

Rapid convenience monitoring as a method to assess immunization status and programmatic reach across different age groups during the Big Catch-up: Experiences from 8 countries

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Abstract

Background

Rapid convenience monitoring of immunization (RCM) is a field-oriented monitoring approach, derived from lot quality assurance sampling, designed to generate rapid, actionable local data for course correction and immunization programme improvement. This analysis summarizes experiences from eight countries that conducted RCM as part of the Big Catch-up immunization activities. The Big Catch-up was an initiative to provide vaccines missed following disruptions and backsliding in childhood vaccination coverage associated with the COVID-19 pandemic and persistent challenges.

Methods

The analysis summarizes experiences with RCM from Burkina Faso, Cameroon, the Democratic Republic of Congo, Guinea, the Gambia, Mali, South Sudan, and Tajikistan.

Results

Across settings, RCM was used by immunization programmes as a rapid operational tool to assess immunization status, identify missed children following catch-up vaccination activities, understand barriers and reasons for missed doses, and prompt programmatic action. Seven countries checked the vaccination status for children above 2 years of age, typically up to 5 years, with two countries checking up to 6 years of age; one country checked up to 2 years. Data collectors for RCMs were either independent groups or health workers assigned to neighboring areas to minimize bias. There was heterogeneity across core variables assessed by countries. DTP1 status among children ≥ 1 year, where assessed, was 83% in South Sudan to 99% in Tajikistan. The RCMs also identified persistent gaps of incomplete vaccination among eligible children, delays in vaccination according to national schedules, continued missed opportunities at service delivery points, and caregiver-facing barriers.

Conclusions

In all eight countries, RCMs led to immediate actions to catch up missed doses as well as programmatic recommendations to combine and integrate strategies to reach missed children. RCM can be a useful method to quickly obtain performance signals for childhood immunization and catch-up across age groups.

Background

Rapid convenience monitoring (RCM) is a field-based monitoring approach designed to generate rapid, actionable evidence for immunization programme improvement. RCM is a non-probabilistic method and

should *not* be interpreted as a statistically representative coverage estimate. Its value is operational: identifying local patterns of un- and under-vaccination, detecting service and demand barriers, assessing service delivery performance, and guiding immediate course correction [1].

RCM is a recommended approach for monitoring vaccination campaigns and other health interventions alongside other methods [2–4] and has been used across diverse contexts typically at a point during or just after a health intervention it is designed to assess [5–8]. RCM differs from lot quality assurance sampling (LQAS), a method used extensively in polio supplementary immunization activities, to determine whether a minimum vaccination coverage is reached in defined geographic areas [5]. Both RCM and LQAS are rapid monitoring approaches: RCM provides a localized validity check to inform immunization activities typically without thresholds whereas LQAS uses a stratified random sampling approach and pre-specifies thresholds for pass/fail [6]. Both methods include programmatic responses.

Briefly, in the context of BCU monitoring, RCM includes evaluating the vaccination status of children in prioritized areas of a health facility catchment area such as communities at greater risk for un- and under-vaccination. Data is collected from age-eligible children in a fixed number of households, usually 20, a number based on feasibility and practical considerations. The number of RCMs conducted considers different settings and population groups, as well as the size of the population at the district level. Field teams can include health facility staff from the same area or “crossed” where staff comes from a neighboring catchment area – an approach mainly used in Latin America – nursing or medical students, or other independent groups. A supervisor covers three to five teams and is responsible for training, resources and logistics, and advice throughout the process. During RCM data collection, field teams select the starting location either by dividing the community into smaller areas on a drawn map or on written slips of paper and randomly selecting one area to start and then begin at a house in that area randomly. The data collection team then goes house-to-house often moving in a clockwise route to obtain data on the required number of children. RCM is not meant to reflect the vaccination status of the entire population, but rather to get an understanding of issues in the areas selected for the RCM [1].

