



Proposal

Design for Global Health Competition 2025 **HealthHive**

An Offline-First Data System for Chronic Disease Care in Jagna

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Executive Summary

HealthHive is a pragmatic, two-pronged programme to improve hypertension and diabetes care in Jagna by pairing an offline-first DHIS2 configuration for field capture and supervisory dashboards with a structured training pathway for Barangay Health Workers (BHWs), Rural Health Unit (RHU) staff, and volunteers. The proposal addresses today's core constraints, fragmented paper records, variable connectivity, and uneven digital literacy, without disrupting ongoing outreach. We begin with a short transitional capture on CommCare to digitise legacy records, then shift to DHIS2 Tracker and dashboards once workflows, validation rules, and governance are proven under real conditions. Throughout, a lean cost envelope prioritises readiness items (configuration, training, testing) and keeps operating costs predictable while evaluation studies drive continuous, small-batch improvements rather than costly rewrites. Partnerships with the RHU, barangay leaders, Philos Health, schools, and targeted international NGO support extend technical reach while safeguarding local decision-making and community participation. If Jagna sustains reliable capture, routine dashboard use, and measurable improvements in continuity and control, we will package a "Jagna Starter Kit" to enable replication in neighbouring municipalities.

I. Introduction

Jagna's rural health system is community-driven yet fragmented: chronic diseases such as hypertension and type 2 diabetes are rising, while information still moves on paper between barangays, the Rural Health Unit (RHU), and outreach partners, slowing follow-up, obscuring stock needs, and breaking continuity of care. HealthHive responds with a practical, offline-first data loop that mirrors current workflows instead of replacing them: BHWs and nurses record once at the point of care; RHU staff validate and aggregate; supervisors act on live dashboards to plan outreach, target recalls, and follow cohorts over time. A bilingual, hands-on training pathway, delivered through bootcamps and a local Digital Health Youth Corps, builds confidence, protects data quality, and keeps ownership with Jagna's institutions.

The approach advances in deliberate steps to avoid disruption. A short transition digitises legacy records using a lightweight capture tool; once forms, validation rules, and governance are proven in the field, the programme shifts to a DHIS2 Tracker + dashboard stack designed for low connectivity and routine supervision. Embedded evaluation studies convert each phase into a learning cycle, tightening metadata, refreshing training, and refining governance, so improvements are continuous, small-batch, and grounded in real use.

By anchoring technology in local capacity and day-to-day service decisions, HealthHive turns data into action: more reliable recalls, better-matched stock, and measurable gains in continuity and control. The result is a lean, affordable pathway from pilot to routine operations, one that strengthens Jagna's system now while laying a replicable foundation for neighbouring municipalities later.

II. Background

2.1. Understanding Jagna and its people

Jagna is a coastal municipality on the southern rim of Bohol, facing the Bohol Sea. It spans approximately 120.5 km² across 33 barangays, with settlements concentrated along a narrow coastal plain that rises sharply into hilly and upland interiors. According to the 2020 Philippine Statistics Authority census, Jagna is home to 35,832 residents distributed across roughly 7,500 households, averaging about 297 persons per km². Cebuano is the dominant language, while English and Filipino are widely used in schools, governance, and commerce, facilitating engagement with national programmes and external partners.

The local economy is rooted in smallholder agriculture, inshore fishing, and micro-enterprises such as food processing, handicrafts, and retail, complemented by a modest but growing tourism sector. Average family

incomes remain close to national lower-middle-income thresholds, making many households sensitive to economic or environmental shocks, typhoons, illness, or commodity price fluctuations. These socioeconomic dynamics directly influence health-seeking behaviour and continuity of care.

Healthcare access reflects the challenges of a dispersed rural geography. Primary care is delivered mainly through barangay health stations and the Rural Health Unit (RHU), which coordinate with visiting non-governmental partners such as Philos Health for outreach missions. However, diagnostic services and specialist consultations typically require travel to Tagbilaran City or other urban centres, imposing transport and opportunity costs on patients. In Central Visayas, the prevailing disease burden is a mix of upper-respiratory infections, vector-borne illnesses such as dengue, and an escalating prevalence of non-communicable diseases (NCDs), notably hypertension and diabetes mellitus. These chronic conditions now account for a substantial share of outpatient visits and hospitalisations, yet continuity of monitoring and treatment remains fragile.

Two structural barriers shape local health behaviour. First, **access**: service distribution is uneven, transport is infrequent, and outreach capacity is limited. Upland barangays, in particular, depend on intermittent medical missions and may lack routine glucose testing or physician consultation days. Second, **affordability**: when chronic conditions are detected, essential medicines may be intermittently unavailable at health centres or unaffordable at private pharmacies during stock-outs. The cumulative effect is a fragile primary-care network in which vulnerable groups, seniors, low-income families, and those with mobility constraints bear disproportionate health risks. Strengthening Jagna's system thus requires bringing services closer to upland sitios, stabilising medicine supply, and enabling continuous, community-based follow-up through data-driven coordination.

2.2. Hypertension and Diabetes Mellitus in Jagna

Hypertension (HTN) and type 2 diabetes mellitus (DM) are the most prevalent chronic diseases in Jagna, mirroring national patterns across the Philippines. Both are silent yet preventable, long-term conditions that require continuous detection, monitoring, and follow-up, activities difficult to sustain in a fragmented and resource-limited rural system.

Hypertension: Hypertension is defined as a persistent elevation of arterial pressure ($\geq 140/90$ mmHg) and is typically asymptomatic, yet it remains the leading modifiable cause of stroke, ischaemic heart disease, heart failure, and renal complications. In Jagna, elevated readings are common among adults screened during Philos Health outreach or barangay visits, but these measurements rarely translate into consistent monitoring. BHWs and outreach teams record results separately using analogue or digital cuffs, and readings remain scattered across notebooks, patient booklets, and mission forms. Without a shared register or standard recall mechanism, follow-up depends largely on outreach schedules and medicine availability.

Diabetes (type 2 focus): Type 2 diabetes results from insulin resistance and progressive β -cell dysfunction, leading to chronic hyperglycaemia and long-term vascular complications. Standard diagnostic cut-offs (A1C $\geq 6.5\%$, fasting plasma glucose ≥ 126 mg/dL, 2-hour OGTT ≥ 200 mg/dL, or random glucose ≥ 200 mg/dL with classic symptoms) should be confirmed unless presentation is unequivocal. Screening is limited to Philos Health missions because barangay centres lack glucometers and strips, leaving many cases undiagnosed. Patients diagnosed during outreach receive short-term medication and counselling but limited follow-up, as BHWs have no means to track glucose readings or adherence between visits. Economic constraints, variable health literacy, and the cost of transport or healthier foods further compound discontinuity of care.

Prevalence and planning assumptions: No public, municipality-level prevalence tables exist for Jagna. For planning, it is reasonable to assume adult hypertension in the ~19–21% range (higher in older adults) and diabetes around ~7–8% of adults, anchored on recent national estimates, then refine locally using barangay registries and RHU tallies as data systems mature. These working figures allow target-setting for screening throughput, treatment initiation, and control rates, pending more granular local measurement. As the project's digital register is established, Jagna can replace assumptions with observed indicators proportion with elevated BP at screening, proportion on treatment, and proportion controlled at 3- and 6-month intervals, disaggregated by barangay and age group.

2.3. Digital Readiness and Connectivity Context

Despite these challenges, Jagna has the foundational infrastructure to support an offline-first digital-health transition. Coastal barangays enjoy reliable 3G/4G coverage with emerging 5G pockets, while upland areas can synchronise data at designated RHU or municipal access points. The DICT Free Wi-Fi for All and Tech4ED Centres programmes, coupled with local computer-literacy workshops, have expanded ICT familiarity among barangay officials and students. School computerisation and ICT clubs, particularly at the Central Visayan Institute Foundation (CVIF), provide a ready pool of youth volunteers who can assist with translation, data entry, and technical troubleshooting.

Nevertheless, connectivity remains inconsistent in upland barangays, and digital literacy among BHWs varies widely. Any technological intervention must therefore be offline-capable, bilingual (Cebuano–English), and designed to mirror existing workflows, ensuring that digital transition complements rather than disrupts community routines.

These realities justify the HealthHive system's offline-first architecture and dual emphasis on training and technology, ensuring that Jagna's transition to digital chronic-disease management enhances, rather than disrupts, established community-health routines.

2.4. Current Health Information Flow and Gaps

Health information in Jagna follows a complex but largely manual pathway shaped by the structure of local care delivery. At the frontline, BHWs maintain handwritten notebooks that record household visits, blood-pressure readings, and basic demographic details. During scheduled medical missions, Philos Health staff and RHU nurses use paper registration and diagnostic forms to document consultations, prescriptions, and counselling notes. Each actor performs its role with diligence, yet their data streams remain isolated; there is no systematic method to merge, update, or analyse records across institutions or outreach cycles.

After an outreach event, Philos Health retains its mission forms, while patients are advised to visit the BHC for monthly blood-pressure checks or medicine refills. BHWs record these visits separately in barangay logs, but the information rarely flows back to Philos or the RHU. Follow-up depends largely on the patient's initiative, and there is no shared register to identify who is overdue for review, who has uncontrolled readings, or which barangays require closer monitoring. The absence of a unified database prevents even basic analytics, such as estimating how many adults in Jagna are hypertensive, which age groups are most affected, or whether blood pressure control rates are improving over time.

Attempts to introduce digital tools have been piecemeal and unsustained. Earlier use of Microsoft Access and Google Forms faced practical limitations:

- **Connectivity:** Upland areas have unreliable internet, making real-time data entry and cloud submission impractical.
- **Usability:** interfaces were not adapted to the low-bandwidth, low-literacy context of rural health work.
- **Maintenance:** once the pilot teams left, no local technical capacity remained to troubleshoot or update the systems.
- **Workflow misalignment:** neither tool was integrated into existing mission or barangay procedures, forcing staff to duplicate effort on paper and screen.

Consequently, data remain scattered across paper notebooks, Excel trackers, and mission summaries, requiring manual collation for even the simplest report. This fragmentation compromises data accuracy, delays decision-making, and obscures treatment outcomes. More critically, it prevents Philos Health and the RHU from determining whether interventions are truly reducing hypertension- and diabetes-related complications or merely sustaining short-term outreach activity.

The challenge in Jagna is therefore not a lack of effort or community engagement, but the absence of an interoperable, patient-centred information system capable of linking barangay-level records with municipal- and

programme-level monitoring. Addressing this gap requires a solution that is offline-capable, intuitive for BHWs, and aligned with open data standards recognised in public-health management. This need forms the rationale for the proposed two-pronged HealthHive system, introduced in the following section.

