EVIDENCE FOR ACTION BRIEF

What Works to Increase Uptake of Childhood Immunization:

A RESEARCH BRIEF SUMMARIZING FINDINGS FROM A RAPID EVIDENCE ASSESSMENT (REA) OF INTERVENTIONS FOCUSED ON CAREGIVERS, HEALTHCARE WORKERS AND COMMUNITIES

ACKNOWLEDGEMENTS

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This brief is based upon the full report: *What works to increase uptake of childhood immunization: A rapid evidence assessment of the impact of interventions focused on caregivers, healthcare workers and communities*

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BACKGROUND

Vaccination is one of the most effective measures for preventing illness, disability and death. However, current vaccination coverage provides insufficient protection for all children, and deaths from vaccine-preventable diseases account for an estimated 21.7% of deaths in children under 5 years old globally.

This brief summarizes the results of a rapid evidence assessment (REA) to fill identified gaps in knowledge and practice related to the effectiveness of interventions to increase immunization uptake. The (REA) was undertaken in collaboration between UNICEF Innocenti, Global Office of Research and Foresight and UNICEF Europe and Central Asia Regional Office with support from the Health Innovation Team, Office of Innovation. The REA took a global perspective to synthesize the evidence about what works to increase vaccination uptake, and to apply that body of evidence to make specific recommendations related to identifying and addressing determinants of low vaccination uptake in specific settings. The REA report, upon which this brief is based, provides a full summary of the available evidence about the impact of interventions targeting caregivers, healthcare workers (HCWs), and communities to improve a range of intermediate vaccine-related outcomes and to increase actual uptake of immunization services.

OBJECTIVES

The REA addressed two primary research questions:

- How effective are interventions targeting caregivers, healthcare workers, and communities to increase vaccination rates of children ≤5 years old; and
- What evidence is available linking intermediate vaccination outcomes (such as intention and motivation to vaccinate) to actual uptake of immunization services?

By answering these research questions, the REA aimed to:

- Develop a conceptual framework linking intermediate outcomes like intention and motivation to vaccinate to the behaviour of vaccination.
- Identify evidence gaps in the literature, taking a global perspective to inform future research directions.
- Provide an evidence base to inform and support policy decisions about interventions that increase vaccination uptake.

On 13 December 2022, a health worker administers the polio vaccine to a child at the Darul Zikri Islamic School during a polio immunization campaign in Aceh Tamiang Regency, Aceh Province, Indonesia.

SCOPE

The REA assessed routine vaccination in children ≤5 years old. The focus was on interventions addressing caregivers, HCWs and communities. The scope of the review was global and included English-language studies published from 2015 onwards. The REA focused primarily on the results of systematic reviews, although primary studies were used to fill synthesis gaps where needed.

The outcomes examined in the REA were divided into intermediate outcomes (e.g., knowledge, awareness, intention) as well as (behavioral) vaccination uptake outcomes. Intermediate outcomes included caregiver knowledge, awareness, attitudes, beliefs and intention to vaccinate; HCW motivation, knowledge, skills, attitudes and beliefs; and community awareness and norms. Vaccination outcomes included uptake, coverage, complete vaccination, up-to-date vaccination and vaccination timeliness.

METHODS

The authors ran searches in Medline, Web of Science, PsycINFO, CINAHL, Embase, Epistemonikos, Social Systems Evidence, the Campbell Collaboration and the Cochrane Database of Systematic Reviews, and also searched institutional databases and evidence platforms. A sample of the records were screened and extracted independently by two reviewers, with disagreements resolved by discussion. The remaining records were screened and extracted by a single reviewer. Quality appraisal was undertaken using appropriate tools from the Joanna Briggs Institute. Data were synthesized using the vote counting method described in the Cochrane Handbook,[1] which categorizes studies by the direction of the effect estimate regardless of the size or statistical significance of the effect. To assist with the interpretation of the findings, the authors developed standardized effectiveness statements based on the number of studies identified and the proportion of results in a given direction.

Evidence was rated as: sufficient evidence (>20 studies with ≥90% of studies showing an effect in one direction), some evidence (>20 studies with ≥70% to <90% of studies showing an effect in one direction; or between 10 and 20 studies with ≥90% of studies showing an effect in one direction), evidence of no effect (>20 studies with ≥50% evidence to <70% of studies showing an effect in one direction, and insufficient evidence to determine (<10 studies, or between 10 and 20 studies with ≥70 to <90% showing an effect in one direction.