Launched in 2023 under the Immunization Agenda 2030 Partnership by Gavi the Vaccine Alliance, the World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF), the Big Catch-up (BCU) is a global initiative in response to backsliding of immunization coverage during the COVID-19 pandemic with three related aims: 1) catching up missed children, 2) restoring coverage to previous levels, and 3) strengthening immunization systems [7]. For objective 1, catch-up, countries used a mixed of strategies, notably expanding the eligibility age for routine immunization up to 59 months and used a combination of service delivery strategies to identify, screen, and vaccinate children missing specific routine immunization doses. Most countries implemented periodic intensification of routine immunization or “PIRI”, characterized by intermittent intensified activities aiming to accelerate improvements in coverage of multiple antigens [8]. Whether fixed site, PIRI, and/or combining BCU delivery with previously planned supplementary immunization activities (SIA) such as for polio and/or measles vaccination, social mobilization was used to reinforce the importance of routine immunization and the possibility for eligible children missing doses to be caught up.

As part of the monitoring, evaluation and learning activities of the BCU, Gavi provided funding to WHO to support specific countries to implement RCMs in selected areas. A total of eight country teams put forward RCM proposals and received funding to conduct RCM during their BCU implementation period. Drawing from eight countries' experiences in 2024–2025 using RCM, the objectives of this analysis are to: summarize RCM methodological approaches and adaptations in practice; present key findings on vaccination status among older-aged groups and immunization card retention from the RCM; and describe practical uses for RCM and implications for routine immunization inclusive of catch-up vaccination.

Methods

In 2024 the Immunization Agenda 2030 Data Strengthening and Use working group developed and shared guidance with countries on approaches to monitor and report on catch-up vaccination [9]. Among other methods, the guidance promotes the use of RCM to provide early indications of BCU implementation performance and identify needs for service improvement. WHO also shared an RCM toolkit with country teams to inform development of RCM approaches [1], including indicators to measure behavioral and social drivers (BeSD) of immunization [10].

RCMs were conducted in eight countries: Burkina Faso was an early implementer in July 2024 and seven other countries implemented in 2025 through funding provided by Gavi through WHO Headquarters. All BCU countries were invited to conduct RCMs with funding support. Cameroon, the Democratic Republic of Congo (DRC), Guinea, Mali, The Gambia, South Sudan, and Tajikistan put forward proposals. The RCM proposals included sharing proposed methods, draft RCM data collection tools, which were reviewed and approved for support by WHO regional and headquarters focal points with a maximum budget envelope of 20,000 USD per country. The methods included rationale for target areas, target population age range, sampling approach, data collection teams, duration, and questionnaires.

Catch-up vaccination in each country was guided by the country's catch-up policy and schedule following WHO recommendations [11]. Countries had different vaccine doses included in national vaccination schedules for children under two years of age (Table 1), and similarly catch-up roll-out varied (Table 2) which were collectively among the doses that could be assessed by the RCM for reach of on-time and catch-up vaccination.

In terms of BCU implementation scope, among the eight countries, five implemented catch-up vaccination nationally (Burkina Faso, Cameroon, The Gambia, Guinea, South Sudan), and three prioritized subnational areas (DRC, Mali and Tajikistan) (Table 3). RCM methods adapted by the country determined which geographic areas to assess based on equity and performance dimensions as well as whether to assess vaccination status against all catch-up doses or a selection of tracer doses.

RCM data collection took place in 2024 for Burkina Faso, and in 2025 for the other seven countries, and was guided by the countries' programmatic and ethical standards. Inclusion criteria for this summary involved having completed the RCM with documentation and detail on RCM methods and findings. Some

countries incorporated components beyond the RCM into the assessment to include systems aspects, as described in the Results section on methods adaptations.

Data was analyzed and reported in individual country reports. This summary extracts methods choices and adaptations and findings from RCM country reports and validated by co-authors involved in the country RCM implementation and who provided technical support from a WHO regional office capacity. Data extraction was done by one of the authors (AH-S) and where questions existed, clarification was provided by regional focal points (HD, ATB) and country implementers (SS, ER, AZ, AKS, BBP, JCKM, FFRM, DKI, JO, MK, FBD, AKS, MB).