Project A: Data Management for Chronic Diseases

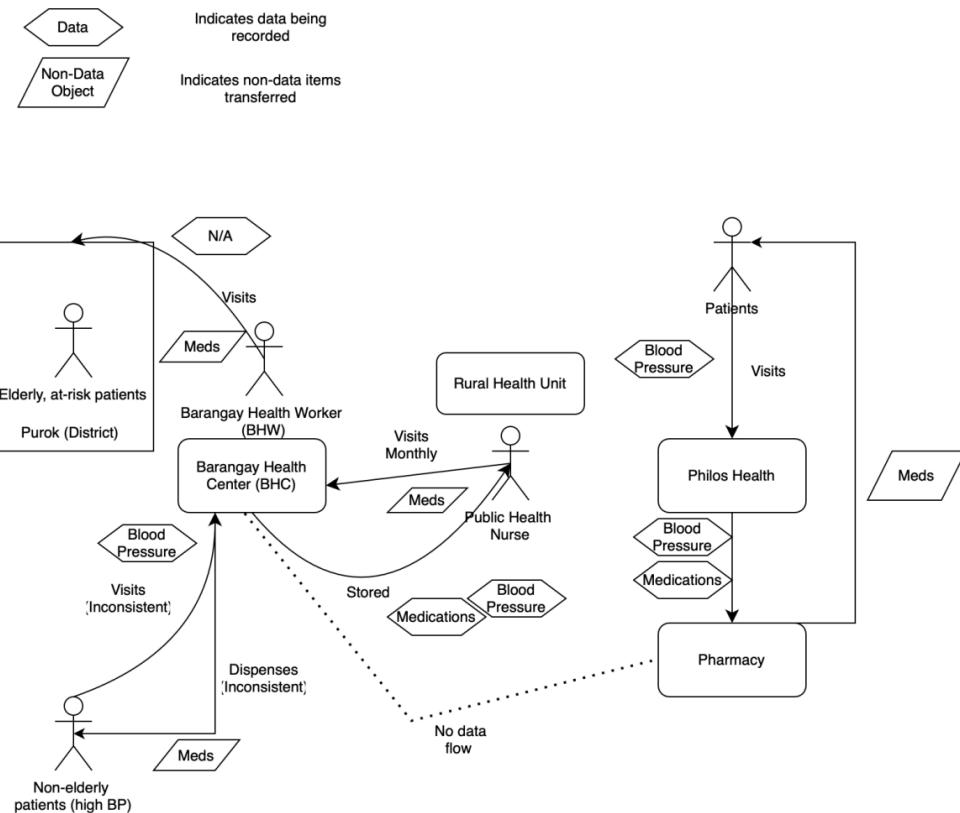


Figure 1. Existing data pathways for chronic-disease management in Jagna. Information currently moves in fragmented, paper-based channels without linkage between community records, RHU reporting, and Philos Health monitoring.

III. Our Solution: HealthHive 2-Pronged Framework

3.1 Overview and Rationale

Building on the existing community-based care structure in Jagna, our team proposes a two-pronged solution designed to strengthen chronic-disease management through both digital innovation and human capacity building.

The solution, named HealthHive, addresses the systemic gap identified in the current data-flow model by integrating two mutually reinforcing pillars:

1. **Digital and Data-Management System:** a DHIS2-supported ecosystem, called HealthHive, that captures, consolidates, and analyzes patient information to support timely, evidence-based decision-making; and
2. **Education and Training Pathway:** a structured programme that equips BHWs, RHU nurses, and Philos Health staff with the knowledge, confidence, and digital literacy to use the system effectively and deliver consistent chronic-disease care.

Together, these two prongs form a continuous learning and feedback cycle, where data from the field informs supervision and planning, and training ensures that every data point collected translates into meaningful clinical action.

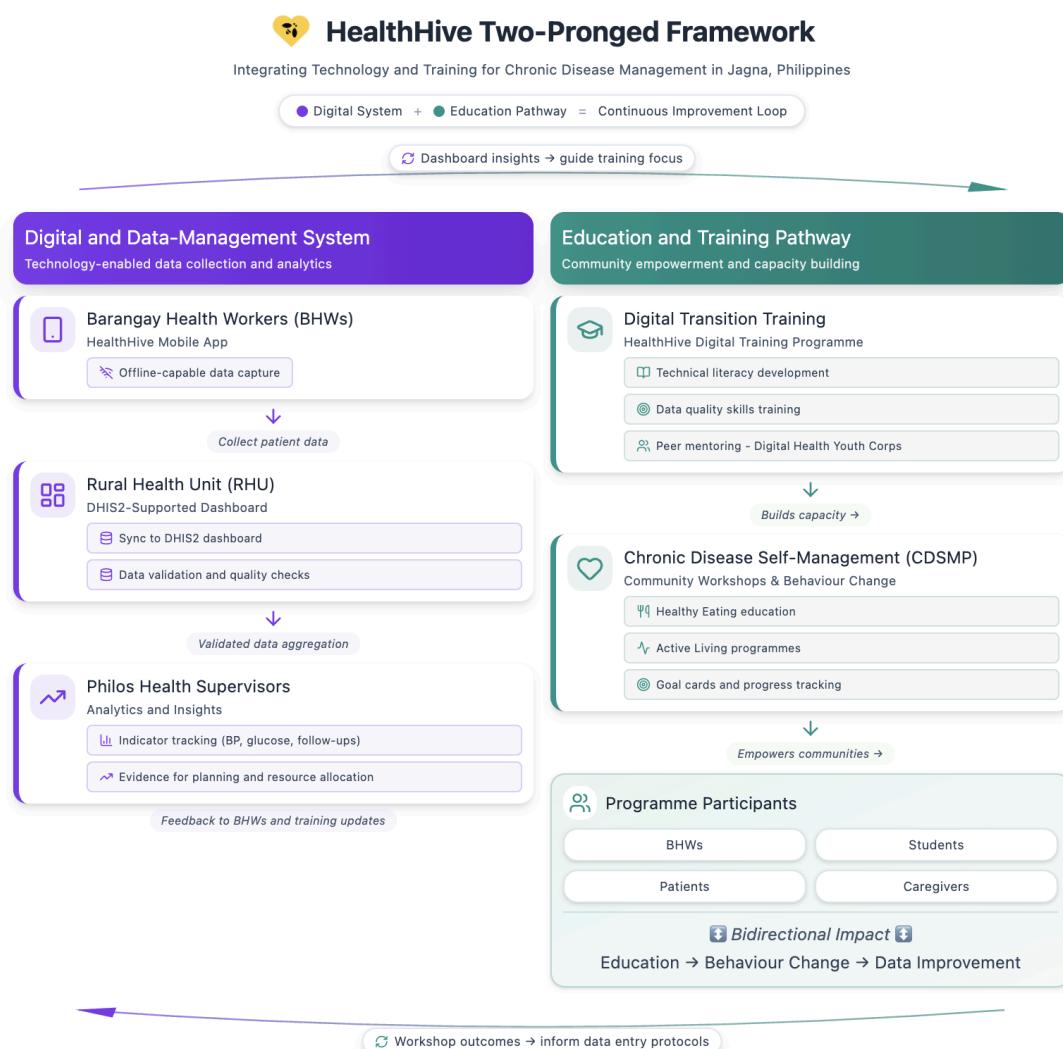


Figure 2. Two-Pronged framework snapshot

3.2. HealthHive Digital Data-Management System

The first prong, the HealthHive Digital System, is a comprehensive data-management ecosystem that closes the information gap identified in Jagna's existing health-record flow. It strengthens chronic-disease management by connecting the people who collect information, the people who deliver care, and the people who make program decisions through a single, coherent digital loop.

Rather than replacing existing workflows, HealthHive aligns with them. BHWs remain the first point of contact for screening and follow-up; RHU nurses continue to coordinate barangay-level supervision; and Philos Health retains its oversight of medical outreach and pharmacy logistics. What changes is how information moves among these actors. Data captured once in the field now travels digitally, first to the RHU for validation and aggregation, then to Philos Health for program monitoring, eliminating the redundant, paper-based transfers shown in the previous figure.

The system integrates two complementary components:

1. **HealthHive Mobile App:** a lightweight, offline-first client that allows BHWs and field nurses to register patients, record blood-pressure readings, and log follow-ups even in low-signal upland barangays; and
2. **HealthHive Dashboard (DHIS2-supported):** a central repository and analytics interface where data synchronises automatically, enabling RHU and Philos supervisors to view real-time trends by barangay, age, or risk level.

In the initial deployment, these components will be implemented within the DHIS2 ecosystem, using its Android Capture App for field data collection and its configurable dashboards for supervisory analytics. The HealthHive prototype developed by our team serves as the design and workflow blueprint guiding this configuration: its user interface, data fields, and logic are being adapted directly into DHIS2 to ensure usability, consistency, and interoperability with existing public-health systems.

This approach prioritises immediate feasibility and cost-effectiveness while laying a foundation for future scalability. As the system stabilises and local capacity grows, the same design framework can evolve into a dedicated HealthHive platform, expanding DHIS2-based workflows into a more customisable software environment with enhanced offline handling and integration potential.

By embedding digital capture and analysis into the existing chronic disease workflow, HealthHive transforms Jagna's program from a sequence of disconnected outreach activities into a continuous cycle of care, feedback, and learning.

3.2.1. Data Flow and System Architecture

The HealthHive system establishes a unified, interoperable information pathway for hypertension and diabetes management, linking community-based screening and follow-up to municipal coordination and supervisory oversight. It replaces fragmented paper records with a structured digital workflow that ensures every blood-pressure and glucose measurement collected in the barangay contributes directly to clinical decision-making and programme planning.

System Architecture

The HealthHive ecosystem operates across three interconnected layers that mirror Jagna's chronic-disease care network. In this initial phase, these functions are implemented through the HealthHive DHIS2-supported Android Capture app (HealthHive App) and HealthHive DHIS2-supported dashboard (HealthHive Dashboard), both configured within DHIS2 to follow the HealthHive workflow design. Together, these components enable a continuous data loop, from capture in the community to validation at the RHU and analysis at Philos Health.

1. Community Layer – Data Capture and Initial Storage

BHWs and volunteers use the HealthHive App during Philos outreach events and daily BHC activities to record patient registration, blood-pressure readings, weight, blood-glucose values (when available), medications dispensed, and next-visit dates.

Each record is time-stamped and stored locally on the device for offline use, allowing full functionality in upland barangays where the signal is unreliable. The interface mirrors existing paper forms, allowing chronic-disease tracking to integrate naturally into current BHW routines.

2. Municipal Layer – Validation and Aggregation

RHU nurses review submissions from all barangays, validate readings, and resolve duplicate entries, generating a unified register of adults with hypertension and diabetes.

Validated data are summarised into barangay-level indicators such as number screened, proportion controlled, and patients overdue for follow-up, supporting RHU decisions on nurse rotations, outreach schedules, and medicine allocation.

3. Supervisory Layer – Analysis and Feedback

Validated data populate the HealthHive Dashboard, where aggregated indicators and trends are visualised for RHU and Philos Health supervisors. The dashboard displays active caseloads, control-rate trends, and follow-up completion rates by barangay, with filters for age, sex, and diagnosis type. Supervisors can generate targeted worklists—such as patients due for BP recheck or barangays with low activity—and share them with field teams, completing the feedback loop between frontline data capture and programme action.

Information Architecture

The information hierarchy mirrors Jagna's service structure:

Municipality → Cluster (Coastal / Upland) → Barangay → Household → Person.

Each person's record functions as a longitudinal chronic-disease profile, linking successive measurements, medication refills, and lifestyle-education attendance. Programme metadata defines consistent identifiers for barangays, facilities, and clinical parameters (e.g., systolic/diastolic BP, fasting glucose, risk tier), ensuring that records from multiple sources merge accurately into a single governed database. Built-in validation rules at upload—such as plausible BP ranges and compulsory next-visit entries for uncontrolled readings—protect data quality and reinforce clinical follow-up protocols.