RESULTS

Included in the results were 48 systematic reviews and 21 primary studies, with most systematic reviews occurring in North America (22 reviews) and South Asia (23 reviews). The least frequently studied region was Eastern Europe and Central Asia (n=2). The most frequently assessed intervention type was caregiver education; in 42 systematic reviews, at least one study assessed the intervention of caregiver education. Other commonly assessed interventions were collaboration and outreach to communities (31 reviews), caregiver home visits (26 reviews) and HCW training and education (19 reviews). Many reviews assessed combination interventions (32 reviews included one or more studies assessing combination interventions).

Vaccination-related outcomes were the most frequently reported outcomes across the reviews (46 of 48 reviews). Intermediate outcomes were assessed in a limited number of reviews: caregiver outcomes in 11 reviews, HCW outcomes in four reviews, and community outcomes in one review. The systematic reviews were rated as high (23 reviews) or moderate quality (19 reviews).

1 Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). Cochrane Handbook for Systematic Reviews of Interventions version 6.3 (updated February 2022). Cochrane, 2022. Available from www.training.cochrane.org/handbook.

IMPLICATIONS

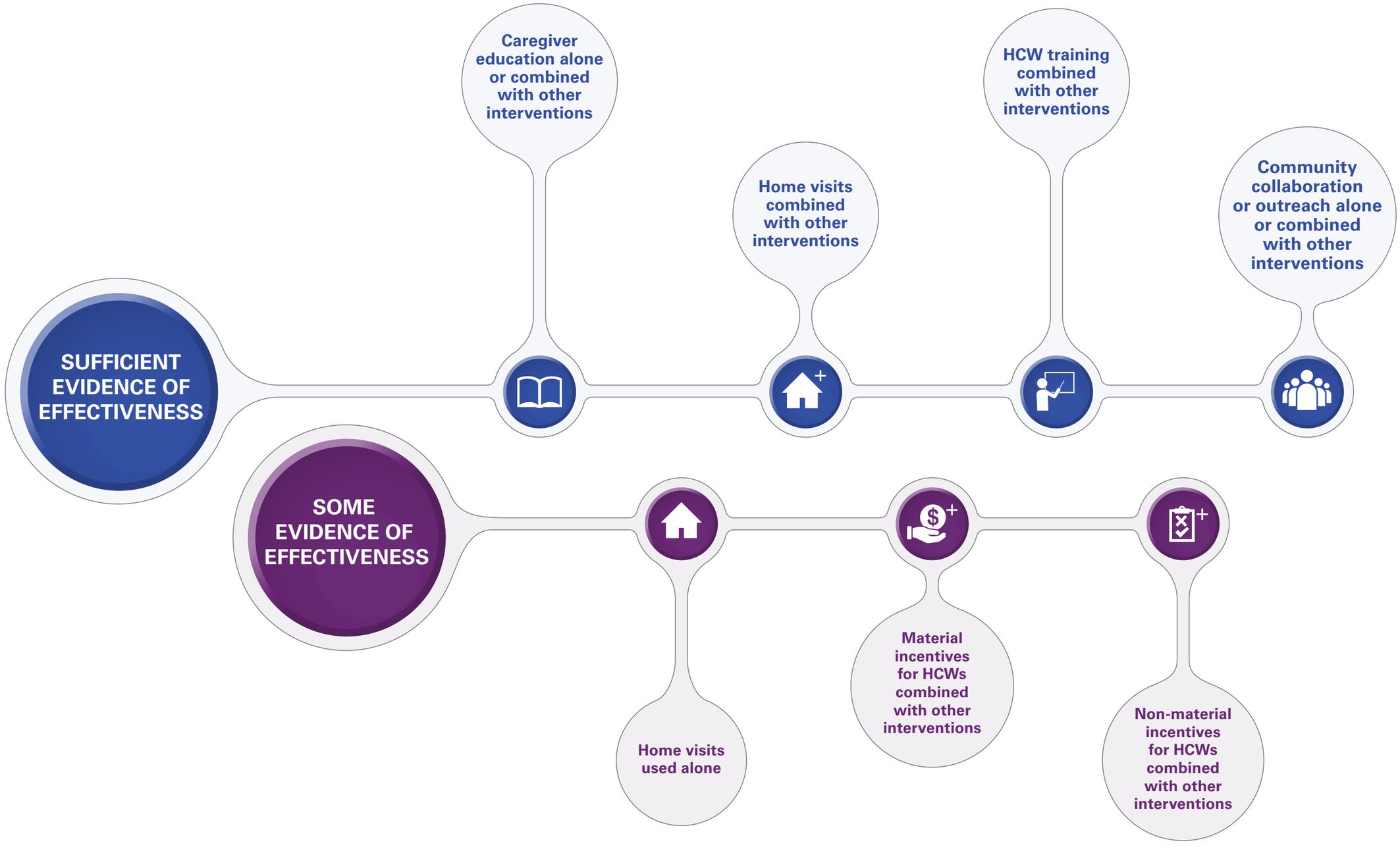
There are a variety of approaches and interventions used to improve vaccination uptake, particularly focusing on areas with low coverage. These vary in terms of priority population, setting, and modality, and include examples from almost every region of the world. In many cases, interventions have been rigorously evaluated and included in systematic reviews. However, prior to this REA, few resources have attempted to provide a broad synthesis of the current state of the evidence in terms of what works, and how to translate this evidence into practice. The REA not only summarizes the strength of the evidence by type of intervention, but it also includes implementation considerations in the literature to better enable policymakers and practitioners to choose the most appropriate interventions based on the characteristics of the contexts and populations with which they work.

