fam Med*. 2018 May;16(3):240-245. doi: 10.1370/afm.2208. PMID: 29760028; PMCID: PMC5951253.
8. Davis, T, and P Moses. "Comparison of Indicator Gap Closure in USAID CSHGP-Funded Care Group and Non-Care Group Approach Projects (1997-2011)." Geneva, December 2022.

https://docs.google.com/document/d/1cRQ7_8JtxY1170a8RRUK4sMP8qQQ5sLt/edit?usp=share_link&oid=101822260208793560054&rtpof=true&sd=true.

9. Davis, Thomas P., Carolyn Wetzell, Emma Hernandez Avilan, Cecilia de Mendoza Lopes, Rachel P. Chase, Peter J. Winch, and Henry B. Perry. "Reducing Child Global Undernutrition at Scale in Sofala Province, Mozambique, Using Care Group Volunteers to Communicate Health Messages to Mothers." *Global Health: Science and Practice* 1, no. 1 (March 1, 2013): 35–51. <https://doi.org/10.9745/GHSP-D-12-00045>.
10. George, Christine Marie, Emilia Vignola, Jim Ricca, Tom Davis, Jamie Perin, Yvonne Tam, and Henry Perry. "Evaluation of the Effectiveness of Care Groups in Expanding Population Coverage of Key Child Survival Interventions and Reducing Under-5 Mortality: A Comparative Analysis Using the Lives Saved Tool (LiST)." *BMC Public Health* 15, no. 1 (September 2, 2015): 835. <https://doi.org/10.1186/s12889-015-2187-2>.
11. Perry, Henry, Melanie Morrow, Sarah Borger, Jennifer Weiss, Mary DeCoster, Thomas Davis, and Pieter Ernst. "Care Groups I: An Innovative Community-Based Strategy for Improving Maternal, Neonatal, and Child Health in Resource-Constrained Settings." *Global Health: Science and Practice* 3, no. 3 (2015): 358–69.
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14. Aregawi, Hailay Gebretnsae, Tesfay Gebregzabher Gebrehiwot, Yamane Gebremariam Abebe, Kidanu Gebremariam Meles, and Alem Desta Wuneh. "Determinants of Defaulting from Completion of Child Immunization in Laelay Adiabo District, Tigray Region, Northern Ethiopia: A Case-Control Study." *PLOS ONE* 12, no. 9 (September 27, 2017): e0185533. <https://doi.org/10.1371/journal.pone.0185533>.
15. Lewycka, Sonia, Charles Mwansambo, Mikey Rosato, Peter Kazembe, Tambosi Phiri, Andrew Mganga, Hilda Chapota, et al. "Effect of Women's Groups and Volunteer Peer Counselling on Rates of Mortality, Morbidity, and Health Behaviours in Mothers and Children in Rural Malawi (MaiMwana): A Factorial, Cluster-Randomised Controlled Trial." *Lancet (London, England)* 381, no. 9879 (May 18, 2013): 1721–35. [https://doi.org/10.1016/S0140-6736\(12\)61959-X](https://doi.org/10.1016/S0140-6736(12)61959-X).

Other papers that serve as critical background information for this topic

1. Sacks E, Morrow M, Story WT, Shelley KD, Shanklin D, Rahimtoola M, Rosales A, Ibe O, Sarriot E. Beyond the building blocks: integrating community roles into health systems frameworks to achieve health for all. *BMJ Glob Health*. 2019 Jun 22;3(Suppl 3):e001384. doi: 10.1136/bmjgh-2018-001384. PMID: 31297243; PMCID: PMC6591791.
2. Sarriot E, Davis T, Morrow M, Kabore T, Perry H. Motivation and Performance of Community Health Workers: Nothing New Under the Sun, and Yet.... *Glob Health Sci Pract*. 2021 Dec 21;9(4):716-724. doi: 10.9745/GHSP-D-21-00627. PMID: 34933969; PMCID: PMC8691878.