End-to-End Data Cycle

1. **Capture:** BHWs collect patient demographics, vitals, and treatment data offline.
2. **Sync:** Records synchronise automatically once the signal is restored.
3. **Validate:** RHU staff verify entries and resolve duplicates.
4. **Analyse:** Aggregated results appear on dashboards for supervisors.
5. **Act:** Insights generate feedback lists and targeted outreach plans.

This closed loop transforms chronic-disease monitoring from a static, paper-bound process into a dynamic feedback system that links every household measurement to real-time supervision. It preserves the roles of local actors while ensuring that hypertension and diabetes data travel seamlessly from the barangay to the RHU and PhilHealth, forming the operational backbone of Jagna's digital transition toward continuous, evidence-based care.

HealthHive Information and Data Architecture

End-to-End Data Flow – Jagna, Bohol Chronic Disease Management

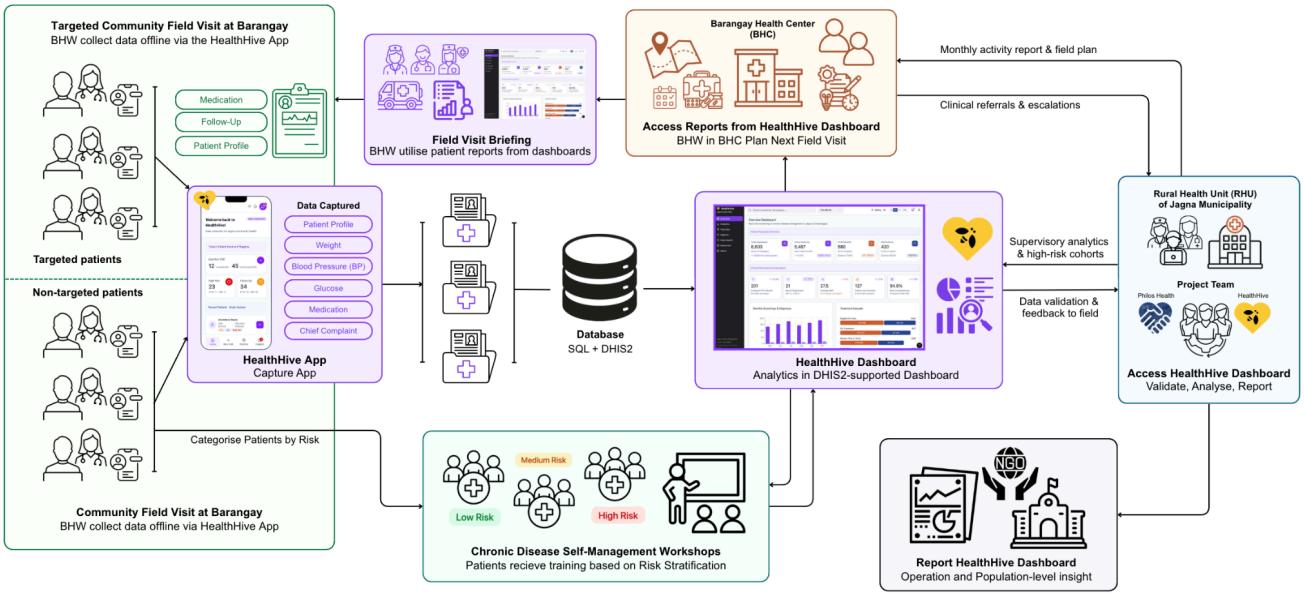


Figure 3. Proposed HealthHive information flow linking barangay-level chronic-disease data capture, RHU validation, and Philos Health supervisory analytics within a unified DHIS2-supported architecture.

3.2.2. HealthHive App

The HealthHive App serves as the community-level engine of Jagna's chronic-disease data system. It enables BHWs and RHU field nurses to capture and manage information on hypertension and diabetes during Philos Health outreach and routine BHC visits.

In this implementation phase, the app's workflows are realised through the DHIS2 Android Capture application, configured to follow the HealthHive design. This configuration ensures that BHWs can work with familiar forms and logic while benefitting from structured data validation, offline capability, and automatic synchronisation to the DHIS2 repository.

The app translates existing paper records into an intuitive, bilingual, offline-first interface, allowing uninterrupted operation in upland barangays with limited connectivity. It simplifies frontline data capture, preserves continuity of care, and strengthens the accuracy of Jagna's chronic-disease registry.

Design Philosophy

HealthHive was designed to meet three field imperatives: Familiarity, Reliability, and Clarity of Action.

Every visual element in the interface supports these goals:

- **Familiarity:** The home screen (Figure X) mirrors the structure of their daily logbooks. Large, high-contrast tiles—Log New Visit, High Risk, Follow-Up—replace menu hierarchies, allowing instant recognition of key tasks.
- **Reliability:** A visible sync indicator and BHW ID badge confirm successful offline capture and user authentication. Entries queue locally until connectivity is restored, ensuring that no data is lost during field work.
- **Clarity of Action:** Colour cues (red = urgent, yellow = pending, green = controlled, HTN = orange, DM = blue) and compact counters (e.g., “HTN 11 • DM 12 High Risk”) translate numerical data into actionable meaning for volunteers with minimal training.

These design choices, prototyped in Figma and translated into DHIS2 forms, ensure that the application remains legible, responsive, and efficient on low-end Android devices, with layouts suited for quick, one-handed use in busy outreach environments.

Core Workflows of the HealthHive App

Features	Workflow	Purpose and Key Features
Patient Registry and Search	Entry point for all interactions; allows BHWs to register new patients or retrieve existing profiles.	Filters for <i>HTN</i> , <i>DM</i> , <i>High Risk</i> , and <i>Follow-Up</i> enable quick triage. Colour-coded cards display the latest BP and glucose readings with “Controlled/Uncontrolled” status, replacing manual notebook searches.
New Visit and Data Entry	Opens a single-page digital form for capturing patient vitals and encounter details.	Auto-fills patient info; fields for BP, glucose, weight, and BMI include built-in validation to flag improbable values, reducing entry errors while keeping the process intuitive.
Visit Summary and Follow-Up	Automatically generates a visit summary after each entry.	Consolidates vitals, medication updates, and lifestyle notes. Includes optional fields for complications (e.g., blurred vision, numbness) and auto-calculates next-visit dates based on control status to ensure continuity of care.
Patient Profile and History	Provides a longitudinal view of patient progress.	Displays demographic and clinical data in two tabs (<i>Patient Info</i> and <i>Clinical Data</i>). Chronological visit records (e.g., “BP 145/92 – Still Elevated”) enable quick review of trends without graphs or spreadsheets.
Task and Follow-Up Management	Converts the home dashboard into a daily worklist for BHWs.	Displays new, high-risk, and follow-up patients by barangay. BHWs can directly access patient records, log visits, or update notes—ensuring no patient is missed during supervision or outreach.
Visit Record Stickers and Recall Tools	Supports patient recall and adherence between visits.	Generates small printed stickers or SMS reminders with key data (Visit ID, BP, glucose, next appointment). Reinforces follow-up and engagement, particularly in low-literacy or remote areas.

Table 1. HealthHive App Features & Workflows.

Integration and Data Quality

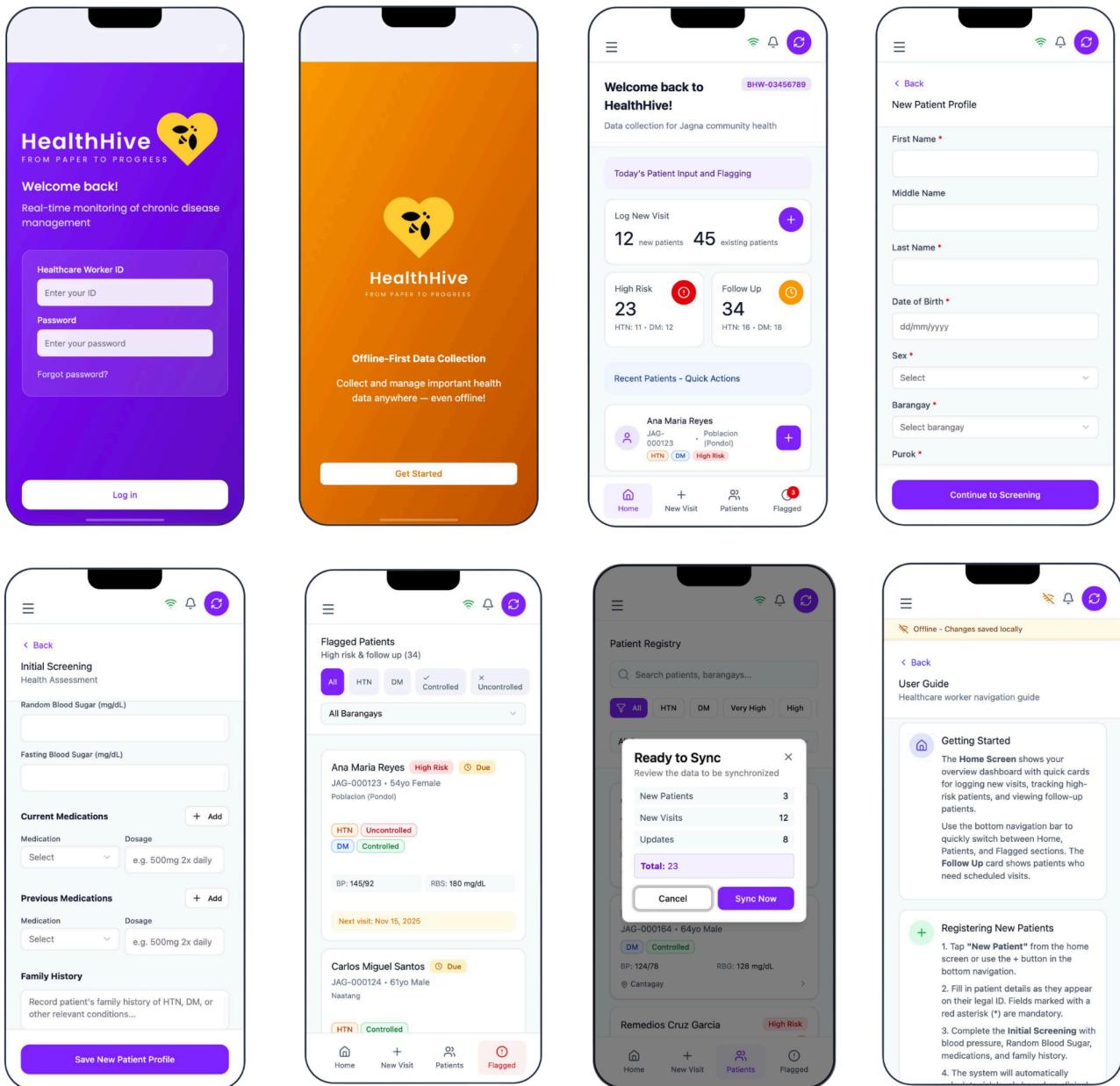
Each HealthHive form corresponds to a DHIS2 Tracker stage: Registration, Screening, Follow-Up, and Education. Once devices reconnect, data automatically synchronizes to the DHIS2 repository. Built-in validation rules (e.g., plausible BP ranges, required follow-up dates for uncontrolled cases) ensure accuracy at the point of entry, while timestamps and user IDs maintain traceability. This workflow embeds data quality and accountability into routine operations rather than relying on post-hoc corrections.