The strongest evidence for what works supports two primary approaches: caregiver education and community collaboration and outreach. The evidence suggests these may be even more effective when combined with other interventions. The other types of intervention with sufficient evidence - home visits and health care worker training – are most effective when implemented as a combination intervention. These findings indicate that, for example, home visits to sensitize parents and caregivers are more effective when combined with vaccination appointment reminders, or that health care worker training could be successfully combined with community health promoters. Similar to lessons learned in other arenas of public health, the results suggest that employing integrated, multi-level, multi-pronged approaches tailored to specific populations are more likely to achieve results than stand-alone interventions.

LIMITATIONS

While efforts were made to be as comprehensive as possible when conducting this review, due to the nature of rapid evidence assessments, there are limitations to the methodologies used when compared with a systematic review (Bakrania, 2020). Some of the included systematic reviews had overlapping research questions, which means that some primary studies were included in several systematic reviews and are counted multiple times in this REA. “Vote counting” was used for the data synthesis approach, which has limitations when summarizing results as it does not account for the size of the effect. However, some reviews only reported direction of effect (positive effect, no effect, negative effect); therefore, this methodology was chosen to utilize all the evidence from the included studies and to assess the full range of interventions and outcomes. The REA is reliant on the information extracted by the included systematic reviews, which may not be complete and there may also be methodological limitations at review level, study level or both that affect the interpretation of the results. Given these constraints and potential tradeoffs, the REA approach was chosen as a recommended approach by the Cochrane Collaboration (McKenzie, 2022).

