

**Research Article****COMMUNITY RESILIENCE OF COMMUNITY-BASED ORGANIZATIONS AND PERFORMANCE OF THE EXPANDED PROGRAMME ON IMMUNIZATION IN RICHARD TOLL, SÉNÉGAL****^{1,*} Alioune Tall, R.N. and ²Sokhna Oumy Sarr, R.N.**¹École Nationale de Développement Sanitaire et Social, Doctoral Programme in Nursing Science,
Université Cheikh Anta Diop, Dakar, Sénégal²École Nationale de Développement Sanitaire et Social, Dakar, Doctoral Programme in Nursing Science,
Université de Montréal, Canada**Received 06th August 2026; Accepted 04th September 2026; Published online 16th October 2026**

Abstract

Routine immunization remains a public health priority in Senegal, where incomplete vaccination, schedule discontinuation, and territorial inequalities persist. Community-based organizations (CBOs) may help bridge households and health services through social mobilization, active case finding, referral, and follow-up. Objective: To assess the level of CBO engagement and describe concurrent changes in key Expanded Programme on Immunization (EPI) indicators in the Thiabakh Health Centre catchment area of the Richard-Toll Health District. A descriptive observational study combined a cross-sectional survey of CBO members with a retrospective analysis of aggregated EPI indicators. Seven of nine available CBOs were included, with five purposively selected members per organization (n = 35). Data were collected over 21 days using a questionnaire, an interview guide, and routine programme records. June and December 2024 indicator values were compared descriptively. Women represented 85.7% of participants. Reported participation in social mobilization was 94.3%, and involvement in vaccination sessions was 97%. Between the end of June and the end of December 2024, BCG/Penta 1 coverage increased from 55% to 85%, Penta 3 completion increased from 60% to 81%, the dropout indicator decreased from 40% to 12%, and recruitment of zero-dose children increased from 25% to 68%. High reported CBO engagement coincided with favourable changes in routine immunization indicators. Because the study lacked a comparison group and used aggregated data, the findings indicate temporal association rather than causal effect. Formalized roles, supportive supervision, simple tracking systems, and stronger prospective evaluation are recommended.

Keywords: Community-based organizations, Community engagement, Community resilience, Immunization, Expanded Programme on Immunization, Senegal.

INTRODUCTION**Global and national context**

Vaccination is among the most effective public health interventions for reducing morbidity, mortality, and disability from vaccine-preventable diseases. However, apparently satisfactory national coverage can conceal geographic and social pockets of under-immunization, zero-dose children, and discontinuation between successive doses. EPI performance therefore depends not only on vaccine availability, but also on the capacity of health systems to identify eligible children, maintain reliable delivery arrangements, communicate with families, organize appointments, and follow children throughout the vaccination schedule (World Health Organization [WHO], 2026). In Senegal, recent disruptions to routine immunization have renewed attention to equity and continuity. WHO Regional Office for Africa reported a decline in the proportion of fully vaccinated children aged 12–23 months from 77% in 2019 to 64% in 2023, while the proportion of zero-dose children increased from 3% in 2017 to 6% in 2023 (WHO Regional Office for Africa, 2024). These trends support combined strategies involving fixed-site services, outreach, active tracing, and community mobilization.

Local problem in Richard-Toll

In the Richard-Toll Health District, continuity of immunization may be influenced by interrelated supply- and demand-side constraints. Variable availability of vaccines and supplies, session organization, transport, and delayed information can reduce effective access. At household level, mobility, competing family and occupational responsibilities, missed appointments, rumours, understanding of the schedule, and decision-making dynamics may delay or interrupt vaccination. These barriers can reinforce one another: a postponed session without timely communication may discourage a family, while a mobile household may miss a dose if no community mechanism supports tracing and referral. CBOs may act as trusted intermediaries. Their local presence can support household identification, culturally and linguistically appropriate communication, appointment reminders, referral, and feedback to health teams. In this study, community resilience refers to the capacity of CBOs to maintain or reorganize these functions despite operational constraints while preserving working relationships with health services.