Operational Value

By embedding digital capture within existing chronic-disease workflows, the HealthHive App converts paper-based monitoring into a structured, data-driven process. It enables:

- Real-time visibility of patient risk status at the point of care.
- Standardised measurement and follow-up scheduling for hypertension and diabetes.
- Automatic transfer of verified data to RHU and Philos Health dashboards.
- Practical recall and education tools that reinforce continuity of care.

Through its offline reliability, intuitive design, and clinical alignment, the HealthHive App empowers Jagna's frontline health teams to deliver timely, evidence-based management of chronic diseases. It forms the entry point of the broader HealthHive ecosystem, feeding validated data directly into the HealthHive Dashboard, which transforms individual records into population-level insights for planning and supervision.



View the interactive prototype and wireframe here: [HealthHive App](#) and [Wireframe](#)

Figures 4. Screens from the HealthHive prototype illustrating the home dashboard, patient registry, data-entry workflow, visit summary, follow-up tracking, sticker printing, and longitudinal history functions.

3.2.3. HealthHive Dashboard

The HealthHive Dashboard forms the supervisory and decision-support layer of Jagna's digital chronic-disease management system. It translates the field-level data captured through the HealthHive App into actionable insights for the RHU and Philos Health, closing the loop between community measurement and programme oversight.

In the current phase, the dashboard is deployed within the DHIS2 analytics environment, configured to follow the HealthHive workflow and visual design developed by our team. This ensures that each indicator, layout, and data path mirrors the intended chronic-disease monitoring cycle while leveraging DHIS2's stability, offline synchronisation, and analytics capability.

Purpose and Rationale

DHIS2 is the pragmatic choice for Jagna's constraints and objectives. Connectivity is the binding limitation; the DHIS2 Android Capture app supports true field work in upland barangays by securely queuing records offline and syncing automatically at the RHU or municipal hall. This offline-first design protects data integrity despite intermittent signal and removes the need for temporary paper workarounds. A lean hypertension/diabetes Tracker, patient ID/QR, demographics, blood pressure with protocol-driven retakes, optional glucose, diagnosis/stage, medicines dispensed, and next-visit date, can be stood up quickly and adjusted by local staff without custom code or vendor lock-in, while a paired Aggregate form provides monthly summaries for supervisors. Built-in dashboards surface control-rate trends, missed-appointment queues, stock-aligned follow-up lists, and data-completeness panels, replacing ad-hoc spreadsheets and anchoring routine review meetings.

DHIS2 also delivers scalability, cost efficiency, and programme coherence. Point-of-entry validations (plausible BP ranges, compulsory next-visit for uncontrolled readings), role-based access (BHW capture vs RHU review), and approvals improve accuracy and align with consent and privacy requirements. As open-source software with a mature implementer community, DHIS2 avoids recurring licence fees, enables local capacity building, and scales from two pilot barangays to municipality-wide coverage simply by adding organisation units and users, no rebuild required.

Subsequently, our HealthHive Dashboard addresses the supervisory gap identified in Jagna's chronic-disease workflow, where field data often fails to return as actionable information. By consolidating patient-level readings from the barangay into aggregated, validated indicators, the dashboard enables decision-makers to:

- Track programme performance across 33 barangays, observing coverage, screening volumes, and control rates.
- Identify clinical priorities, such as patients overdue for follow-up or barangays with high rates of uncontrolled hypertension or diabetes.
- Monitor operational efficiency, including screening frequency, nurse rotation coverage, and outreach completion.
- Ensure data integrity through completeness, validation, and timeliness indicators.
- Support planning and accountability, replacing manual reports with dynamic, visual summaries suitable for RHU coordination meetings and Philos Health planning.

This structure aligns Jagna's chronic-disease management with global best practices for data-driven primary care, enabling local actors to evaluate, plan, and act within one continuous information loop.

System Structure and Key Modules

The HealthHive Dashboard is composed of six integrated modules, accessible through a unified sidebar navigation. Each module draws directly from the DHIS2 Tracker dataset used in the HealthHive App and refreshes automatically after every successful data synchronisation.

Module	Function	Key Indicators / Features
Overview	Provides a municipality-wide snapshot of chronic-disease activity.	Total registered patients; active caseloads; HTN (orange) and DM (blue) breakdown; control rates; monthly screenings; new diagnoses; overdue follow-ups; data-completeness metrics.
Analytics	Presents longitudinal analysis and condition-specific trends.	Separate pages for Hypertension and Diabetes Mellitus, showing control vs uncontrolled counts, high-risk segmentation, top barangays by uncontrolled cases, and adherence/retention analysis. A Cohort Analysis view displays 6- and 12-month retention and demographic risk patterns by age, sex, and occupation.
Field Ops	Coordinates mobile-clinic schedules and follow-up visits.	Visit progress by team; overdue and upcoming visits; weather/route advisories; barangay priority map based on risk and inactivity; exportable task lists for BHWs and nurses.

Registry	Functions as a consolidated patient index for chronic-disease follow-up.	Searchable by patient ID, name, or barangay; includes condition tags (HTN / DM), risk tier, control status, and next-visit date; allows RHU validation and audit tracking.
Data Quality	Monitors record integrity and synchronisation status.	% records synced; duplicate and conflict counts; implausible BP/glucose values; field-completeness and validation-rule panels; issue summaries for immediate correction.
Resources & Stock	Tracks medication and equipment availability across barangays.	Stock levels of antihypertensives (Amlodipine, Losartan) and antidiabetics (Metformin); days-of-supply forecasts; consumption trends; reorder alerts linked to outreach planning.

Table 2. DHIS2 Dashboard Modules: Functions & Key Indicators

Visual and Design Framework

The dashboard follows the same colour language and usability logic as the HealthHive App to ensure seamless user transition:

- Hypertension and Diabetes Mellitus are consistently colour-coded in orange and blue, respectively, across all modules. Status indicators—green for controlled, yellow for pending, and red for uncontrolled—provide immediate visual interpretation without the need to read numerical data.
- Instead of dense data tables, the dashboard uses modular cards and interactive charts, each displaying a key metric, its change from the previous reporting period, and contextual labels (e.g., “71% controlled – BP < 140/90 mmHg”). This visual hierarchy helps supervisors focus on performance trends and outliers rather than raw figures.
- All interfaces were first designed and validated in Figma to ensure legibility on low-resolution monitors, consistent alignment with the HealthHive mobile workflow, and smooth translation into DHIS2 dashboard tiles.

This combination of visual simplicity and analytical depth allows supervisors to navigate efficiently between aggregated and granular data views, from municipal-level summaries to barangay and patient-level records, within a single, coherent environment.

Core Analytical Workflows

The HealthHive Dashboard operationalises four interlinked analytical workflows that sustain Jagna's chronic-disease management system. Each workflow transforms data from routine blood-pressure and glucose monitoring into actionable guidance for programme improvement.

1. Population Monitoring

Provides real-time visibility of all adults registered with hypertension or diabetes, displaying active caseloads, control rates, and newly screened individuals by barangay. This continuous tracking allows supervisors to gauge programme reach and detect emerging trends in chronic-disease prevalence.

2. Risk Targeting

Automatically identifies barangays and patient cohorts with high proportions of uncontrolled readings ($\geq 140/90$ mmHg for hypertension, ≥ 200 mg/dL for glucose). These insights enable the RHU to prioritise follow-up visits, adjust nurse rotations, and target community education in the most affected areas.

3. Continuity of Care

Tracks patient engagement over time through retention panels at six and twelve months. Drop-off detection highlights individuals who have missed appointments, prompting recall by BHWs or outreach teams. This feature strengthens adherence and continuity within the chronic-disease care cycle.

4. Operational Oversight

Integrates service and resource indicators—screening volumes, outreach coverage, staff activity, and medicine inventory—to support day-to-day management. Field and stock data are displayed together, ensuring that operational decisions align with clinical priorities.

Together, these workflows convert static field data into a dynamic, decision-support system that links clinical outcomes with operational performance.

Integration and Data Flow

All dashboard indicators are powered by the DHIS2 Tracker and Aggregate programmes that underpin the HealthHive App. When devices synchronise, validated records automatically feed into the analytics layer, updating visualisations and reports within minutes.

Each data point is time-stamped, linked to its barangay, and attributed to the data-entry user, ensuring traceability and accountability. Built-in validation rules—such as plausible blood-pressure and glucose ranges, compulsory follow-up scheduling for uncontrolled cases, and duplicate-ID alerts—maintain consistency and accuracy before aggregation.

Supervisors can download structured CSV or PDF summaries for offline review or meeting presentations, ensuring that evidence from the field directly informs planning and policy discussions. The result is a single, reliable source of truth connecting BHWs, RHU staff, and Philos Health supervisors through one unified data system.

Scalability and Future Direction

While the current configuration focuses exclusively on hypertension and diabetes, the system's modular DHIS2 design allows for progressive enhancement within the chronic-disease domain. Future expansions may include risk-factor stratification (e.g., BMI or lipid data), automated cohort analysis, or interoperability with laboratory results once local infrastructure allows.

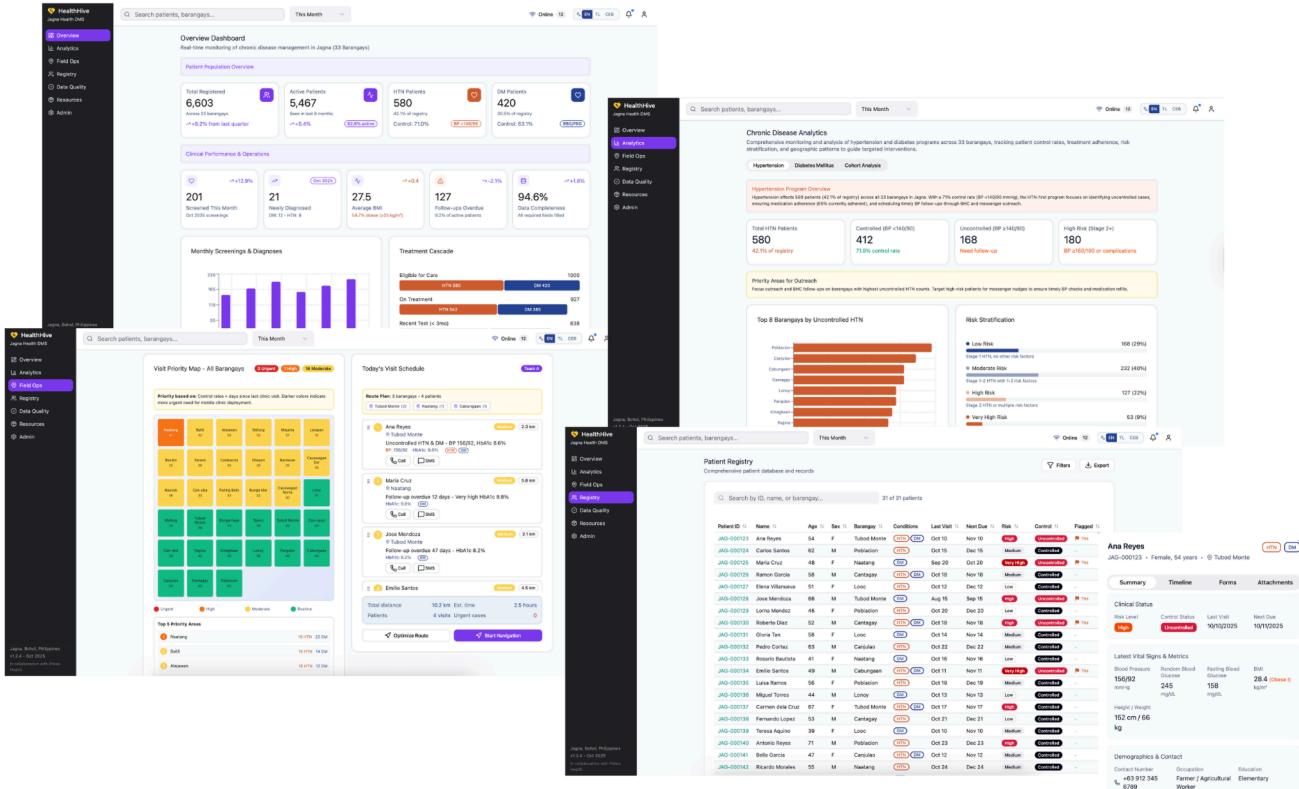
The HealthHive design framework also serves as a foundation for potential software development beyond DHIS2. Should funding and technical capacity permit, a fully customised HealthHive platform could integrate offline analytics, predictive modelling, and patient-engagement features, evolving the current pilot into a scalable, stand-alone system for chronic-disease management in rural settings.