RESULTS, RECOMMENDATIONS, AND IMPLEMENTATION CONSIDERATIONS



Strength of evidence	Types of interventions	Examples of interventions	Main findings (vaccination outcomes only)	Implementation considerations
Sufficient evidence of effectiveness	 **Caregiver education alone or combined with other interventions**	**Combination interventions:** ■ Telephone and postcard reminders, immunization scheduler, brochures, intervention area task force activities, bumper stickers, magnets, door-to-door education. ■ Computerized tracking and reminders, caregiver and HCW education, HCW incentives, caregiver incentives and home-visiting outreach. ■ Face-to-face information delivered by a social worker, with immunization camps and caregiver incentives. ■ Redesigned immunization card and health-center-based education. ■ Health promotion for children's well-being delivered by community healthcare workers.	Sufficient evidence (28/31 studies [90%] in positive direction) on the effectiveness of caregiver education alone on vaccination outcomes. Sufficient evidence that caregiver education in combination with other interventions improves vaccination outcomes (94/97 studies [97%]).	Delivery of information in a discussion format was more effective than in written format. To save on time and cost, limit discussion-based interventions to vaccine-hesitant parents. HCWs should present immunization as the default behaviour. Decision aids may improve decision-making but may be most useful to employ only in cases to address confidence and knowledge barriers to vaccination. Materials should be clear and culturally and linguistically appropriate.
	 **Home visits combined with other interventions**	■ Home visits by community healthcare workers, training in improved case management of sick children, women's groups, strengthening of health systems. ■ Home visits, community presentations, door-to-door canvassing, dissemination material, reminders, appointments. ■ Computerized tracking and reminders, caregiver and HCW education, HCW incentives, caregiver incentives and home-visiting outreach. ■ Home visits, reminders and health passports. ■ Immunization database, outreach, home visits.	Sufficient evidence that home visits in combination with other interventions increases vaccination outcomes. This is based on data from 9 high-quality reviews and 7 moderate-quality reviews that reported 56/59 studies (95%) had a positive impact on the direction of effect of vaccination outcomes.	Home visits can be an important component of successful interventions, particularly in remote areas, among disadvantaged groups, low socio-economic populations, and where cultural barriers exist. However, because they are resource-intensive and logistically challenging, home visits may not be feasible in some low-resource settings. There are also security considerations for HCWs and gender and cultural considerations as well as security concerns parents may have about having HCWs visit their homes. Involving community members in discussions about the design and delivery of services may increase acceptability of services. Combination interventions selected based on contextual factors and specific barriers are more likely to succeed.

Strength of evidence	Types of interventions	Examples of interventions	Main findings (vaccination outcomes only)	Implementation considerations
Sufficient evidence of effectiveness *(continued)*	 **HCW training combined with other interventions**	■ Healthcare workers' skills improved through training and supervision in immunization, along with introduction of community health promoters and strengthening health systems (planning, health information systems, logistics and financing). ■ Screening checklist administered by healthcare workers to mothers at health facility, provider training and introducing policies to remove geographical barriers to vaccine access. ■ Supportive supervision to enable staff to perform duties through guidance and training to improve immunization knowledge and skills (including interpersonal communication). ■ Provider reminders (medical chart marked if behind on immunizations or well child visits), and performance feedback based on monthly cycles and provider education used in tandem with client reminders and recall process.	Sufficient evidence (42/45 studies [93%] in positive direction) that HCW training, when combined with other interventions, such as prompts for HCWs, expansion of services or caregiver education can have a positive effect on vaccine uptake. Insufficient evidence (3/3 studies in positive direction) to draw conclusions on the effectiveness of HCW training when used alone.	Investing in motivational interviewing training for HCWs can nurture provider-caregiver relationships. Participatory interventions require sufficient training to ensure physician confidence when undertaking the intervention. Use of information technology in design of training could be a consideration. It is difficult to be prescriptive about other components that should be combined with HCW training, as studies reported a range of combinations.
	 **Community collaboration or outreach alone or combined with other interventions**	■ A community–provider partnership focused on provider knowledge and accountability, practice and system improvements, and community outreach. ■ Community-based outreach and tracking, immunization reminders, follow-up cards/phone calls/home visits and feedback and incentives. ■ Assessment, referral, monthly voucher pick-up, outreach/tracking and parental incentives. ■ Community leaders enrolled to support community mobilization, film shown to whole community: edutainment drama, presentation, computer simulation of virus, feedback. ■ Healthcare worker training, health systems improvements, family and community activities.	Sufficient evidence that community collaboration or outreach used alone has a positive effect on vaccination outcomes. Of the 13 reviews reporting these data, a positive effect on vaccination outcomes was reported in 26/26 of the included studies. Sufficient evidence that community collaboration or outreach in combination with other interventions improves vaccination outcomes. Across the 18 reviews that assessed this intervention type, 75/76 included studies (99%) reported a positive direction of effect on vaccination outcomes.	Collaboration with community members, including trusted local leaders, in implementation and evaluation allows local knowledge to be accessed by health staff. It also increases acceptability of services and counteracts disinformation. Partnerships with community-based organizations to coordinate vaccination activities may be helpful because they use pre-existing service delivery structures and pre-established relationships with parents. Communities are not homogeneous, and participation may be hampered by differences within communities (e.g., ethnic or linguistic differences but also income inequalities).