Results

The findings are presented in two sections: I) methodological choices and adaptations, and II) results from the RCMs.

I. Methodological choices and adaptations

All countries indicated an objective related to assessing performance of BCU among children up to 5 or 6 years (< 24 months for Guinea), sometimes paired with assessing infant vaccination status (< 12 months). Across countries, RCM proposals had design features that included cross-sectional non-probabilistic sampling, purposively selecting geographic areas often based on performance. Target age groups varied and sample sizes ranged from 480 to 37,202 children (Table 4). One RCM is usually 20 households in an area served by a selected health facility though there was some variation in implementation by country.

Timing RCM vis-à-vis immunization activities

Across countries, the RCMs were timed to take place after BCU immunization activities had started, to inform continuation of catch-up vaccination. In Burkina Faso, one of the earliest country implementers of the BCU starting in 2023, the RCM was conducted in July 2024 on remaining days of a week-long PIRI round; specifically, the RCM took place days on days 4–7. In Cameroon, the RCM was implemented in districts that had already completed all three planned BCU PIRI rounds, in fixed posts and through outreach, across 2024–2025 and when catch-up vaccination continued as part of routine sessions. In the DRC, the RCM was scheduled about one month after two successive PIRI rounds in Mongala and Tshuapa, with an explicit operational rationale: to use findings to strengthen microplanning for the third PIRI round. In Guinea, the RCM was embedded as part of vaccination intensification activities combined with Vitamin A supplementation and birth registration in 38 districts, taking place as campaign activities continued, i.e., monitoring days were mapped onto later campaign days. In The Gambia, the first RCM took place in August 2025 in one region after three rounds of PIRI followed by six regions covered from October to November 2025. Mali's RCM took place in October 2025, following two earlier BCU/PIRI rounds in January and July 2025, allowing time for catch-up implementation while still close enough to

inform course correction. South Sudan's RCM took place in November 2025 after starting BCU activities nationwide in April 2025. Finally, Tajikistan's RCM was conducted in late 2025, after the BCU launch in 2024, serving as a rapid appraisal of the extent to which catch-up processes had been institutionalized within primary health care service delivery, microplanning, data use, outreach and community engagement (Table 5).

Age ranges

Across the RCMs, age ranges varied, with most focusing on children under 5 or 6 years. DRC and Mali assessed children 0–59 months, while the Gambia and South Sudan targeted children within the BCU eligibility range of 12–59 months; South Sudan also included an infant comparison cohort (0–11 months) alongside the BCU target group of 12–59 months. Burkina Faso assessed children 24–59 months, older children within catch-up eligible range. Guinea used a narrower range among under-two's (0–23 months). Cameroon and Tajikistan used the widest age ranges: 0–6 years for Tajikistan and 12–71 months for Cameroon.

Questionnaires

The questionnaires all contained vaccination status questions with verification by card and/or recall. For example, the Gambia checked for status of 21 doses in schedule (BCG, Penta1–3 or DTP-HepB-Hib vaccine doses 1–3, MR1–2, IPV1–2, OPV1–5, PCV1–3, Rota1–2, YF, MenA, DTP booster) among children by sex. Other countries focused on specific vaccine doses. For example, Burkina Faso assessed children aged 24–59 months for having received Penta1, Penta3, Measles-Rubella1, and IPV1. Behavioral and social drivers' questions were included in questionnaires for Cameroon, DRC and Tajikistan. Burkina Faso also included a question on which site catch-up vaccination occurred (e.g. health center, health post, and specific outreach location types such as markets, pre-schools, sites for internally displaced persons, places of worship). In RCMs where BeSD domains were not all used, information was collected on related variables such as reasons for not vaccinating and sources of information. Burkina Faso included a question on adverse events following immunization (AEFI) with response options that included symptoms and severity reported.