Operational Value

The HealthHive Dashboard strengthens Jagna's chronic-disease programme by:

- Providing real-time situational awareness across 33 barangays.
- Enabling data-driven supervision that replaces manual compilation with automated indicators.
- Improving resource allocation through visibility of medicine stocks, outreach gaps, and workload distribution.
- Ensuring data quality and accountability, supported by built-in validation and sync tracking.
- Closing the feedback loop between field data and supervisory action through live worklists and reports.

By integrating DHIS2's robust architecture with the HealthHive design model, the dashboard transforms Jagna's monitoring system into a responsive, evidence-based management tool, capable of guiding daily operations while laying the groundwork for long-term digital transformation.



View the interactive prototype and wireframe here: [HealthHive Dashboard](#) and [Wireframe](#)

Figures 5. Screens from the DHIS2-supported HealthHive Dashboard showing the Overview, Analytics, Field Ops scheduling, and the Patient Registry with record details.

3.3. HealthHive Education Program and Training Pathway

The second prong of the HealthHive framework is the Education and Training Pathway, a capacity-building programme designed to ensure that Jagna’s digital transition is both technically sustainable and clinically meaningful. It complements the digital system by equipping frontline workers, supervisors, and community members with the knowledge, confidence, and behavioural tools needed to manage hypertension and diabetes effectively in low-resource settings.

This pathway consists of two interconnected components:

- Digital Transition and Data-Quality Training:** prepares health workers to adopt and sustain the HealthHive digital system; and
- Chronic Disease Self-Management Programme (CDSMP):** empowers patients and families to take an active role in managing hypertension and diabetes through practical, culturally adapted education.

Together, these deliverables create a closed loop of capacity and care: accurate data capture drives better supervision and planning, while health education strengthens adherence and control, making chronic-disease management more consistent, measurable, and sustainable across Jagna’s barangays.

3.3.1. Data and Technology Training Programme: Digital Transition Roadmap

Programme Objective

The aim of the HealthHive Digital Training Programme is to guide Jagna’s frontline health workers from fragmented paper notebooks toward an integrated, offline-first HealthHive Data Management System (HDMS) that connects a simple mobile data-capture app for field use with a DHIS2-supported dashboard for

supervisors. This allows health data to flow securely and consistently from barangay encounters to programme analysis.

This transition recognises Jagna's current reality: all three key stakeholders, Philos Health, RHU, and BHWs, maintain separate paper records with little or no routine data flow. Previous digitisation attempts using Microsoft Access and Google Forms were unsuccessful due to low digital literacy, unstable connectivity, and the absence of continuous technical support.

To overcome these barriers, HealthHive introduces technology through people-centred capacity building rather than software alone.

Training Model and Delivery Approach¹

Training adopts a bootcamp-plus-mentorship model aligned with Philos Health's outreach visits (two to four times annually) and sustained remotely between visits. Each cycle blends on-site practical workshops with continuous field mentoring and technical support.

Learning materials are bilingual (Cebuano–English), illustrated, and pre-loaded onto tablets for offline use. A local student network, the “Digital Health Youth Corps,” provides real-time translation, peer coaching, and troubleshooting in the field, ensuring that all participants, regardless of literacy or experience, can follow along and practise confidently.

The result is a gentle, staged digital transition that allows Jagna's health teams to maintain ongoing outreach operations while progressively developing confidence, data quality habits, and basic analytics capacity.

Training Structure and User Roles

Training and system access are organised across three operational tiers, mirroring Jagna's real-world health hierarchy. Each participant learns only what they need for their scope of responsibility, ensuring efficiency, accountability, and gradual skill progression.

User tier	Who	System access	What they do in the system
Tier 1 Data entry	BHWs / BHC volunteers	Mobile app (offline)	Register patients, capture encounters at BHC/outreach, sync when in town, flag follow-ups
Tier 2 Validation & reporting	RHU staff, public health nurses, Philos team	App + DHIS2 dashboard	Verify/clean entries, generate weekly/monthly reports, track stock vs. follow-ups
Tier 3 Interpretation	LGU/NGO leaders	DHIS2 dashboard (read-only)	Review barangay trends, plan resources, and monitor programme KPIs
Support network	CVIF student “Digital Health Youth Corps”	Transitional entry & field help	On-site troubleshooting, Excel organisation, exports, and translation support

Table 3. User Tiers, Access, and Roles.

This tiered access model reinforces accountability and ensures that each user operates within a scope consistent with their role in Jagna's health system.

Pedagogical Design

The curriculum is designed around low-connectivity, low-literacy realities, ensuring that technology complements rather than overwhelms existing community workflows.

¹ The detailed technological rollout, covering data consolidation, transitional capture, and full system launch, is presented in Section 5: Implementation and Evaluation Plan.

Key features include:

- **Hands-on demonstrations:** trainees practise each step on tablets using live or sample data.
- **Visual and simplified manuals:** step-by-step pictorial guides minimise reliance on text.
- **Peer mentorship:** pairing each BHW with a student “tech buddy” for real-time coaching.
- **Offline learning:** all instructional materials pre-installed on devices; no internet required during sessions.
- **Trusted facilitation:** workshops co-led by Philos Health and RHU mentors to foster trust and continuity.
- **Continuous support:** Messenger-based help groups and scheduled RHU review meetings for problem-solving.

This experiential design makes digital adoption both accessible and sustainable, embedding data habits into daily routines rather than treating them as special tasks.

Monitoring, Evaluation, and Sustainability

Training effectiveness is monitored through both participant progress and system performance indicators, reviewed after each outreach cycle.

Level	Indicators	Measurement Methods
Individual (BHW / Student)	Digital literacy gain, data-entry accuracy	Pre-/post-tests, app logs
System	Record-migration rate, sync success, duplicate reduction	SQL / DHIS2 audits
Institutional (RHU / Philos)	Dashboard utilisation, reporting timeliness	DHIS2 usage analytics
Community	Active barangays submitting monthly data	RHU tracking sheets / run-chart review

Table 4. Multi-Level Performance Metrics & Measurement.

Risks and mitigation are built into the training cycle: pictorial guides and peer mentoring address low literacy; offline workflows and monthly RHU uploads counter connectivity gaps; tablet rotation mitigates device scarcity; and quarterly refresher bootcamps sustain skills over time.

Sustainability rests on three pillars:

- **Local ownership:** RHU and BHWs as custodians of the digital system.
- **Youth engagement:** the *Digital Health Youth Corps* ensures continuous mentorship and bilingual translation.
- **Institutional linkage:** dashboard access for local government and the Department of Health promotes alignment with national reporting and potential funding for scale-up.

Integration with the Chronic Disease Programme

The HealthHive Digital Training Programme underpins the Chronic Disease Self-Management Programme by creating the data backbone that links education and care.

Data entered by BHWs through the HealthHive App synchronises with the DHIS2-supported Dashboard, allowing RHU and Philos Health supervisors to track hypertension and diabetes trends, monitor follow-up adherence, and evaluate workshop outcomes in real time.

In turn, insights from CDSMP workshops, such as participant progress and recurring barriers, feed back into data-entry protocols and training refinements. This establishes a closed feedback loop in which digital monitoring informs health education, and education improves data quality and service continuity across Jagna’s chronic-disease network.

Expected Outcomes

- Consolidated legacy health records digitised into a unified database.
- BHWs proficient in offline digital data capture and routine synchronisation.
- RHU and Philos staff are confident in dashboard-based reporting and supervision.

- Students and volunteers are empowered as community digital-health mentors.
- Establishment of Jagna as a model site for sustainable rural digital-health transition in Bohol.

3.3.2. Chronic Disease Self-Management Programme (CDSMP)²

The HealthHive Chronic Disease Self-Management Programme empowers Jagna residents to prevent and manage HTN and DM through practical, culturally adapted education embedded within existing Philos Health outreach. The programme complements the digital transition by ensuring that every data point collected through the HealthHive system translates into actionable health behaviour at the community level. This approach aligns with global evidence that structured Self-Management Education and Support (SMES) programmes significantly enhance chronic-disease control, self-efficacy, and behavioural adherence (Allory et al., 2024).

Recognising the community's limited health literacy and strong reliance on visual, oral, and peer learning, the CDSMP replaces conventional one-way learning with interactive, visual, and locally relevant sessions. These are conducted in Cebuano or Boholano, supported by bilingual visuals and demonstrations using familiar foods, household activities, and storytelling.

The overarching goal is to embed practical self-management skills into everyday routines, strengthening health literacy, improving adherence, and linking behavioural data to the HealthHive DHIS2-supported system for ongoing monitoring and feedback.

Program Structure

The CDSMP runs in parallel with Philos Health and BHC outreach missions, hosting short, repeatable workshops under two core themes:

1. Healthy Eating for Chronic Disease Prevention
2. Active Living for Heart and Metabolic Health

Each theme follows a two-session structure delivered within the same outreach cycle:

- **Session 1:** Foundation & Action Planning: builds baseline understanding of diet, activity, and chronic-disease prevention through local examples and demonstrations; participants set one-week personal goals using colour-coded cards (orange = HTN, blue = DM; Figure X).
- **Session 2:** Progress Review & Problem-Solving: revisits goals, reviews BP/glucose readings, identifies barriers (cost, taste, time, weather), and sets revised targets with nurse or doctor guidance.

Future modules such as *Stress & Sleep* and *Medication & Monitoring* can be added using the same dual-session format once the model stabilises.