Research question and conceptual framework

To what extent was CBO engagement associated with favourable changes in key EPI indicators among children aged 0–24 months in the CBO intervention areas served by Thiabakh Health Centre? The analytical framework follows a

***Corresponding Author: Alioune Tall, R.N.**

École Nationale de Développement Sanitaire et Social, Doctoral Programme in Nursing Science, Université Cheikh Anta Diop, Dakar, Sénégal.

results chain in which community and institutional inputs enable mobilization, active case finding, referral, and session support; these activities may improve identification, initiation, and completion of vaccination, while contextual factors may modify the observed relationship.

Table 1. Conceptual framework

Level	Observable elements
Inputs	Active CBOs; experienced or trained members; coordination with health teams; monitoring tools.
Activities	Social mobilization; education; active case finding; referral; participation in vaccination sessions.
Outputs	Households informed; children identified or accompanied; appointments recalled; alerts communicated.
Expected outcomes	Higher BCG/Penta 1 coverage and Penta 3 completion; lower dropout.
Contextual factors	Vaccine availability; logistics; geographic accessibility; mobility; sociocultural norms; concurrent interventions.

Interpretive comment: The framework makes explicit that CBO activities are one component of a broader delivery system. It therefore supports an associational, not causal, interpretation of the observed changes.

OBJECTIVES

The general objective was to assess CBO engagement and describe concurrent changes in key EPI indicators in the Richard-Toll Health District by the end of December 2024. Describe the characteristics of CBO members involved in EPI activities. Measure reported participation in social mobilization and vaccination sessions. Compare BCG/Penta 1 coverage, Penta 3 completion, and the dropout indicator between the end of June and the end of December 2024. Assess recruitment of previously zero-dose children aged 0–24 months. Identify plausible mechanisms through which CBOs support immunization and propose operational improvements.

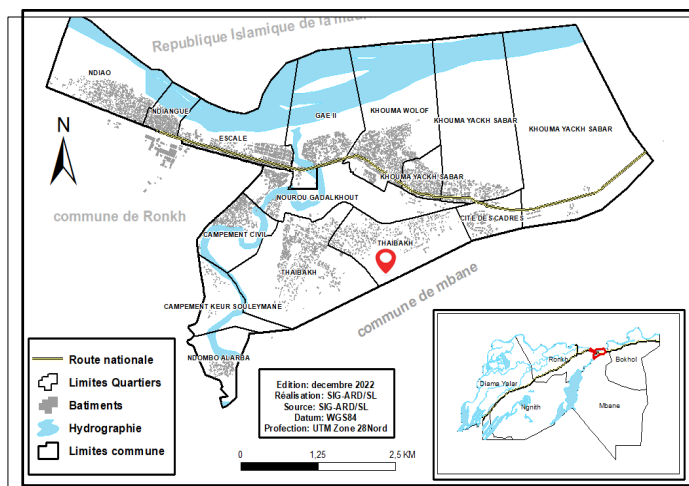
MATERIALS AND METHODS

Study design and period

This descriptive observational study was conducted in December 2024. It combined a cross-sectional survey of CBO members with a retrospective descriptive analysis of aggregated EPI indicators at two time points, the end of June and the end of December 2024. This classification is more accurate than a purely cross-sectional design because programme indicators were compared over time.

Setting, population, and sampling

The study covered seven sites served by selected CBOs in the Thiabakh Health Centre catchment area, Richard-Toll municipality, Saint-Louis Region, Senegal. The community unit of observation was the CBO, the individual unit was the surveyed CBO member, and the programme unit was the intervention area for which aggregated EPI data were available. The source population comprised members of nine available CBOs. Seven CBOs were selected, and five members per CBO were purposively recruited, yielding 35 participants. Selection considered organizational seniority, practical knowledge of EPI activities, demonstrated involvement, and availability during data collection. Purposive sampling was appropriate for identifying information-rich participants in an exploratory operational study. Nevertheless, it does not provide a known probability of selection and limits statistical generalization to non-included CBOs and other districts.



