Improving Digital Health Information Systems and Data Use at Sub-Health Centers in Meghalaya

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Digital health information systems are essential for collecting information on population health. However, data collection challenges including technological barriers and redundant data entry processes increase the workload for data collection. In West Garo Hills in the state of Meghalaya, health workers put significant time and effort into data collection, fragmented data management systems and inefficient processes mean that the data collected is not effectively used to improve service delivery. Enhancing data use requires comprehensive solutions that address the entire data management ecosystem, including better data entry applications, improved system integration, and streamlined workflows. To optimize data management, there is a need for integrated interventions including re-designing data entry applications, providing better training to healthcare workers, and ensuring cohesive data collection and reporting systems that support practical data use.
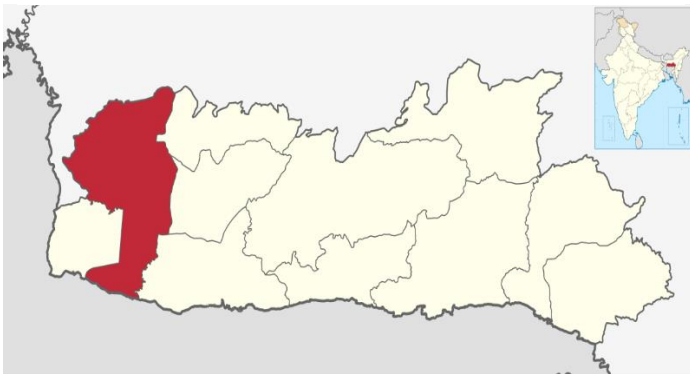
West Garo Hills, Meghalaya

Figure 1: Map of Meghalaya state highlighting West Garo Hills district

Over the past decade, India has made significant progress in integrating digital health information systems into its healthcare delivery infrastructure to enhance patient-centered care, continuity and quality of care, and integrated service delivery.

Newly digitized information systems - such as the Community Based Assessment Checklist (CBAC), family folders, and ABHA IDs - are crucial for enhancing operational efficiency, resource allocation, and potentially providing access to real-time patient data.

Although existing evidence from Meghalaya is limited, globally studies show that demands on healthcare workers tasked with data reporting can at times force data collection to take precedence over patient care.[1] Additionally, implementation of digital data systems requires strong health systems, including skilled healthcare workers,[2] adequate infrastructure (including mobile networks),[2,3] and coordination among different stakeholders involved in electronic data collection and entry.[4] **This policy brief describes local challenges in managing digital health information systems in rural Meghalaya, and provides recommendations to improve data collection, and its use.**

Methods

This policy brief is based on 33 in-depth interviews with stakeholders in West Garo Hills, Meghalaya (Figure 1).

Interviewees had varied roles in data collection including physically collecting data, entering it, transmitting it and supervising the process. Our interviews primarily focused on the CBAC and 'family folder' data collection processes, although respondents also discussed other data and documentation workflows.

We used an inductive approach to analyse the transcripts and develop a codebook, allowing the data to guide the analysis, facilitate the identification of barriers, and develop recommendations.

Key findings

Patient screening and data collection in West Garo Hills play a crucial role in assessing the status of population health, identifying pre-existing conditions, and enabling follow-up care. These activities raise health awareness within the community to support targeted interventions and improve patient management.

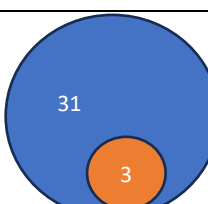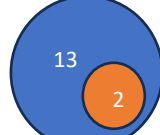**While the benefits of data collection are well recognized, technological barriers persist.** Challenges include inconsistent internet access, limited mobile data, and cumbersome processes for obtaining one-time passwords (OTPs) for health applications. As one example, network issues once prevented anyone from updating non-communicable disease data for a week, leading to no district reports being filed that week. Several respondents observed that Accredited Social Health Activists (ASHAs) often prefer offline data collection due to persistent network issues.

ASHAs and ANM workers frequently start by manually recording data on paper, which is later entered online - often by ANMs or Mid-Level Health Provider (MLHP) - increasing their workload.

A MLHP explained, "*ASHAs are in charge of filling out applications, but their phones often don't work due to poor connectivity, making it difficult to sync data. This can lead to data loss, so I've taken on the responsibility of handling the online work myself.*"

Of the 90 registers maintained at the Health and Wellness Centers (HWCs) at sub-health centre level, 34 are based on applications or portals, while 56 are maintained exclusively offline (Table 1). Many of these registers capture information that is also recorded in online portals. In some cases, additional information - beyond what the online systems can store - is maintained offline, serving as future reference and record-keeping.