Workshop Theme	Session 1	Session 2:
	Introductory – Foundation & Action Planning	Follow-Up – Progress Review & Problem Solving
Healthy Eating for Chronic Disease Prevention	<p>Uses food samples, local meal pictures, and games and demonstrations to teach portion control, food substitution, and simple cooking adjustments. Participants design one-week action plans with CHW guidance.</p> <p><i>Example:</i></p> <ul style="list-style-type: none"> • Short visual talk: "What's on our plate?" using local meals. • DM focus: sugar sources, portion control, spacing meals. • HTN focus: salt, oil, and processed food reduction. • Cooking demo using low-salt, low-sugar recipes. • Each participant sets a 1-week food goal (e.g., halve sugary drinks / avoid instant noodles). 	<p>Conducted later in the week. Participants discuss experiences, symptoms, and barriers (e.g., cost, family habits), then update goals.</p> <p><i>Example:</i></p> <ul style="list-style-type: none"> • Review goal-cards and home logs. • Small-group discussions separated by DM and HTN where CHWs address specific difficulties. • Symptom check-in (dizziness, fatigue, thirst, BP spikes). • Update individual plans and share peer strategies.

² Detailed module timelines, session plans, and learning outcomes are provided in the supplementary deliverable: "HealthHive Education and Training Materials (Annex 1 and 2)."

Active Living for Heart and Metabolic Health	<p>Demonstrates safe, home-based physical activities (walking, stretching, broom exercises). Participants set a daily movement target.</p> <p><i>Example:</i></p> <ul style="list-style-type: none"> • Demonstrate low-impact exercises adaptable to home or farm work. • DM focus: walking after meals, foot care. • HTN focus: breathing and stretching to reduce stress. • Participants set personal daily-movement goals. 	<p>Participants review adherence, share struggles (e.g., time, fatigue), and practise alternative routines.</p> <p><i>Example:</i></p> <ul style="list-style-type: none"> • Participants share progress and barriers (time, weather, joint pain). • Nurses re-measure BP/glucose; discuss safe limits. • Group problem-solving and reinforcement of habit formation.
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Table 5. Chronic Disease Self-Management Workshops: Themes & Session Flow.

Participant Flow

Participation follows a tiered and inclusive pathway, ensuring that all residents begin with shared foundations and progress according to risk level, motivation, and readiness.

Stage / Session	Who Joins	Purpose & Focus	Requirement	Facilitators
Introductory Workshop (Session 1)	General public, all risk levels, and caregivers	Build shared understanding through stories, visuals, and local examples; set individual one-week goals.	Mandatory for first-time participants; repeat allowed for refreshers.	BHWs + Digital Health Youth Corps students + RHU nurses
Follow-Up Workshop (Session 2)	Participants who completed Session 1, caregivers of medium/high-risk or diagnosed individuals	Review goals, record BP/glucose readings, and address barriers in DM/HTN breakout groups.	Mandatory for medium/high-risk and diagnosed; optional for low-risk and caregivers.	BHWs + RHU nurses + Philos Health doctors
Continuing Support Circles	Diagnosed or high-risk participants; caregivers	Provide ongoing mentoring, peer sharing, and follow-up monitoring between visits.	Ongoing enrolment.	Nurses + doctors + trained peer mentors (Digital Health Youth Corps)

Table 6. Engagement & Facilitation Plan for Workshops

Key principles:

- Universal Entry: all participants begin at Session 1 with a common foundation.
- Tiered Progression: support intensity increases with risk level; higher-risk groups receive closer monitoring.
- Caregiver Integration: families participate alongside patients.
- Open Re-entry: participants may revisit any session or module as needed.

Facilitation and Roles

Implementation relies on trusted local actors who already anchor Jagna's community-health network:

- **Barangay Health Workers:** lead small-group sessions in local dialects, conduct household reminders, and collect feedback.
- **Digital Health Youth Corps (students):** assist facilitation, translation, and data recording; manage goal-card and attendance logs.
- **RHU nurses:** supervise clinical accuracy, validate BP/glucose readings, and guide moderate-risk participants.
- **Philos Health doctors:** oversee high-risk sessions, address medical queries, and ensure correct integration of workshop data into the HealthHive DHIS2-supported Dashboard.
- **Philos programme leads:** coordinate logistics, materials, and facilitator refresher training.

All facilitators receive structured orientation during the Digital Transition Programme (see Section 3.3.1) to ensure pedagogical and data-entry consistency.

Pedagogical Approach

The CDSMP adopts a learning-by-doing framework aligned with Jagna's low-literacy context:

- Visual learning: flip-charts, pictorial food guides, and portion models replace text-heavy materials.
- Action planning: participants set measurable, one-week goals for diet or physical activity tracked on coloured goal cards.
- Small-group circles: 6–8 participants per group encourage discussion and accountability.
- Peer mentorship: returning participants and students act as motivators and accountability partners.
- Data feedback: CHWs and students record attendance, vitals, and goal outcomes directly into the HealthHive DHIS2-supported system, linking behavioural data to clinical monitoring.

Sample Goal Cards

Heart Health – My One-Week Goal (For People Preventing or Managing High Blood Pressure)		
1. My Goal for This Week		
<input type="checkbox"/> I will avoid eating any salt this week. <input type="checkbox"/> I will skip instant noodles this week. <input type="checkbox"/> I will eat one fruit or vegetable each day. <input type="checkbox"/> I will do 10 minutes of deep breathing or stretching every morning. <input type="checkbox"/> Other: _____ Circle or write one.		
2. My Daily Tracker (Mark <input checked="" type="checkbox"/> = done, <input type="checkbox"/> = partly, <input type="checkbox"/> = missed)		
Day	Goal?	Notes
Mon	<input checked="" type="checkbox"/>	
Tue	<input type="checkbox"/>	
Wed	<input type="checkbox"/>	
Thu	<input type="checkbox"/>	
Fri	<input type="checkbox"/>	
Sat	<input type="checkbox"/>	
Sun	<input type="checkbox"/>	
3. How Do I Feel?		
<input type="checkbox"/> Less headache <input type="checkbox"/> More relaxed <input type="checkbox"/> Still dizzy <input type="checkbox"/> Better sleep <input type="checkbox"/> Other: _____		
4. Support & Signature		
Facilitator:		
Participant:		
Follow-up Date:		

Facilitator Section (For CHW or nurse use only)		
1. My Goal for This Week		
<input type="checkbox"/> I will reduce my salt intake from _____ times to _____ times a week. <input type="checkbox"/> I will eat half a cup less rice each meal. <input type="checkbox"/> I will add vegetables to lunch or dinner every day. <input type="checkbox"/> I will walk 10 minutes after meals at least 5 days. <input type="checkbox"/> Other: _____ Write or circle one only (Facilitator helps fill in).		
2. My Daily Tracker (Mark <input checked="" type="checkbox"/> = done, <input type="checkbox"/> = partly, <input type="checkbox"/> = missed)		
Day	Goal?	Notes
Mon	<input checked="" type="checkbox"/>	
Tue	<input type="checkbox"/>	
Wed	<input type="checkbox"/>	
Thu	<input type="checkbox"/>	
Fri	<input type="checkbox"/>	
Sat	<input type="checkbox"/>	
Sun	<input type="checkbox"/>	
3. How Do I Feel?		
<input type="checkbox"/> More energy <input type="checkbox"/> Less thirst <input type="checkbox"/> Tired <input type="checkbox"/> Fell dizzy <input type="checkbox"/> Other: _____		
4. Support & Signature		
Facilitator:		
Participant:		
Follow-up Date:		

Healthy Eating & Living – My One-Week Goal (For People Preventing or Managing Diabetes [High Sugar])		
1. My Goal for This Week		
<input type="checkbox"/> I will reduce my sugar intake from _____ times to _____ times a week. <input type="checkbox"/> I will eat half a cup less rice each meal. <input type="checkbox"/> I will add vegetables to lunch or dinner every day. <input type="checkbox"/> I will walk 10 minutes after meals at least 5 days. <input type="checkbox"/> Other: _____ Write or circle one only (Facilitator helps fill in).		
2. My Daily Tracker (Mark <input checked="" type="checkbox"/> = done, <input type="checkbox"/> = partly, <input type="checkbox"/> = missed)		
Day	Goal?	Notes
Mon	<input checked="" type="checkbox"/>	
Tue	<input type="checkbox"/>	
Wed	<input type="checkbox"/>	
Thu	<input type="checkbox"/>	
Fri	<input type="checkbox"/>	
Sat	<input type="checkbox"/>	
Sun	<input type="checkbox"/>	
3. How Do I Feel?		
<input type="checkbox"/> More energy <input type="checkbox"/> Less thirst <input type="checkbox"/> Tired <input type="checkbox"/> Fell dizzy <input type="checkbox"/> Other: _____		
4. Support & Signature		
Facilitator:		
Participant:		
Follow-up Date:		

Facilitator Section (For CHW or nurse use only)		
1. My Goal for This Week		
<input type="checkbox"/> Diagnosed DM <input type="checkbox"/> At-risk <input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High <input type="checkbox"/> Introductory <input type="checkbox"/> Follow-up		
2. My Daily Tracker (Mark <input checked="" type="checkbox"/> = done, <input type="checkbox"/> = partly, <input type="checkbox"/> = missed)		
Day	Goal?	Notes
Mon	<input checked="" type="checkbox"/>	
Tue	<input type="checkbox"/>	
Wed	<input type="checkbox"/>	
Thu	<input type="checkbox"/>	
Fri	<input type="checkbox"/>	
Sat	<input type="checkbox"/>	
Sun	<input type="checkbox"/>	
3. How Do I Feel?		
<input type="checkbox"/> More energy <input type="checkbox"/> Less thirst <input type="checkbox"/> Tired <input type="checkbox"/> Fell dizzy <input type="checkbox"/> Other: _____		
4. Support & Signature		
Facilitator:		
Participant:		
Follow-up Date:		

HTN Goal Cards

DM Goal Cards

Figure 6. Sample One-Week Goal Cards for HTN & DM, pairing patient checklists and daily trackers with facilitator forms capturing risk, session type, outcomes, and data entry.

Integration with the HealthHive System

The CDSMP is fully embedded within the HealthHive ecosystem. Workshop data, including attendance, blood-pressure/glucose readings, goal-achievement rates, and participant feedback, are digitised through the HealthHive DHIS2-supported Dashboard.

This integration allows the RHU and Philos Health to:

- Identify high-risk participants for targeted recalls.
- Compare behavioural adherence with clinical control trends.
- Refine future workshop content based on real-world barriers (e.g., cost or dietary patterns).

This data, education feedback loop closes the cycle between community learning, health behaviour, and clinical outcomes.

Monitoring, Challenges, and Sustainability

Monitoring and Evaluation: progress is tracked across four levels:

- **Individual:** goal-achievement rate and short-term BP/glucose improvement.
- **Community:** workshop attendance, repeat participation, and caregiver engagement.
- **Institutional:** dashboard usage and integration into RHU reporting cycles.
- **Programme:** alignment between CDSMP results and HealthHive performance indicators.

Anticipated challenges, such as low literacy, motivation decline, or weather-related absences, are mitigated through pictorial materials, flexible venues (schools, barangay halls, shaded porches), and peer-recognition incentives.