Phase 2: Plans for brief development

Based on an initial PubMed search using the terms above, a feasible number of citations were identified (n=167), including 9 reviews/systematic reviews, suggesting a full search from 2010-present is feasible, without restricting the search to LMICs and without restricting to immunization. Of note, this topic is conceptually challenging as much has been written about CHWs and about community organizations, but few have focused on the overlap and leveraging between these two distinct types of entities. Definitional issues about CHWs also endure in practice and documentation, which is a challenge. Using the evidence brief to better define this intervention and outlining evidence pertaining to its effectiveness and implementation to reach marginalized communities will be a use addition to the field, specifically within the realm of ZD and pro-equity interventions.

Appendix 12. Women's groups

Topic: Using women's groups/associations to reach zero children and missed communities (REACH component of IRMMA)

Phase I: Exploratory

Research Questions of Interest:

1. To what extent are women's groups/women's associations effective in improving child health outcomes among communities in vulnerable contexts, including those with high prevalence of zero dose children, especially within immunization programs?
 - a. What impact do women's groups/women's associations within communities in vulnerable contexts have on women's empowerment as one potential pathway to improving child health outcomes, especially for zero dose children and missed communities?
2. What are the implementation considerations for implementing women's groups/women's associations among communities in vulnerable contexts pertaining to child health outcomes, especially immunization?

Intervention definition

Women's groups, and community groups more broadly, have grown in popularity over the past several decades, in part due to the Alma Ata Declaration's recognition of the importance of people's participation in planning and implementing healthcare.^{36,37} Women's groups in particular often aim to facilitate increased agency for women as gender inequities often constrain women's abilities to make decisions and act. Evidence is becoming clear that group membership, particularly in economic-focused groups, can lead to empowerment.³⁸ Additionally, in 2014, the World Health Organization recommended the implementation of community mobilization through facilitated participatory learning and action cycles with women's groups as an intervention to improve maternal and newborn health, noting strong evidence for newborn health and moderate to weak evidence for newborn mortality, maternal mortality, and care access.³⁹ However, there is less clear evidence regarding women's groups and child health outcomes, especially immunization outcomes, and mechanisms through which participation in a women's group may improve these outcomes remains unclear. Group participation might work through altering psychosocial mechanisms, such as increased social support, social influence, and/or access to social and material resources, thus ultimately leading to behavior change. Groups can also potentially impact upstream factors related to health, such as by using increased social

³⁶ International Conference on Primary Health Care. Declaration of Alma-Ata. WHO Chron. 1978 Nov;32(11):428-30. PMID: 11643481.

³⁷ Prost A, Colbourn T, Seward N, Azad K, Coomarasamy A, Copas A, Houweling TA, Fottrell E, Kuddus A, Lewycka S, MacArthur C, Manandhar D, Morrison J, Mwansambo C, Nair N, Nambiar B, Osrin D, Pagel C, Phiri T, Pulkki-Brännström AM, Rosato M, Skordis-Worrall J, Saville N, More NS, Shrestha B, Tripathy P, Wilson A, Costello A. Women's groups practising participatory learning and action to improve maternal and newborn health in low-resource settings: a systematic review and meta-analysis. *Lancet*. 2013 May 18;381(9879):1736-46. doi: 10.1016/S0140-6736(13)60685-6.

³⁸ Brody, C., de Hoop, T., Vojtkova, M., Warnock, R., Dunbar, M., Murthy, P. and Dworkin, S.L. (2015), Economic Self-Help group Programs for Improving Women's Empowerment: A Systematic Review. *Campbell Systematic Reviews*, 11: 1-182. <https://doi.org/10.4073/csr.2015.19>

³⁹ World Health Organization (WHO) WHO recommendation on community mobilization through facilitated participatory learning and action cycles with women's groups for maternal and newborn health. Geneva: WHO; 2014. Available from: http://www.who.int/maternal_child_adolescent/documents/community-mobilization-maternal-newborn/en/ [Google Scholar]

cohesion to mobilize and advocate for changes to social norms, policies, aspects of health service delivery, etc. For this brief, we are defining a “women’s group” as any community-based group of women, or mostly women, brought together “to share their experiences, gain access to resources and build knowledge, skills, and social networks”⁴⁰ with the goal of improving health or quality of life through activities such as health promotion, support, economic empowerment, skills building, etc. We are also including women’s associations that might operate at levels beyond the community (e.g., regional or national levels) that most likely focus more on advocacy efforts to improve health as opposed to individual empowerment.