Strength of evidence	Types of interventions	Examples of interventions	Main findings (vaccination outcomes only)	Implementation considerations
Some evidence of effectiveness	 **Home visits used alone**	For home visits, studies were considered 'alone' if home visits were used to educate/ inform about immunization or immunize only, while combination interventions included this component plus an additional intervention.	Some evidence that home visits used alone increase vaccination uptake. This is based on 11/12 (92%) studies in a positive direction from 8 systematic reviews, but the number of studies in each review assessing home visits used alone is low (≤2 studies in each review) and the direction was unclear or mixed in an additional 4 studies.	See "home visits combined with other interventions"
	 **Material incentives for HCWs combined with other interventions**	■ Team-Based Goals and Incentives Intervention (TBGI): HCWs were provided with training and material incentives (e.g., utensils, cookware), and non-material rewards (certificate of recognition). ■ P4P scheme: Financial payments made to health facilities based on achievement of targets. A proportion of the bonus is distributed among HCWs, with some percentage being retained by the facility. Staff received training and supervision. ■ Intervention designed to address vaccine availability and accessibility by combining provider education and incentives (supply-side barriers) with parent education, incentives, transportation assistance and home visits. ■ Quality improvement project coupled with incentive payments; commissioning of care packages in geographical areas; target-setting with use of information technology for reminder/ recall; and follow-up of defaulters.	Some evidence (10/10 studies [100%] in positive direction, plus meta-analysis of 2 studies) to support the use of material incentives for HCWs when combined with other strategies, but insufficient evidence to determine use on its own (1/1 study in positive direction).	**Designing a pay for performance (P4P) initiative to increase vaccine uptake requires consideration of several factors:** ■ Where immunization coverage was already high (saturation of immunization coverage), there was limited room for the intervention to have an effect; carefully consider facility and location. ■ Marginal costs to achieve service improvement will differ by facility; the value of the incentive may differ from one facility to another. ■ The distinction between PBF and direct financing might not have been made clear enough to staff to cause them to modify their practice. Clearly communicate the objective of the intervention so that it is well understood. ■ If PBF is being implemented across multiple services simultaneously (including childhood immunization), it is possible that providers could trade off various incentives within the PBF package. ■ Achieving the ideal balance between intrinsic and extrinsic incentives when designing a P4P intervention is desirable and is perhaps an area for additional research.

Strength of evidence	Types of interventions	Examples of interventions	Main findings (vaccination outcomes only)	Implementation considerations
Some evidence of effectiveness *(continued)*	 **Non-material incentives for HCWs combined with other interventions**	■ Intensive reminder/recall at the level of the patient and as part of the well child clinic process (assessment, feedback, incentives, and exchange of information). ■ A financial bonus paid to physicians based on achievement of specified immunization targets along with performance feedback (intrinsic incentive). Physicians received feedback on performance at the time of assessment and in a detailed letter afterwards. Feedback included their coverage rates, missed opportunities to immunize, comparative peer performance information, and hypothetical examples of what their coverage rates could have been if no opportunities were missed or more timely appointments were scheduled. ■ Increasing immunization fees for each vaccine administered (paid up front) along with feedback were given to physicians.	Some evidence (16/17 studies [94%] in positive direction) that non-material incentives, when combined with other interventions can have a positive effect on vaccination uptake. Insufficient evidence (2/3 studies [67%] in a positive direction) to determine effectiveness when this intervention was used alone. The evidence from the primary studies supports this overall bottom-line statement.	**These types of incentives may be less costly than financial incentives and less prone to controversy in implementation. However, some issues need to be considered:** ■ If implemented as a standalone intervention project, sustaining performance after the intervention period may become an issue. ■ When designing performance feedback interventions, consider the entire team required to improve vaccination uptake. Non-monetary incentives combined with team-based goals had a positive impact on attitudes related to coordination and teamwork among the group of HCWs (finding not specific to vaccine uptake). ■ Health system constraints such as administrative or supply chain factors impact the effectiveness of teams and their ability to achieve goals, which could result in low morale. ■ It is important to provide supervision with feedback to ensure implementation and motivation.

for every child, answers

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