Sustainability strategies:

- **Local capacity building:** CHWs and students certified as year-round facilitators.
- **Institutional linkage:** Philos Health's planned nurse expansion for continuous BP/glucose monitoring.
- **Community ownership:** Barangay and church groups host recurring sessions.
- **Data continuity:** Behavioral outcomes logged in DHIS2 ensure longitudinal tracking.

Expected Outcomes

The CDSMP is expected to enhance community knowledge and self-efficacy in hypertension and diabetes management, reduce uncontrolled BP and glucose levels among participants, and strengthen caregiver and peer-support networks. By linking behavioural education to digital data monitoring through the HealthHive Dashboard, the programme transforms community learning into actionable insights for the RHU and Philos Health. It establishes a feasible, low-literacy model of chronic-disease self-management that can be scaled across other Philos-supported municipalities in Bohol.

IV. Implementation and Sustainability Plan

The implementation of HealthHive will follow a phased transition-to-deployment framework that balances practicality, participation, and sustainability. Each phase builds sequentially, from groundwork and data consolidation to system training, deployment, and long-term operationalisation, ensuring that no stage outpaces local readiness.

The overarching objective is to enable Jagna's chronic-disease management programme to move from paper-based tracking toward a fully integrated digital ecosystem, while preserving the continuity of care and community trust that underpins existing outreach.

HealthHive's rollout will therefore combine:

- a gradual digital transition through offline-first workflows,
- a capacity-building pathway tailored to frontline users, and
- a rigorous evaluation sequence that translates learning into programme improvement.

Each phase concludes with measurable outputs, trained personnel, cleaned datasets, operational dashboards, and evidence of clinical and operational impact, laying the foundation for scale-up beyond Jagna.

4.1. Transition Period

The transition period establishes the groundwork for Jagna's digital transformation while ensuring that ongoing outreach and care delivery remain uninterrupted. To preserve service continuity, legacy patient records from BHCs and Philos Health outreach will first be digitised using CommCare, a lightweight, fully offline mobile data-capture tool.

This phase begins with a short, no-paperwork transition where all existing patient records will be captured in CommCare while frontline teams continue using their familiar visit summary cards, maintaining established workflows. This approach ensures that no new paperwork or procedures are introduced prematurely, while a clean digital baseline of patient histories begins to form.

4.1.1. Current State and Rationale for a Transitional Platform

At present, patient information is documented through a patchwork of paper notebooks kept at each BHC and personal monitoring booklets held by patients (Figure 7). Each page records manual entries of blood-pressure readings, visit dates, and medication remarks. While familiar and low-cost, this process produces several systemic challenges:

- Records remain isolated within each BHC, with no municipal-level consolidation.
- Data quality varies, and readings are often missing or illegible.
- Monthly follow-ups depend on whether nurses or BHWs visit, making continuity inconsistent.



Paper-form notebook in BHC

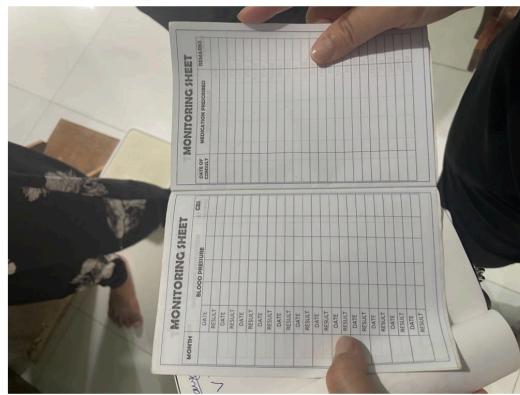


Figure 7. Examples of current paper-based records: (left) BHC logbook with handwritten BP, visit dates, and medication notes; (right) patient-held monitoring booklet—illustrating fragmented, variable-quality data and limited consolidation.

To bridge these limitations without disrupting existing workflows, the project will use CommCare as a short-term, offline-ready digital collection tool. CommCare allows the team to begin structured, field-level data capture immediately, while the full HealthHive Data Management System (HDMS), comprising the HealthHive Mobile App and DHIS2-supported Dashboard, is configured for long-term use.

CommCare was selected because it provides:

- Offline capability that ensures field usability in upland barangays;
- Form-based simplicity that mirrors existing paper records; and
- Low start-up cost and minimal training needs, enabling immediate use during the pilot phase.

Nonetheless, CommCare is not the intended long-term platform. While it is an open-source and widely adopted digital health tool, its licensing model, hosting requirements, and limited local configurability CommCare's role is therefore deliberately transitional: it will establish the initial digital framework and validated dataset needed to populate and test the HDMS architecture before permanent migration to the scalable DHIS2 environment.

4.1.2 Interim Workflow and Data Management Process

During this phase, a two-step workflow combining CommCare and Excel will maintain continuous data collection and quality assurance while preparing for full DHIS2 integration.

1. Field Data Capture (CommCare):

- BHWs and volunteers record patient registrations, blood pressure and glucose readings, medication refills, and follow-up dates using CommCare on mobile devices.
- Entries are stored locally and automatically synchronised once internet connectivity is available (typically at the RHU or municipal hall).

2. Data Consolidation (Excel via OneDrive):

- Uploaded CommCare data are exported weekly into Excel trackers stored on a shared OneDrive workspace accessible to the project team.

- Members of the Digital Health Youth Corps manually key in legacy data from the existing BHC notebooks and patient booklets (as shown in Figures X–Y), cross-checking entries and tagging missing information.
- The project team then performs structured cleaning and integration of these Excel files into a unified SQL master database, which will later feed directly into DHIS2.
- These verified datasets serve as interim “master files” for pilot analytics and dashboard prototypes, allowing RHU and Philos supervisors to monitor progress even before the full system is launched.

3. Migration to DHIS2 (End of Phase 1):

- Once the HealthHive App and DHIS2 Dashboard are finalised, validated data from the SQL database will be migrated to DHIS2 Tracker programmes.
- From this point forward, BHWs will record directly through the HealthHive App, retiring CommCare and paper logs entirely.

This CommCare → Excel → SQL → DHIS2 chain ensures that every record collected during the transition remains traceable, validated, and interoperable within the final system. It also allows the project to establish robust data-governance protocols before full-scale deployment, guaranteeing that Jagna’s digital transformation progresses without compromising continuity of care.

4.1.3. Transition-Phase Activities and Deliverables

Activity	Lead Actors	Expected Outputs
Configure CommCare forms for hypertension and diabetes tracking	Project Team + Philos Health	Validated digital forms aligned with BHC paper workflows
Digitise legacy patient notebooks and personal booklets	BHWs + Digital Health Youth Corps	Cleaned Excel datasets of historical patient data
Conduct <i>Evaluation Study 1: Jagna Digital Health Field Feedback</i>	RHU + Project Team	Field-validated usability and workflow insights
Define data dictionaries and KPIs for chronic-disease tracking	Project Team + RHU Staff + Philos Health	Standardised indicator set for programme monitoring
Prepare SQL migration scripts for CommCare → DHIS2	Project Team	Verified migration protocol ensuring data integrity

Table 7. Transition Activities and Outputs.

By the end of this transition stage, Jagna will have:

- A digitised and validated patient-level dataset ready for DHIS2 import.
- Standardised data definitions and KPIs; and
- A trained core group of users proficient in offline digital data entry forms the foundation for the full HealthHive deployment in later phases.

4.2. Phased Implementation Roadmap

HealthHive’s rollout follows a four-phase roadmap designed to advance technical development and capacity-building in parallel, ensuring that every step consolidates both digital infrastructure and community readiness. Each phase culminates in measurable deliverables, clean datasets, trained users, operational dashboards, and validated indicators, forming a traceable pathway from pilot implementation to long-term, routine use.

The roadmap is underpinned by a transitional data workflow (CommCare → Excel → SQL → DHIS2) that safeguards data continuity during system build-out and training. Evaluation studies embedded in each phase generate continuous learning, accountability, and refinement of both technology and processes.

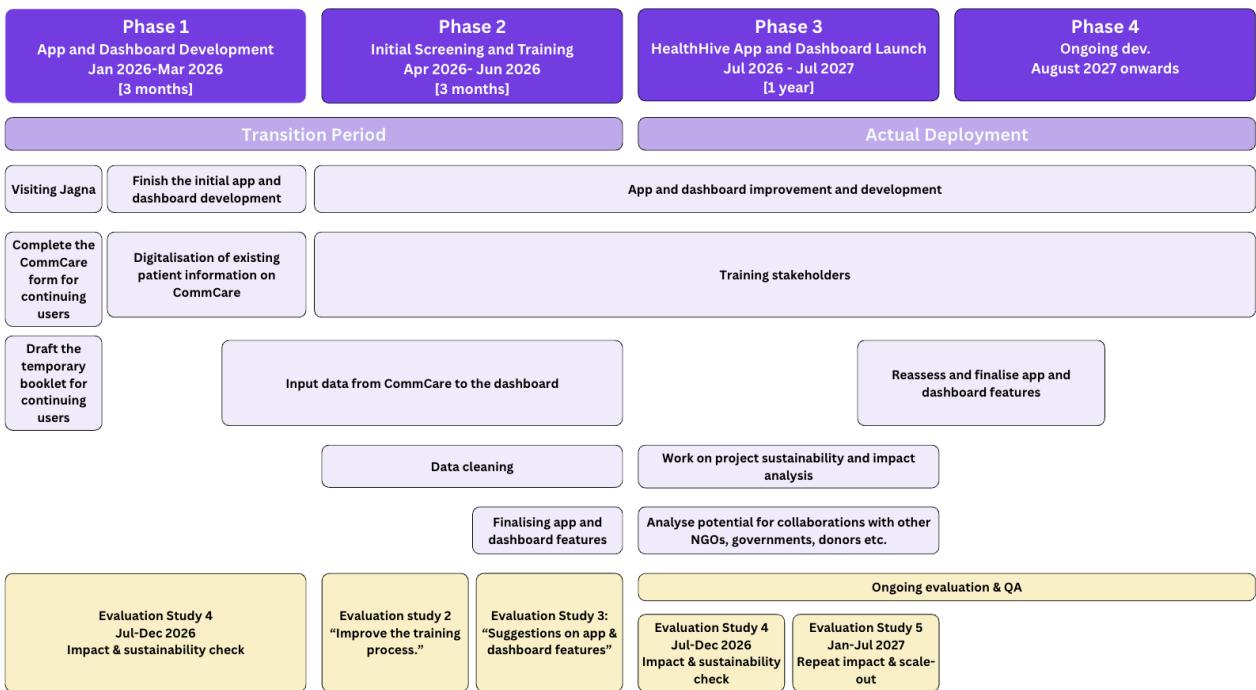


Table 8. Phased Transition and Deployment Timeline

Transition Phase/Pre-deployment

4.2.1. Phase 1 (Jan–Mar 2026): Personalise the Stack, Execute the Transition

The first quarter focuses on configuring the initial data-capture stack and preparing the field for digital adoption.

Evaluation Study 1 – “Jagna Digital Health Field Feedback” will gather frontline insights to validate workflow logic, data elements, and usability needs. CommCare forms will be finalised and deployed for active data collection, while BHWs continue using familiar visit summary cards to preserve continuity.

During this period, the Digital Health Youth Corps will assist in encoding historical patient data from barangay notebooks and outreach forms into Excel trackers. These files will be cleaned, validated, and migrated into an interim SQL master database, creating the first consolidated digital baseline for Jagna.