Additionally, Mali, Cameroon and Tajikistan included a questionnaire for health workers as part of the rapid assessment. Tajikistan's questionnaire examined facility system readiness in terms of standard operating procedures (SOP) use, vaccine supply and forecasting, human resource, microplanning, outreach, data systems (DHIS2 and electronic immunization registry) use, community engagement, and financing/technical assistance needs.

Data collectors

RCM data collection relied on locally recruited teams who had not been involved in BCU activities in the area sampled. In Cameroon, enumerators were selected from a pool of routine independent monitoring and LQAS data collectors, recruited locally who were mainly students. In DRC, data collections were facility in-charges ("*infirmiers titulaires*") who were assigned to a neighboring catchment area. In addition to the facility in-charge, DRC's RCM teams included a community health worker to facilitate access to households and a supervisor. In Guinea, 12 external monitors with varied professional backgrounds – sociologists, lawyers, teachers – were deployed for the RCM in the 12 priority districts. In Mali, four enumerators (one per region) worked with a supervisor and a national coordinator. In South Sudan, data collectors were selected who had not been involved in BCU activities and trained at the county level, supervised by national/county supervisors.

Training & supervision

Training approaches were generally short, standardized, and tailored to each country's data-collection model, aiming for consistent tool use, role clarity, and supervisory checks. In Cameroon, 76 enumerators were selected and trained to implement community and facility components. In the Gambia 120 trained data collectors supported by 20 regional supervisors and 4 national coordinators conducted the data collection. In Guinea, monitors were briefed by the WHO team prior to deployment and trained to use digital tools for data capture under close supervision. In Mali, enumerators and regional supervisors were deployed with national coordination to reinforce standardized interviewing and interpretation of questions. In Tajikistan, data quality assurance also included digital checks through ODK, GPS/time-stamp review, anomaly checks, duplicate review and supervisor validation. In South Sudan, data collectors and supervisors underwent a standardized, Ministry of Health (MOH)/WHO-led training, after which one trained enumerator supported by a local guide was deployed per county, with close national- and county-level supervision and routine quality checks throughout data collection

Data collection

RCM data collection centered on rapid household-based verification of child vaccination status, typically using home-based records – i.e. vaccination card/child welfare cards – and, where documentation was missing, based on caregiver recall (Table 6). DRC uniquely combined household visits with out-of-household case-finding at community gathering points and also verified vaccination status using facility registers when cards were not available.

Household selection was implemented as a quota-based itinerary approach, with teams moving sequentially through a community until the required number of eligible households was reached. In the Gambia, monitors visited a fixed quota of 20 households per selected settlement and excluded households without an eligible child (12–59 months), continuing until the quota of eligible households was achieved. In South Sudan, teams selected 20 households per payam (often operationalized as one eligible child assessed per household) within selected bomas/settlements, yielding a consistent household count per administrative unit. In Guinea, teams identified the first household using a random

direction method (spinning a pen to randomly select start orientation) from a defined reference point, then selected subsequent households based on proximity to the previous household's door, progressing household-to-household until the daily/area quota was met.

All countries used digital data capture (e.g., tablet/phone-based forms), enabling rapid aggregation and quality checks; in Tajikistan, electronic collection was paired with supervisor-led data quality controls, including GPS and time-stamp verification and daily review for anomalies and duplicates. Burkina Faso, Cameroon, Guinea, South Sudan and Tajikistan used ODK electronic forms, and DRC and Mali used KoBoCollect.

Operational challenges were reported for the Gambia, which noted that that PIRI was conducted during the holidays and some children were away from home with no access to the child welfare card for recording. Also, in the Gambia there were heavy rains during data collection which led to delays and longer days in the field, specifically data collectors being in the field for 10 hours on some days.