Source : Agence Régionale de Développement de St Louis. Sénégal. <https://ardsl.sn/commune-richard-toll/>

Variables and operational definitions:

Table 2. Study variables and operational definitions

Domain	Variable	Operational definition or measurement
Profile	Sex and age group	Participant-reported sociodemographic distribution.
Engagement	Social mobilization	Proportion reporting participation and activity completion against plans.
Engagement	Vaccination sessions	Proportion reporting involvement and session completion against plans.
Performance	BCG/Penta 1 coverage	Aggregated proportion reported by the programme for the selected entry-dose indicator.
Continuity	Penta 3 completion	Aggregated proportion of target children reported as reaching the third dose.
Continuity	Dropout indicator	Aggregated programme measure of loss between initiation and continuation; the exact formula requires confirmation before submission.
Equity	Zero-dose recruitment	Reported proportion of previously zero-dose children identified and recruited into vaccination services.

Interpretive comment: The indicators capture engagement, programme performance, continuity, and equity. For reproducibility, the final submission should state the exact numerator, denominator, and calculation formula for each programme indicator.

Data collection and quality assurance

Data were collected over 21 days. A structured questionnaire documented participant characteristics and engagement. An interview guide explored intervention modalities, perceived constraints, and links with health services. Programme indicators were extracted from vaccination registers, monthly reports, and health-centre dashboards. Quality procedures included harmonization of definitions, end-of-day completeness checks, consistency checks between numerators, denominators, totals, and percentages, double verification of June and December values, and traceability of corrections.

Data analysis

Categorical variables were summarized using frequencies and percentages. Changes between June and December were expressed as percentage-point differences and relative change. BCG/Penta 1 increased by 30 percentage points, equivalent to a 54.5% relative increase. Penta 3 completion increased by 21 points, or 35.0%. The dropout indicator decreased by 28 points, corresponding to a 70.0% relative reduction. Recruitment of zero-dose children increased by 43 points, or 172%. Because the source manuscript did not provide

interview transcripts or detailed qualitative findings, no empirical themes or quotations were generated.

Ethical considerations

Participation was voluntary after provision of information on the study purpose, procedures, and intended use of data. Confidentiality and anonymity were to be protected, and programme data were used in aggregated form. The administrative authorization and, where applicable, ethics approval reference should be inserted before submission because these identifiers were not provided in the source document.

Potential bias

Table 3. Potential biases and mitigation measures

Risk	Possible consequence	Mitigation or interpretation
Purposive selection	Overestimation of engagement through inclusion of highly active members.	Report criteria transparently and avoid population-wide generalization.
Social desirability	Over-reporting of participation.	Protect anonymity; use factual questions; triangulate with activity records.
Aggregated data	No child-level linkage to a specific CBO activity.	Interpret changes as temporal association only.
No comparison group	Concurrent actions may explain part of the change.	Avoid causal language and recommend controlled evaluation.
Seasonality and denominators	Variation may reflect campaigns, mobility, or target estimation.	Document campaigns, stock-outs, mobility, and denominator methods.

Interpretive comment: These limitations primarily threaten causal attribution and generalizability. They do not invalidate the descriptive value of the findings for local programme review.

RESULTS

Survey coverage and participant profile

Seven of nine identified CBOs were included (77.8%). The survey enrolled 35 members, five per CBO. Women represented 30 participants (85.7%), and men represented five (14.3%). All participants were aged 30 years or older. Twenty-two participants (62.9%) had more than 10 years of organizational experience.

Table 4. Profile of respondents

Characteristic	n	%	Age groups			Years of service with the organization	
			Age 30–39	Age 40–49	Age ≥50	5–10 years	>10 years
Women	30	85.7	5	7	18	8	22
Men	5	14.3	2	3	0	5	0
Total	35	100.0	7	10	18	13	22

Interpretive comment: The group was predominantly female and highly experienced. These characteristics may facilitate household access and local credibility; however, the design does not demonstrate that age or seniority caused higher trust or better immunization outcomes.

Community engagement

CBO engagement was assessed through social mobilization, participation in vaccination sessions, home visits, and advocacy with community leaders. Activity completion was high across the four domains.

Table 5. Planned and completed community activities

Activity	Planned	Completed	Coverage or reach	Observation
Social mobilization	12	11	11 of 12 sites	One activity was not completed because of an unforeseen event.
Vaccination-session support	24	24	12 of 12 sites	Fifty-five children were referred for reminders, zero-dose status, or vaccine supply disruptions.
Home visits	48	45	45 households and 45 household heads	Some planned contacts were affected by household-head mobility.
Advocacy with community leaders	45	40	40 of 45 leaders	Some leaders were unavailable or absent.