Table 1: Registers and digital systems used at the sub-health centres (■ Registers; ■ Digital applications/portals)

Thematic area	Number of digital applications/portals and registers	Registers paper-based only: Total No.= 56	Registers where paper-based data is also entered in applications/portals: *(listed application wise)* Total No= 34		
RMNCHA+N*	31 / 3	N= 16	**Appverse**** N=7	**UWIN> Appverse**** N= 3	**FP-LMIS** N= 5
Communicable diseases	7 / 2	N=1	**IDSP** N=2	**Nikshay portal** N=4	-
Non-communicable diseases	4 / 1	N=1	**NCD app** N= 3	-	-
Expanded services and HWC programmatic aspects	13 / 2	N=3	**AB-HWC portal** N= 9	**e-Sanjeevani** N= 1	-
Other paper-based registers only					
Other service delivery related data (referrals, outreach, etc.)	N= 9				
Medicines and diagnostics	N= 5				
Facility maintenance and bio-medical waste management	N= 11				
NQAS specific	N= 3				
Miscellaneous	N= 6				

* Reproductive, Maternal, Neonatal, Child and Adolescent Health + Nutrition
**Appverse, UWIN>Appverse are Meghalaya state specific digital applications used for recording maternal and child health related data.
 Other digital systems are used across states in India- 1. FP-LMIS: Family Planning Logistics Management Information System; 2. IDSP: Integrated Disease Surveillance Program; 3. Nikshay portal: for recording TB related data; 4. NCD app: Non-communicable diseases app; 5. e-Sanjeevani: for teleconsultation.

This dual system of maintaining online and offline records can lead to inefficiencies in data management, as the same information is often recorded twice. It also increases the risk of inaccurate reporting and data loss, particularly when there are delays in online submissions, leading to discrepancies between the offline and online records.

Additionally, multiple applications often require the same data to be entered multiple times. Each center must submit a monthly Health Management Information System (HMIS) report, summarizing all the data collected each month across offline and online platforms.

Due to these duplicative systems, the workload of data collection - in conjunction with other tasks - becomes challenging to manage. A MLHP highlighted the significant workload and difficulties ASHAs face in completing their tasks. One ASHA stated, "*we forget how to use the mobile app, and some of us don't know how to use it at all.*"

ASHAs play a crucial role in a districts' ability to collect vital health data and promote public health initiatives. **However, challenges in receiving incentive payments regularly, as well as the level of payments is demotivating.** Many ASHAs and other healthcare workers expressed that the incentives they receive do not adequately reflect the demands of their workload. One ASHA stated, *"The incentive is not enough, especially since tasks cannot be completed in a single visit."* Further, incentive payments are often delayed significantly.

The time burden of app-based data collection feels particularly frustrating for workers, because applications are not designed to allow them to *use* the data to improve quality of care. One medical officer (MO) remarked, "*Cross-checking information between online and offline systems can feel burdensome, leading most to rely entirely on offline methods.*" Additionally, a MLHP mentioned, "*Online, I can check how many have been entered last month. But who we referred, that information is only available in hard copy.*"

Therefore, despite the time and effort invested in data collection, electronic data is not effectively utilized for providing services. Training is heavily focused on data entry, with minimal guidance on how to *use* the data for practical purposes. Referrals and follow-ups are tracked manually using hard copies of the data. When reports are requested from ASHAs, some are submitted via online portals while others are provided in hard copy. MOs noted that tracking individuals from the registers is primarily done offline.

Improving data use in West Garo Hills will require a combination of inter-connected interventions: better data entry applications, enhanced system integration, improved training, and streamlined workflows. Effective solutions must address the entire data management ecosystem, including redesigning applications, improving process efficiency, ensuring that data collection and reporting systems are cohesive and supportive of practical data usage, and motivated health workers.

Recommendations

1. **Prioritize reliable network connections and enable offline data collection**
   - Invest in reliable network infrastructure and create systems that support offline data collection.
   - Prioritize the creation of automated syncing systems with data validation.
   - After offline data collection is complete, ensure seamless data uploading once data connection is restored.

2. **Reduce duplication across data collection and reporting formats**
   - Assess and streamline registers: Compare the existing register list with program requirements to identify gaps or excesses.

- Centralized data repository: Implement a centralized data repository that integrates data from various registers, as successfully implemented in other countries.[5,6]
- Automate data entry: Implement automated data entry tools, such as pre-filled forms or barcode scanning, to reduce manual input and duplication.
- Unified mobile health application: Develop or adopt a single mobile health application that covers all necessary data collection and reporting needs.

3. Align incentives with workload and data use

- Re-evaluate incentive structure: Base incentive payments on effort associated with data collection, recognizing the frequency of visits, geographic and internet challenges. Doing so will better align incentives with the time required for data collection.
- Streamline incentive claims: Simplify the incentive claim process to improve efficiency and ensure timely compensation for ASHAs.

4. Ensure dedicated data entry management

- Prioritize filling data entry positions: Ensure data entry operator positions are filled promptly.
- Clarify roles and accountabilities: Clearly define roles and responsibilities for data entry and use, allowing frontline health workers such as MOs, ANMs, and MLHPs to focus on their primary duties.

5. Configure digital apps for user-friendly data use

- Develop user-friendly interfaces: Configure applications to include data dashboards that are accessible and useful for staff, not simply in entering data, but in *using* it to better serve their communities.
- Provide education and support: Offer training and support for effectively using online data systems. Consider features that allow staff to see their own health statistics, which could enhance motivation and engagement in data management, as well as promote data use.

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