Data analysis

Analysis across the RCMs was primarily descriptive, summarizing a cross-sectional snapshot of vaccination status and related operational indicators using frequencies and percentages. Several countries incorporated recommended disaggregation by age group: for example, DRC disaggregated findings into 2–11 months, 12–23 months and 24–59 months, to show programme performance among infants and younger toddlers closer to routine schedules from older children eligible for catch-up. When included in the RCM questionnaire, countries structured reporting of barriers using BeSD domains (Table 7).

Ethical considerations

Ethical considerations were incorporated into RCM practices. For example, DRC's RCM protocol involved obtaining verbal consent from caregivers during data collection, and anonymized data during the cleaning phase prior to analysis. Mali health authorities sent an information letter to inform participants ahead of time, followed by verbal consent, and confidentiality through anonymized responses. Tajikistan's ethical considerations included community leadership informed of fieldwork, voluntary participation and informed consent before each interview, no identifying information recorded, and children missing doses were referred to nearest facility. In South Sudan, the RCM was conducted with formal authorization from the Ministry of Health, including a written request to WHO and deployment letters to state and county authorities to facilitate field access; verbal informed consent was obtained from all caregivers prior to interviews, and no personal identifiers were recorded during data collection. Four reports did not explicitly mention ethical considerations and practices.

II. RCM results and reported actions

Overall, the RCMs consistently showed that catch-up activities were reaching eligible children, at least in the areas covered by the RCM, though gaps persisted with un- and under-vaccinated children identified

(Table 8).

Vaccination status

In Cameroon, of the 1,087 children aged 12–71 months assessed by vaccination card, 90% (n = 979) had received Penta1, 74% (n = 804) received Penta3, and only 54% (n = 586) received MCV1. DRC's RCM similarly identified missed children after repeated catch-up rounds, with results showing lower “up-to-date” status among older children and an information gap around the need to return for subsequent doses. In the Gambia, out of 36,988 assessed for Penta1 35,955 (97.2%) were vaccinated; similarly, out of 36,999 checked for Penta3 35,524 (96.0%) were vaccinated. Guinea's RCM reported high catch-up uptake during the campaign period and highlighted that referral/orientation of identified missed children supported rapid correction. In Tajikistan, overall zero-dose identified was 3.5%, zero-dose among 1–6-year-olds was 1.38%, and zero-dose among infants < 1 year 7.74%. Penta1 and Penta3 coverage were both around 96.5–96.6%, with very low dropout, indicating strong follow-through once children enter the system. For Tajikistan, the main vulnerability identified was delayed/timely entry among infants, with IPV1 serving as a sensitive indicator of early-contact performance.

Age factors

Age-related patterns across the RCMs suggest that gaps were often, but not always, more pronounced in older children. In DRC, “fully vaccinated” was defined operationally based on the tracer antigens verified during the RCM – Penta1, Penta2, Penta3, IPV, MCV1 and MCV2 – and interpreted according to the child's age, particularly for MCV2, which is expected from 15 months of age. RCM results by age group showed lower fully vaccinated status among 24–59 months compared with 12–23 months, and similarly Cameroon saw 36–71 months children had proportionally more missing doses. In South Sudan, more complete vaccination status increased with age within the BCU target group, with higher uptake among children 24–59 months than 12–23 months, reflecting successful catch-up of older cohorts, while infants (0–11 months) showed lower early series uptake, indicating challenges in timely initiation. In contrast to other settings where gaps were more pronounced among older children, Tajikistan showed a different pattern, with higher zero-dose prevalence among infants and very low levels among children aged 1–6 years. This suggests that catch-up activities have successfully addressed historical immunity gaps, while challenges persist in timely initiation of vaccination; BCU appears to have substantially reduced immunity gaps among children aged 1–6 years.

Geographic variations

RCMs identified heterogeneity of performance with some clustering or pockets of un-/under-immunized children. In the Gambia, lower rates of fully immunized status were reported in urban and semi-urban areas of Western Region 1 and Western Region 2, and Central River Region, while the other four regions scored above 90%. In South Sudan, the RCM noted persistent clusters of missed and zero-dose children in Duk, Manyo, Panyikang, and Bor South counties reflecting localized access, mobility, and service-reliability constraints. While variations in service-delivery strategies across these counties were

not explicitly detailed, the findings point to underlying geographic and contextual barriers, such as seasonal flooding and insecurity, contributing to unequal performance.