Interpretive comment: Completion ranged from 88.9% for advocacy to 100% for vaccination-session support. The figures show strong implementation fidelity among selected members, but purposive recruitment of already engaged actors may have inflated participation estimates.

Changes in EPI indicators

All four selected indicators changed in a favourable direction between the end of June and the end of December 2024. Entry into the vaccination schedule, completion of Penta 3, and zero-dose recruitment increased, while the reported dropout indicator decreased.

Table 6. Change in EPI indicators between June and December 2024

Indicator	End June	End December	Absolute change	Relative change
BCG/Penta 1 coverage	55%	85%	+30 points	+54.5%
Penta 3 completion	60%	81%	+21 points	+35.0%
Dropout indicator	40%	12%	–28 points	–70.0%
Zero-dose children recruited	25%	68%	+43 points	+172.0%

Interpretive comment: The largest proportional improvement concerned recruitment of zero-dose children, while the 28-point decline in dropout suggests improved continuity. These results cannot isolate the contribution of CBOs from health-team outreach, campaigns, supply improvements, or seasonal effects.

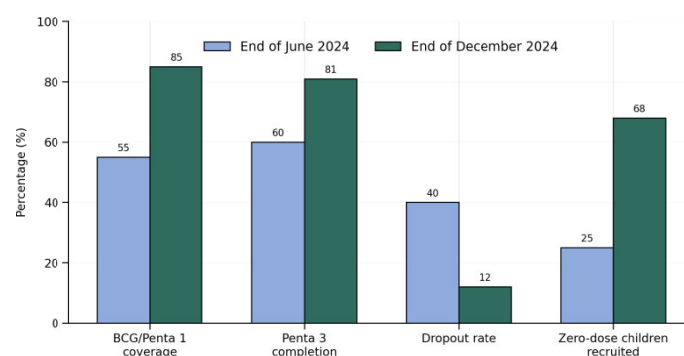


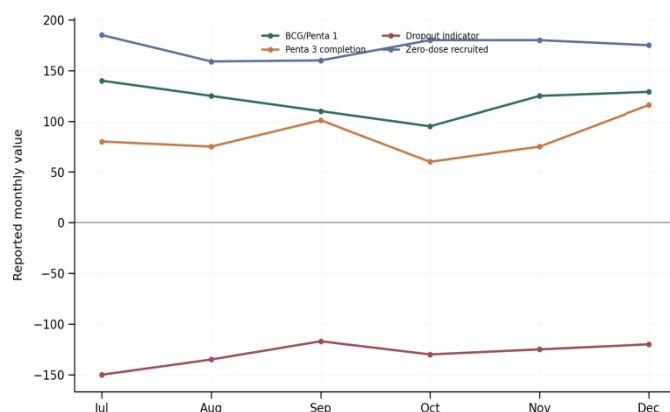
Figure 1. Comparison of selected EPI indicators at the end of June and December 2024

Interpretive comment: The chart highlights simultaneous improvement across initiation, completion, retention, and equity indicators. Because dropout is an adverse indicator, its decline represents improvement. The combined BCG/Penta 1 label should be disaggregated in the final database if separate values are available.

Table 7. Reported monthly values for selected EPI indicators, July–December 2024

Indicator	Jul	Aug	Sep	Oct	Nov	Dec
BCG/Penta 1	140	125	110	95	125	129
Penta 3 completion	80	75	101	60	75	116
Dropout indicator	-150	-135	-117	-130	-125	-120
Zero-dose recruited	185	159	160	180	180	175

Interpretive comment: The monthly series shows fluctuation rather than a uniform linear trend. October recorded the lowest BCG/Penta 1 and Penta 3 values, followed by recovery in November and December. The negative dropout values require verification because their unit and calculation are not specified and they are not directly comparable with the percentage-based dropout values in Table 6.

**Figure 2. Monthly pattern of reported EPI values, July–December 2024**

Interpretive comment: The graph faithfully reproduces the source values, including negative dropout values. It should be treated as a data-quality review figure until the authors confirm whether the values are counts, differences, rates, or coding conventions.