Outcomes of interest:

- **Effectiveness of women’s groups on impacting child health outcomes:** Changes to child health outcomes, including but not limited to immunization-related outcomes, within marginalized groups and/or communities where women’s groups/women’s associations were implemented as compared to a control or comparison group, or compared over time (i.e., pre/post intervention implementation).
 - **Secondary effectiveness outcome of interest:** Changes to women’s empowerment comparing those involved in women’s groups/women’s associations to those who were not or compared over time, as well as changes to women’s knowledge/awareness of child health services, including immunization). Of note, studies with only secondary outcomes present will not be eligible for inclusion. To be eligible for inclusion, studies must maintain a focus on health and include at least one primary child health-related outcomes as listed above.
- **Implementation:** Any description of implementing women’s groups/women’s associations, including factors related to adoption, feasibility, acceptability, fidelity, appropriateness, implementation cost, penetration, or sustainability particularly as related to specific underserved or marginalized populations or communities/geographic areas in vulnerable contexts.

Search terms:

(“women’s group” OR “women’s groups” OR “women’s association” OR “women’s associations” OR “women’s collective” OR “women’s collectives” OR “mother’s group” OR “mother’s groups” OR “women’s organization” OR “women’s organizations” OR “women’s agency” OR “women’s empowerment” OR “female empowerment”)

AND

(“zero dose” OR under-immunized OR underimmunized OR unimmunized OR unvaccinated OR under-immunised OR underimmunised OR unimmunised OR “low coverage” OR “at risk” OR vulnerable OR marginalized OR marginalised OR underserved OR disadvantaged OR neglected OR “conflict setting” OR “missed community” OR “missed settlements” OR nomad OR nomadic OR rural OR remote OR “urban poor” OR poor OR poverty OR equity)

⁴⁰ Kumar N, Scott S, Menon P, Kannan S, Cunningham K, Tyagi P, et al. Pathways from women’s group-based programs to nutrition change in South Asia: A conceptual framework and literature review. *Glob Food Sec.* 2018;17:172–85.

AND

[(child OR children OR childhood OR paediatric OR paediatric* OR offspring OR newborn OR new-born OR new-borns OR neonate OR neonates OR neonatal OR toddler OR toddlers) AND (health OR illness OR disease OR disorder OR infect* OR injury OR accident OR well-being OR biomedical* OR medical* OR medicine OR HIV OR vaccin* OR immun* OR anemia OR pneumonia OR stunting OR wasting OR underweight)]

AND

LMIC country list

Inclusion criteria:

13. Took place in a low- or middle-income country defined by the World Bank.
14. Involved a women's group or women's association as defined above within a community or group facing vulnerabilities.
15. Presents data relevant to one of the primary outcomes of interest listed above, specifically outcomes that are relevant to child health.
16. Meet one of the following study design criteria:
 - To be considered eligible for an effectiveness study, the article must also use a multi-arm design OR reports on pre-post assessment of outcomes OR assesses time trends following the introduction of an intervention assuming (a) short and simple causal pathway; (b) relatively large, expected impact; and (c) unlikely confounding.
 - To be considered eligible for an implementation study, the article must contain descriptive or comparative data—either quantitative or qualitative—relevant to some aspect of intervention implementation.