Service delivery

Burkina Faso's RCM reported information on the location at which catch-up vaccination services were provided. While more catch-up vaccinations took place at fixed sites (n = 1,823 at health centers; n = 1,475 at health posts), many catch-up vaccinations were also given at different outreach locations (n = 439 at markets; n = 348 at sites for internally displaced people; n = 205 for churches and mosques; n = 87 at pre-schools) demonstrating the importance of offering catch-up across different service delivery points. In South Sudan, RCM findings similarly indicated the importance of outreach and mobile delivery for reaching the target population with access constraints, with higher uptake observed among older children targeted by catch-up activities. Findings from Mali and Tajikistan also highlight the role of missed opportunities for vaccination (MOV) as a key operational driver. Caregiver reports of being turned away (6.4%) were associated with delayed initiation and missed early doses, particularly IPV1, reinforcing the importance of ensuring that all eligible vaccines are administered at each contact with the health system.

Adverse events following immunization

Burkina Faso's RCM reported a total of 52 cases of minor AEFIs. Fever (n = 31) and pain at the point of injection (n = 17) were the most commonly cited. The other RCM reports did not explicitly mention AEFIs.

Behavioral and social drivers

RCMs that incorporated BeSD questions – Cameroon, DRC, the Gambia, South Sudan, and Tajikistan – findings converged on a mix of information gaps, practical constraints, and belief/perception barriers that help explain why some children remained missed despite catch-up delivery. In DRC, the most frequent reason for under-vaccinated status was an information/knowledge gap about completing the schedule – caregivers often did not understand the need to return for additional doses – while the broader BeSD framing also captured barriers linked to beliefs/perceptions and practical obstacles (e.g., competing demands, mobility, or constraints accessing services). In Cameroon, caregiver-reported reasons for non-vaccination prominently included lack of information (in general, 30% of reasons given, and related to doses needed to complete the vaccination schedule, 23%), alongside other access-related constraints. In The Gambia, a caregiver too busy to take the child to vaccination was mentioned as the main reason. In South Sudan, caregiver-reported reasons for non-vaccination were dominated by information gaps, with lack of awareness accounting for 38% of responses and fear of side effects for 11%, indicating limited evidence of vaccine hesitancy overall. In Tajikistan, BeSD findings showed high caregiver confidence in vaccination (~ 89%), very strong perceived social norms (~ 99.7%), high intention to fully vaccinate (94.3%), universal knowledge of where to vaccinate, and high perceived ease of access. Remaining missed-dose patterns were therefore more closely linked to practical and service delivery barriers, including being turned away, rather than vaccine hesitancy.

Information sources

Information about catch-up activities was commonly conveyed through frontline health workers and community channels, with variation by country. South Sudan's RCM reported that households most often heard about the campaign from social mobilizers, followed by health workers and community leaders. The Gambia's RCM similarly emphasized that vaccination information was mainly obtained through health workers. In Cameroon, RCM results indicate caregivers were informed through PIRI's campaign-like communication and, among those who were aware, many reported receiving a direct invitation/reminder. Tajikistan's RCM results suggest a combination of formal and informal dissemination often relying on local outreach and interpersonal communication.