DISCUSSION

Principal findings

The study produced two complementary findings: very high reported engagement among purposively selected CBO members and concurrent favourable changes in routine immunization indicators. Increased BCG/Penta 1 coverage suggests greater entry into the schedule, whereas higher Penta 3 completion and lower dropout suggest improved continuity. The increase in recruitment of zero-dose children is particularly relevant to equity because it reflects outreach to children who had not previously received routine vaccination services.

Interpretation in the Senegalese context

The findings are consistent with the need to restore and strengthen routine immunization in Senegal. The national decline in complete vaccination and increase in zero-dose prevalence described by the WHO Regional Office for Africa underscore the importance of strategies that combine facility-based services, outreach, household tracing, and locally credible communication (WHO Regional Office for Africa, 2024). Within such a model, CBOs may reduce informational and social distance between services and households. The 85% coverage level observed in December remained below the national ambition of exceeding 90% across regions described in the 2025 immunization revitalization agenda (Ministry of Health and Social Action, Senegal, 2025). Although that policy direction post-dated the study period, it reinforces the current

relevance of structured community engagement and targeted action for children who remain unreached.

Plausible mechanisms of CBO contribution

Several mechanisms may plausibly explain the observed association without proving causality. First, CBO proximity may facilitate rapid communication through familiar languages and social networks. Second, local knowledge may support active tracing of children who are zero-dose, delayed, or lost to follow-up. Third, accompaniment and reminders may reduce non-financial access costs, including uncertainty about dates and locations. Fourth, CBOs may relay information on rumours, refusals, mobility, and access barriers to health teams. Repeated community presence may also strengthen confidence and normalize timely vaccination.

Gender, resilience, and sustainability

The predominance of women among participants highlights their central role in community action and may facilitate communication with mothers and other caregivers. At the same time, programme design should avoid relying on invisible or inadequately supported female labour. Recognition, training, communication resources, safe mobility, and meaningful involvement of men and community leaders can distribute responsibility more equitably. Community resilience should not be reduced to one-time availability. It involves the capacity to anticipate, adapt, and sustain action during service changes, rumours, population movement, or logistical disruptions. This capacity depends on clear roles, regular links with district teams, simple data systems, supportive supervision, and minimum operational resources. Exclusive reliance on informal volunteerism may be difficult to sustain.

Strengths and limitations

Strengths include operational grounding in seven intervention sites, joint consideration of community engagement and programme indicators, comparison of two time points, and immediate relevance for local supervision. The principal limitation is the absence of a comparison group, which precludes attribution of the observed changes exclusively to CBO action. Purposive recruitment may overestimate engagement, self-report is vulnerable to social desirability, and aggregated indicators do not link individual children to specific activities. Exact numerators, denominators, and formulae were not available in the source manuscript. The combined BCG/Penta 1 indicator should be clarified because the antigens represent different contacts. Finally, no interview quotations or detailed qualitative results were available, so participant perceptions cannot be reported empirically.

Implications for research and practice

The findings primarily apply to the CBOs and sites studied. They provide a favourable programme signal but not a generalizable estimate of CBO effectiveness. Future research should compare sites with different levels of community mobilization, use anonymized child-level data, document concurrent interventions and confounding factors, and prospectively follow vaccination cohorts through schedule completion.

OPERATIONAL IMPLICATIONS AND RECOMMENDATIONS

Table 8. Priority actions and monitoring indicators

Domain	Priority action	Suggested monitoring indicator
Governance	Formalize CBO roles in health-post microplans.	Proportion of sites with a signed and updated microplan.
Data	Maintain confidential lists of expected, delayed, and recovered children.	Number of children traced and vaccinated after follow-up.
Communication	Co-design concise messages adapted to local languages and test comprehension.	Proportion of community sessions using validated messages.
Continuity	Introduce reminders and active tracing after missed appointments.	Dropout between doses and number of zero-dose children.
Logistics	Rapidly communicate session changes and supply alerts.	Proportion of sessions maintained or rescheduled with prior notice.
Capacity	Train CBO members on schedules, respectful listening, referral, and confidentiality.	Proportion trained and receiving supportive supervision.
Recognition	Provide minimum resources and equitable, non-discriminatory recognition.	Retention of active CBO members.
Evaluation	Establish prospective comparison across intervention areas.	Adjusted difference in coverage change between areas.