Databases searched: PubMed, Global Health, and CINAHL

Dates of inclusion: 1 January 2010 – 32 February 2023

Phase 2: Plans for brief development

- A preliminary search in PubMed yielded 901 citations and 36 reviews.
- A preliminary review of reviews identified several relevant reviews, including:
 - Gram L, Fitchett A, Ashraf A, et al. Promoting women's and children's health through community groups in low-income and middle-income countries: a mixed-methods systematic review of mechanisms, enablers and barriers. *BMJ Global Health* 2019;4:e001972.
 - Pratley P. Associations between quantitative measures of women's empowerment and access to care and health status for mothers and their children: A systematic review of evidence from the developing world. *Soc Sci Med*. 2016 Nov;169:119-131. doi: 10.1016/j.socscimed.2016.08.001. Epub 2016 Aug 22. PMID: 27716549.
 - Prost A, Colbourn T, Seward N, Azad K, Coomarasamy A, Copas A, Houweling TA, Fottrell E, Kuddus A, Lewycka S, MacArthur C, Manandhar D, Morrison J, Mwansambo C, Nair N, Nambiar B, Osrin D, Pagel C, Phiri T, Pulkki-Brännström AM, Rosato M, Skordis-Worrall J, Saville N, More NS, Shrestha B, Tripathy P, Wilson A, Costello A. Women's groups practising participatory learning and action to improve maternal and newborn health in

low-resource settings: a systematic review and meta-analysis. *Lancet*. 2013 May 18;381(9879):1736-46. doi: 10.1016/S0140-6736(13)60685-6.

- Thorpe S, VanderEnde K, Peters C, Bardin L, Yount KM. The Influence of Women's Empowerment on Child Immunization Coverage in Low, Lower-Middle, and Upper-Middle Income Countries: A Systematic Review of the Literature. *Matern Child Health J*. 2016 Jan;20(1):172-186. doi: 10.1007/s10995-015-1817-8. PMID: 26511131.

Given the findings from our preliminary findings, our plan for the evidence brief is as follows:

- Review and include results from relevant systematic reviews, specifically highlighting any reviews that were specific to immunization or child health more broadly.
- Conduct a review of primary citations related to women's groups/women's associations among communities facing vulnerabilities from 2010-present that measure effectiveness in regard to child health outcomes or describe factors related to implementation. The initial search in PubMed yielded 270 relevant articles, with 26 reviews.
- If available, specifically highlight any immunization-specific studies that were identified in the search that related to women's groups or women's associations.