Actions and recommendations

Corrective actions for missed or under-vaccinated children identified by the RCM varied across settings. In Burkina Faso, it was reported that 6,143 children aged 24–59 identified missing vaccine doses were caught up out of the total 37,202 children assessed. In Cameroon, facilities reported organizing additional catch-up sessions to reach missed children, and the report concludes with a series of programmatic recommendations related to social mobilization, supervision, supply management, and adapting to local conditions. In DRC, children identified as missed through household and community searches were issued a catch-up token ("*jeton de rattrapage*") and referred to the health facility for vaccination. Additionally in DRC, missed children were targeted during the last round of the PIRI in the two assessed provinces. In Guinea, children found to have missed doses were oriented/referred for catch-up. In The Gambia, all identified missed children were vaccinated with the required doses at the nearest health facility. The Gambia, Mali, and South Sudan's RCM reports mentioned programmatic recommendations. In Tajikistan, all missed children were referred to the nearest primary health care facility.

Discussion

Our analysis is the first to summarize country experiences where rapid convenience monitoring was used to assess routine immunization and catch-up vaccination in areas prioritized by country teams for RCM. Rolled out during the Big Catch-up immunization activities, these RCMs occurred during a period of change incorporating catch-up vaccination among older children in country systems and practices, i.e. health workers trained on assessing eligibility for catch-up and updated recording and reporting tools to include older aged children. Having RCM findings alongside administrative data, supportive supervision, and other monitoring methods provided useful performance signals and areas for action for programme managers at subnational and national levels.

Immunization programmes have longstanding commitment towards goals of protecting people from vaccine-preventable diseases and leveraging monitoring approaches to measure and assess coverage and equity dimensions [12, 13]. Delays in childhood immunization can occur due to health systems disruptions such as during and after conflict [14] and vaccination timeliness can vary among specific groups across diverse contexts [15, 16]. A recent analysis shows that many children in low- and middle-income countries experience substantial delays in vaccination and while late vaccination is better than

no vaccination, disease susceptibility and immunity gaps occur when vaccination timeliness is delayed [17].

RCM is an important programme tool as seen through its use in these countries during catch-up immunization activities for “mop-up” and programmatic recommendations. It can be deployed quickly and to priority areas, i.e. geographic, focused on specific vaccine doses, age groups, etc. RCM is complementary to – and not a replacement for – more extensive data collective processes and exercises such as routine administrative data, periodic surveys [18, 19], programme reviews (e.g. EPI reviews). It is also comparatively low cost. Particularly when conducted during immunization activities, RCM presents an opportunity to mop-up when missed children are identified, either through referral or directly vaccinating depending on the protocol established for the programme and RCM. In fragile settings such as South Sudan, where insecurity, flooding, and mobility constrain routine monitoring, RCM offered timely, operationally feasible insights during catch-up implementation.

RCM methods are flexible in design and scope: an RCM can be adapted to the in-process needs and areas of inquiry where programme managers are looking for answers. Geographic selection is purposive to areas where there are performance questions or concerns such as outlier administrative data or evidence of un- and under-immunization. Inclusion of behavioral and social drivers questions [10] brings out these dimensions alongside immunization status to better understand what is behind un- and under-vaccination. The RCM questionnaire can include all vaccine doses in the childhood schedule to assess “fully vaccinated” status according to age or be tailored to focus on doses of interest [20]. When a wider age group is captured in an RCM for catch-up vaccination purposes, age stratification assists in understand patterns across age groups. Tajikistan’s integration of a BCU institutionalization assessment alongside RCM demonstrated the value of linking household findings with system-level determinants. The assessment suggested that remaining infant zero-dose and delayed-dose patterns were linked to practical system issues such as newborn tracking, microplanning, outreach frequency, supply forecasting, and use of DHIS2/EIR for follow-up. This illustrates how RCM can function not only as a rapid monitoring tool, but also as a practical system diagnostic when paired with facility/system-level assessment. Practical considerations for field monitoring such as pilot testing [21], digital approaches to data collection, and fit-for-purpose supervisory structures can facilitate rapid convenience monitoring.

Sampling for RCM uses a non-probabilistic quota approach [22], and in doing so, RCM does not provide coverage estimates and should not to be referred to as a survey [23]. Periodic surveys have their own important role in generating coverage estimates, which methodologically RCMs are not intended to do. Some countries such as DRC have designed a rapid vaccine coverage survey approach [24].