Interpretive comment: The recommendations translate study findings into actions that are measurable at district level. Priority should be given to indicator harmonization and data-quality verification before results are used for performance management.

Table 9. Indicative 90-day action plan

Period	Operational priorities
Days 1–30	Validate indicator definitions and formulae; map low-coverage areas; clarify roles; update confidential tracking lists.
Days 31–60	Train CBO members; launch reminders and active tracing; conduct joint supervision; monitor stock-outs and postponed sessions.
Days 61–90	Review coverage and dropout; conduct a community review; document recovered children; adjust microplans and resources.

Interpretive comment: The plan emphasizes an early data-verification phase, followed by coordinated implementation and a structured review cycle. It can be integrated into routine district supervision rather than operated as a parallel system.

Conclusion

In the study areas of the Richard-Toll Health District, CBO members reported high engagement, and EPI indicators changed favourably between the end of June and the end of December 2024. These observations support organized community mobilization as a promising means of bringing services closer to families, identifying under-immunized children, and reducing discontinuation. They do not demonstrate an independent causal effect of CBOs. Sustainable progress requires explicit role definition, simple and confidential tracking tools, supportive supervision, equitable recognition of community actors, reliable logistics, and more rigorous prospective evaluation.

Declarations

Competing interests: The authors declare no conflicts of interest.

Funding: The authors declare that they received no external funding for the conduct of the study.

Author contributions:

Alioune Tall: conceptualization, methodology, investigation, data curation, analysis, writing – original draft, and project administration.

Sokhna Oumy Sarr: methodology, validation, writing – review and editing.

Acknowledgements

The authors sincerely thank the members of the Richard-Toll health district, the staff of the Thiabakh health center, the participating community organizations, and the community members for their full and complete participation.

REFERENCES

- <https://www.unicef.org/fr/rapports/situation-enfants-dans-le-monde-2023>
- Rapport UNICEF. « La situation des enfants dans le monde.2023. » <https://www.unicef.org/media/151966/file/FrenchSOWC2023Web.pdf>
- ANSD. RGPH-5 2023. https://www.ansd.sn/donnees-recensements?field_liste_annee_value=2023&field_regions_value=SAINT-LOUIS&field_departements_value=DAGANA&page=0
- Ministère de la Santé et de l'Action sociale. (2025, 19 août). Forum consacré à la relance du Programme élargi de vaccination (PEV). <https://sante.gouv.sn/Actualites/forum-consacrer%C3%A9-%C3%A0-la-relance-du-programme-%C3%A9largi-de-vaccination-pev>
- Organisation mondiale de la Santé. (2026, 15 juillet). Couverture vaccinale. <https://www.who.int/fr/news-room/fact-sheets/detail/immunization-coverage>
- Organisation mondiale de la Santé, Bureau régional de l'Afrique. (2024, 26 avril). Vacciner les tout-petits au Sénégal, peu importe où ils se trouvent. <https://www.afro.who.int/fr/countries/senegal/news/vacciner-les-tout-petits-au-senegal-peu-importe-ou-ils-se-trouvent>
- Organisation mondiale de la Santé, Bureau régional de l'Afrique. (2025, 1er juillet). Le Sénégal introduit le vaccin hexavalent dans son programme de vaccination. <https://www.afro.who.int/fr/countries/senegal/news/le-senegal-introduit-le-vaccin-hexavalent-dans-son-programme-de-vaccination>
- UNICEF Sénégal. (2025, 2 juillet). Communiqué conjoint UNICEF-OMS : Le Sénégal introduit le vaccin hexavalent dans son programme de vaccination. <https://www.unicef.org/senegal/communiqu%C3%A9s-de-presse/communiqu%C3%A9-conjoint-unicef-oms-le-s%C3%A9n%C3%A9gal-introduit-le-vaccin-hexavalent-dans>
- https://apps.who.int/iris/bitstream/handle/10665/154598/WHO_HSE_GAR_ERI_2010.4_Rev1_fre.pdf