Appendix 13. Low- and middle-income (LMIC) country search string

("low/middle income"[tiab] OR "low or middle income"[tiab] OR "low and middle income"[tiab] OR "low- and middle-income"[tiab] OR "low-income"[tiab] OR "low income"[tiab] OR "LMIC"[tiab] OR "LMICs"[tiab] OR "LAMI country"[tiab] OR "LAMI countries"[tiab] OR "developing countries"[tiab] OR developing countries[Mesh] OR "developing country"[tiab] OR "low resource"[tiab] OR "resource-limited"[tiab] OR "developing nation"[tiab] OR "developing nations"[tiab] OR "developing population"[tiab] OR "developing populations"[tiab] OR "developing world"[tiab] OR "less developed country"[tiab] OR "less developed countries"[tiab] OR "less developed nation"[tiab] OR "less developed nations"[tiab] OR "less developed population"[tiab] OR "less developed populations"[tiab] OR "less developed world"[tiab] OR "lesser developed country"[tiab] OR "lesser developed countries"[tiab] OR "lesser developed nation"[tiab] OR "lesser developed nations"[tiab] OR "lesser developed population"[tiab] OR "lesser developed populations"[tiab] OR "lesser developed world"[tiab] OR "under developed country"[tiab] OR "under developed countries"[tiab] OR "under developed nation"[tiab] OR "under developed nations"[tiab] OR "under developed population"[tiab] OR "under developed populations"[tiab] OR "under developed world"[tiab] OR "underdeveloped country"[tiab] OR "underdeveloped countries"[tiab] OR "underdeveloped nation"[tiab] OR "underdeveloped nations"[tiab] OR "underdeveloped population"[tiab] OR "underdeveloped populations"[tiab] OR "underdeveloped world"[tiab] OR "middle income country"[tiab] OR "middle income countries"[tiab] OR "middle income nation"[tiab] OR "middle income nations"[tiab] OR "middle income population"[tiab] OR "middle income populations"[tiab] OR "low income country"[tiab] OR "low income countries"[tiab] OR "low income nation"[tiab] OR "low income nations"[tiab] OR "low income population"[tiab] OR "low income populations"[tiab] OR "lower income country"[tiab] OR "lower income countries"[tiab] OR "lower income nation"[tiab] OR "lower income nations"[tiab] OR "lower income population"[tiab] OR "lower income populations"[tiab] OR "underserved country"[tiab] OR "underserved countries"[tiab] OR "underserved nation"[tiab] OR "underserved nations"[tiab] OR "underserved population"[tiab] OR "underserved populations"[tiab] OR "underserved world"[tiab] OR "under served country"[tiab] OR "under served countries"[tiab] OR "under served nation"[tiab] OR "under served nations"[tiab] OR "under served population"[tiab] OR "under served populations"[tiab] OR "under served world"[tiab] OR "deprived country"[tiab] OR "deprived countries"[tiab] OR "deprived nation"[tiab] OR "deprived nations"[tiab] OR "deprived population"[tiab] OR "deprived populations"[tiab] OR "deprived world"[tiab] OR "poor country"[tiab] OR "poor countries"[tiab] OR "poor nation"[tiab] OR "poor nations"[tiab] OR "poor population"[tiab] OR "poor populations"[tiab] OR "poor world"[tiab] OR "poorer country"[tiab] OR "poorer countries"[tiab] OR "poorer nation"[tiab] OR "poorer nations"[tiab] OR "poorer population"[tiab] OR "poorer populations"[tiab] OR "poorer world"[tiab] OR "developing economy"[tiab] OR "developing economies"[tiab] OR "less developed economy"[tiab] OR "less developed economies"[tiab] OR "lesser developed economy"[tiab] OR "lesser developed economies"[tiab] OR "under developed economy"[tiab] OR "under developed economies"[tiab] OR "underdeveloped economy"[tiab] OR "underdeveloped economies"[tiab] OR "middle income economy"[tiab] OR "middle income economies"[tiab] OR "low income economy"[tiab] OR "low income economies"[tiab] OR "lower income economy"[tiab] OR "lower income economies"[tiab] OR "low gdp"[tiab] OR "low gnp"[tiab] OR "low gross domestic"[tiab] OR "low gross national"[tiab] OR "lower gdp"[tiab] OR "lower gnp"[tiab] OR "lower gross domestic"[tiab] OR "lower gross national"[tiab] OR