To assess vaccination status, RCMs rely on the home-based records or vaccination cards if available and caregiver recall. These home-based records, or a subset when elements require checking, can also be compared with the immunization register borrowing from data audit methods [25].

Limitations of RCM should be made explicit whenever used. RCMs are not representative and cannot be generalized to the broader population by design. RCMs have a selection bias, being drawn from

purposively selected areas and at the field-level. Where HBR retention is low [26], data collectors rely on recall for immunization status which may be affected by social desirability bias or other factors. Limitations of this paper include that the RCM reports included in the analysis were not standard, limiting extraction of comparable data.

Across diverse contexts, RCM findings provided granular, actionable data especially when an immunization activity is ongoing and can make corrections and adapt. Also, the experiences from countries using draft RCM guidance have helped inform the finalization of RCM guidance. As seen through country experiences in this paper, RCM can assist in understanding vaccination status patterns across age groups to inform routine and catch-up approaches.

Conclusions

Rapid convenience monitoring, as the name implies, provides quick performance signals for immunization programmes. RCM is a valuable approach to generate data for programmatic problem-solving for routine and catch-up vaccination and flexible to adapt to priorities, whether geographic, expanded age group, by sex, or other population characteristics of interest. It is a tool for immunization programmes increasingly focused on ensuring timely entry into the system for infants, supported by stronger institutionalization of routine processes within primary health care.

List of Abbreviations

AEFI adverse events following immunization

BeSD behavioral and social drivers for immunization

BCU Big Catch-up

BCG Bacille Calmette Guerin vaccine

CHW community health worker

DRC Democratic Republic of the Congo

DTP diphtheria-tetanus-pertussis-containing vaccine

EIR electronic immunization registry

HBR home-base record

HepB hepatitis B vaccine

Hib *Haemophilus influenzae* type b

IPV inactivated poliovirus vaccine

LQAS lot quality assurance sampling

PCV pneumococcal conjugate vaccine

MCV measles-containing vaccine

MenA vaccine targeting *Neisseria meningitidis* serogroup A

MOH Ministry of Health

MOV missed opportunity for vaccination

MMR measles, mumps, rubella vaccine

MR measles-rubella vaccine

ODK open data kit

OPV oral poliovirus vaccine

Penta DTP-HepB-Hib vaccine

PIRI periodic intensification of routine immunization

RCIP Tajikistan's Republic Center for Immuno-Prophylaxis

RCM rapid convenience monitoring

Rota rotavirus vaccine

SIA supplementary immunization activities

SOP standard operating procedures

UNICEF United Nations Children's Fund

WHO World Health Organization

YF yellow fever vaccine

Declarations

Competing interests

The authors declare that they have no competing interests.

Ethics approval and consent to participate

The rapid convenience monitoring exercises summarized in this paper complied with the Declaration of Helsinki. Ethical approval was deemed unnecessary in the context of being used for programme improvement purposes with anonymized data. In each of the eight countries, participation was voluntary and consent was obtained either written or verbally from all participants.

Consent for publication

Not Applicable.

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Author Contribution

Conceptualization of synthesis: StS, AH-S, MCD-H

Conceptualization of RCM methods in each country: SaS, ER, AZ, AKS, BBP, JCKM, FFRM, DKI, JO, MK, FBD, AKS, MB

Data collection of RCM: SaS, ER, AZ, AKS, BBP, JCKM, FFRM, DKI, JO, MK, FBD, AKS, MB
Analysis of RCM: SaS, ER, AZ, AKS, BBP, JCKM, FFRM, DJI, JO, MK, FBD, AKS, MB

Synthesis: AH-S, HD
Writing manuscript: AH-S

Review: StS, HD, SaS, AZ, AKS, ATB, MCD-H
All co-authors reviewed the final manuscript and consented to its publication.

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Data Availability

The country-level RCM data is not publicly available.

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Tables

Tables 1 to 8 are available in the Supplementary Files section.

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