"third world"[tiab] OR "transitional country"[tiab] OR "transitional countries"[tiab] OR
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Armenia[Mesh] OR Azerbaijan[Mesh] OR Bangladesh[Mesh] OR Belize[Mesh] OR Byelarus[tiab] OR
Belarus[Mesh] OR Belorussia[tiab] OR Belize[Mesh] OR Benin[Mesh] OR Bhutan[Mesh] OR Bolivia[Mesh]
OR Bosnia[Mesh] OR Herzegovina[Mesh] OR Hercegovina[tiab] OR Botswana[Mesh] OR Brasil[tiab] OR
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OR Colombia[Mesh] OR Comoros[Mesh] OR Comoro Islands[tiab] OR "Cote d'Ivoire"[Mesh] OR "Ivory
Coast"[tiab] OR Congo[Mesh] OR "Democratic Republic of the Congo"[Mesh] OR Comoros[Mesh] OR
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Somaliland"[tiab] OR Dominica[Mesh] OR Dominican Republic[Mesh] OR East Timor[Mesh] OR Timor
Leste[Mesh] OR "Timor-Leste"[tiab] OR Ecuador[Mesh] OR Egypt [Mesh] OR "El Salvador"[Mesh] OR
Eritrea[Mesh] OR Eswatini[Mesh] OR Fiji[Mesh] OR Swaziland[tiab] OR Ethiopia[Mesh] OR Gabon[Mesh]
OR "Gabonese Republic"[tiab] OR Gambia[Mesh] OR "The Gambia"[tiab] OR Gaza[tiab] OR
Georgia[Mesh] OR "Georgia Republic"[tiab] OR "Georgian Republic"[tiab] OR Ghana[Mesh] OR
Grenada[Mesh] OR Guatemala[Mesh] OR Guinea[Mesh] OR "Guinea-Bissau"[Mesh] OR Guiana[tiab] OR
Guyana[Mesh] OR Haiti[Mesh] OR Honduras[Mesh] OR Indonesia[Mesh] OR India[Mesh] OR Iran[Mesh]
OR Iraq[Mesh] OR Jamaica[Mesh] OR Jordan[Mesh] OR Kazakhstan[Mesh] OR Kenya[Mesh] OR
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Kosovo[Mesh] OR "Kyrgyz Republic"[tiab] OR Kyrgyzstan[Mesh] OR Republic of North Macedonia[Mesh]
OR "North Macedonia"[tiab] OR "Lao PDR"[tiab] OR "Lao PDR"[tiab] OR Laos[Mesh] OR Lebanon[Mesh]
OR Lesotho[Mesh] OR Basutoland[tiab] OR Liberia[Mesh] OR Libya[Mesh] OR Macedonia[Mesh] OR
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Nyasaland[tiab] OR Malaysia[Mesh] OR Maldives[Mesh] OR Mali[Mesh] OR Marshall Islands[Mesh] OR
Mauritania[Mesh] OR Mauritius[Mesh] OR "Agalega Islands"[tiab] OR Melanesia[tiab] OR Mexico[Mesh]
OR Micronesia[Mesh] OR Moldova[tiab] OR Mongolia[Mesh] OR Morocco[Mesh] OR
Montenegro[Mesh] OR Mozambique[Mesh] OR Myanmar[Mesh] OR Burma[tiab] OR Namibia[Mesh] OR
Nepal[Mesh] OR Nicaragua[Mesh] OR Niger[Mesh] OR Nigeria[Mesh] OR Pakistan[Mesh] OR
Palestine[tiab] OR Papua New Guinea[Mesh] OR Paraguay[Mesh] OR Peru[Mesh] OR Philippines[Mesh]
OR Philippines[tiab] OR Russia[Mesh] OR "Russian Federation"[tiab] OR Rwanda[Mesh] OR Ruanda[tiab]
OR Saint Lucia[Mesh] OR "St Lucia"[tiab] OR Saint Vincent and the Grenadines[Mesh] OR "Saint
Vincent"[tiab] OR Grenadines[tiab] OR Samoa[Mesh] OR "Samoan Islands"[tiab] OR "Navigator
Island"[tiab] OR "Navigator Islands"[tiab] OR Sao Tome and Principe[Mesh] OR "Sao Tome"[tiab] OR
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Lanka"[Mesh] OR Ceylon[tiab] OR Sudan[Mesh] OR Sudan[tiab] OR Suriname[Mesh] OR Surinam[tiab]
OR Swaziland[Mesh] OR Syria[Mesh] OR "Syrian Arab Republic"[tiab] OR Tajikistan[Mesh] OR
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OR Togo[Mesh] OR "Togolese Republic"[tiab] OR Tonga[Mesh] OR Tunisia[Mesh] OR Turkey[Mesh] OR
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Bank"[tiab] OR Yemen[Mesh] OR "Republic of Yemen"[tiab] OR Atlantic Islands[Mesh:noexp] OR
Commonwealth of Independent States[Mesh:noexp] OR Pacific Islands[Mesh:noexp] OR Indian Ocean

Islands[Mesh:noexp] OR Europe, Eastern[Mesh:noexp] OR "Atlantic Islands"[tiab] OR "Commonwealth of Independent States"[tiab] OR "Pacific Islands"[tiab] OR "Indian Ocean Islands"[tiab] OR "Eastern Europe"[tiab])