By March, MVP versions of the HealthHive App and DHIS2-supported Dashboard will be ready for internal testing. The project team will confirm key performance indicators (coverage, data quality, continuity of follow-up) and prepare configuration adjustments for Phase 2.

Key Deliverables:

- Validated CommCare form and transitional data-capture workflow established.
- Digitised baseline records consolidated into SQL master database.
- MVP HealthHive App and DHIS2 Dashboard prototypes completed.
- Evaluation Study 1 completed; KPIs defined for ongoing monitoring.

4.2.2. Phase 2 (Apr–Jun 2026): Train, Pipe Data, and Stabilise

This phase emphasises user training, live testing, and stabilisation of data flow across platforms.

In April, formal training begins under the bootcamp-plus-mentorship model, aligning with Philos Health’s outreach schedule. Participants are grouped by digital-literacy level, and all training is bilingual and hands-on. By mid-phase, the CommCare → Excel → SQL → DHIS2 pipeline will be fully active. Data captured in the field

through CommCare will flow via OneDrive-based Excel exports into SQL, where it is validated and visualised on the DHIS2 dashboard.

Two formative evaluations will run in tandem:

- Evaluation Study 2 – “Improving the Training Process” uses pre-/post-assessments and field observations to measure training effectiveness.
- Evaluation Study 3 – “App and Dashboard Feature Feedback” gathers rapid usability input via short surveys and A/B tests to guide configuration updates.

By June, coinciding with Philos Health’s planned transition to a new site, final data cleaning and documentation will be conducted. This ensures that Jagna’s dataset, dashboard indicators, and user competencies are stable for formal deployment.

Key Deliverables:

- Tiered training completed for BHWs, RHU staff, and Youth Corps.
- Fully functional data pipeline linking CommCare to DHIS2.
- Evaluation Studies 2 and 3 completed with recommendations implemented.
- Clean, validated dataset and user-ready dashboard.

HealthHive App and Dashboard Deployment

4.2.3. Phase 3 (Jul 2026–Jul 2027): Prove Impact, Maintain Momentum

This phase marks full deployment of the HealthHive ecosystem, transitioning all data entry to the HealthHive App, retiring CommCare and paper logs, and running the system under real operational conditions.

Evaluation Study 4 – “Impact and Sustainability Check” (Jul–Dec 2026) will assess the platform’s functionality in routine use, examining technical stability, user retention, and data accuracy under field constraints. Monthly technical reviews will track crash logs, sync performance, and help-desk tickets, while cost and workflow studies inform the sustainability framework.

From January to July 2027, Evaluation Study 5 – “Scale-Out Validation” will measure system durability, user satisfaction, and outcome trends as the programme expands or stabilises across barangays. These findings will feed into scale-up strategies and policy dialogues with local government and health authorities.

Key Deliverables:

- Complete migration to the HealthHive App and DHIS2 dashboard.
- Monthly monitoring and evaluation cycles are operational.
- Evidence of improved data quality, continuity of follow-up, and chronic-disease control indicators.
- Partner engagement and sustainability roadmap developed.

4.2.4. Phase 4 (Aug 2027 onward): Operationalise for the Long Run

Once core workflows and data systems stabilize, HealthHive will enter continuous operations. The focus shifts to institutionalising digital routines, refining performance, and sustaining motivation.

Routine activities will include:

- End-of-training evaluations for every new cohort.
- Monthly technical audits and bug-resolution cycles.
- Quarterly “run-chart huddles” reviewing KPIs and system performance.
- Incremental software updates and refresher bootcamps.

Partnerships with NGOs, local government, and the Department of Health will be formalised to support maintenance funding and potential replication in other municipalities.

Key Deliverables:

- Routine operations embedded in RHU workflows.
- Institutional cost-sharing and maintenance plan finalised.
- System performance is sustained through continuous learning and iteration.

4.3. Evaluation studies

The HealthHive rollout embeds a continuous evaluation framework that mirrors the project's phased implementation. Each evaluation study generates actionable insights—testing usability, data quality, training effectiveness, and long-term sustainability, to guide adaptive improvement before scale-up.

Rather than treating monitoring as a separate exercise, the evaluation process forms an integral feedback loop between the field, technical team, and programme leadership. This ensures that learning directly informs decision-making, resource allocation, and design iteration across all phases.

Early studies focus on formative learning and system readiness, while later studies assess impact, sustainability, and scalability. Together, they provide a structured line of sight from pilot implementation to long-term integration within Jagna's health system.

4.3.1. Evaluation Framework Overview

Study	Phase	Primary Focus	Key Questions	Core Outputs
Study 1 Jagna Digital Health Field Feedback	<i>Transition → Phase 1 (Jan 2026)</i>	Ground reality and system feasibility	How do local workflows, digital skills, and resource constraints affect the system's setup? Which features and data fields are essential for usability?	Validated CommCare forms, refined data workflows, and confirmed programme KPIs
Study 2 Improving the Training Process	<i>Phase 2 (Apr–Jun 2026)</i>	Effectiveness of the bootcamp and mentorship model	Does the training approach improve digital literacy and data-entry accuracy? Which participants require additional mentoring?	Revised training modules and mentorship allocation model
Study 3 App & Dashboard Feature Feedback	<i>Phase 2 (Apr–Jun 2026)</i>	Usability and feature optimisation	Which aspects of the app and dashboard create friction or delay? How can workflows be simplified?	Prioritised list of UX refinements and configuration updates
Study 4 Impact and Sustainability Check	<i>Phase 3 (Jul–Dec 2026)</i>	Real-world system performance under routine use	Does the HealthHive App → DHIS2 framework sustain accuracy, reliability, and user engagement? What are the cost, time, and governance implications?	Midterm impact report with sustainability metrics and policy implications
Study 5 Scale-Out Validation	<i>Phase 3–4 (Jan–Jul 2027)</i>	Durability and scalability	Does system performance remain stable as coverage expands? What adjustments are required for replication in other municipalities?	Final evaluation report and replication roadmap

Table 9. Sequenced Evaluation Studies.

4.3.2 Continuous Quality Assurance and Learning Mechanisms

Alongside the five formal evaluation studies, HealthHive maintains ongoing, embedded quality-control routines:

- **Training evaluation:** Each bootcamp concludes with post-course tests, confidence self-ratings, and scenario-based observations.
- **Technical monitoring:** Monthly audits track app crashes, sync success, data-duplicate frequency, and task completion times, producing a standing “bug burn-down” list for the tech team.
- **Quarterly run-chart reviews:** RHU, Philos, and project partners jointly review chronic-disease indicators, dashboard trends, and data completeness for iterative improvement.

- **Learning Notes:** A concise two-page summary of findings, adaptations, and next steps shared with donors and government counterparts after each evaluation cycle.

These mechanisms ensure that learning is continuous, applied, and co-owned by the institutions that will ultimately sustain the system.

4.3.3 Adaptive Evaluation and Risk Mitigation

The evaluation framework is designed to remain adaptive and decision-oriented, acknowledging Jagna's local constraints such as patchy connectivity, limited devices, and varying digital literacy.

Mitigation strategies are built into both implementation and evaluation:

- Offline-first workflows with scheduled sync windows prevent data loss during outages.
- Structured SQL validation scripts and unique ID conventions ensure data integrity.
- Targeted refresher coaching and peer mentorship address skill decay.
- Rapid product clinics resolve high-friction usability issues after each field cycle.

Evaluation instruments, KPIs, and sampling plans will be refined with RHU and Philos Health before each study to ensure relevance, feasibility, and actionable results.

4.3.4 Function of the Evaluation System

The evaluation framework functions as an adaptive, evidence-building mechanism that evolves alongside HealthHive's implementation. Rather than serving as a post-project assessment, it operates as a continuous learning engine, translating field insights into iterative improvements in design, training, and governance.

The early evaluations (Studies 1–3) focus on exploration and validation, ensuring that workflows, digital tools, and training approaches are grounded in the realities of Jagna's health ecosystem. They enable the team to refine forms, strengthen digital-literacy modules, and optimize usability before full deployment. The subsequent studies (Studies 4–5) shift toward institutionalisation, measuring sustainability, policy alignment, and scalability across barangays. Through this staged approach, evaluation findings progressively transition from technical validation to strategic decision support, equipping both Philos Health and the RHU with the evidence and capacity to govern the system independently.

Ultimately, this framework transforms implementation into a structured process of learning, ownership, and accountability, ensuring that every dataset, training cycle, and outreach encounter contributes directly to building a resilient, data-driven, and self-sustaining rural health system in Jagna.

4.4. Finances

We propose a lean, offline-first rollout that pairs a simple DHIS2 Android SDK data-capture client with a DHIS2-supported supervisory dashboard for a 500-user pilot in Jagna, with spending intentionally front-loaded to secure early readiness. This envelope covers the configuration of the Hypertension/Diabetes Tracker programme, program rules that enforce correct blood-pressure workflows and mandatory next-visit dates, supervisory dashboards for control rates/recalls/data completeness, and end-to-end testing to validate the field stack before scale. A more granular budget will be finalised once Philos' cost constraints are confirmed and device availability is known; the figures below set a practical ceiling while surfacing frequently overlooked line items such as training delivery, support time, devices or stipends, observability, backup/disaster recovery, and a modest contingency.

Potential costs and expenses		Approximate amount (in HK\$)
HealthHive app	App development (non-recurring)	\$100,000.00
	Maintenance costs (recurring)	\$10,000.00

DHIS2-supported dashboard	Database user fee (US\$1,440/year = ~HK\$11,184.42)	\$11,200.00
Other expenses	Training materials	\$8,000.00
	Operating expenses and Evaluation studies	\$1,000.00

Table 10. Estimated Cost Envelope for HealthHive Pilot (HK\$).

These figures are designed to launch and stabilise core workflows without locking the project into heavy custom engineering before the DHIS2-based approach has demonstrated fit in Jagna's connectivity and staffing realities.

Primary revenue sources will include international and local donors, government health budgets, and national health-insurance streams. Phase 1 implementation will sharpen scope, unit costs, and partner responsibilities, strengthening proposals for expanded coverage. We anticipate that early evidence, clean dashboard KPIs, and improved follow-up completion will unlock co-funding from the local government and private donors, broaden the partnership base, and support a sustainable transition from pilot to routine operations.

4.5. Data Privacy, Consent, and Patient Rights (Philippines DPA 2012)

HealthHive is designed to meet and operationalize the Philippines' Data Privacy Act of 2012 (DPA). All personal data collection is limited to a declared, specific, and legitimate purpose directly tied to service delivery and programme monitoring; nothing is gathered "just in case." Before any data capture, we obtain consent that is freely given, specific, informed, and evidenced by recorded means. The consent language clearly explains the extent and purpose of processing, and explicitly mentions automated processing, any data sharing, and that no direct marketing occurs. We seek separate, opt-in consent for sharing information with affiliates or a parent organisation. As health information is "sensitive personal information" under the DPA, processing is limited to lawful bases: the patient's consent; a requirement under law; necessity to protect life or health; necessity for medical treatment; or to protect lawful rights in proceedings. Individuals can access, correct, or withdraw consent for future processing at any time without affecting urgent care.

Operationally, HealthHive applies "privacy by design" across people, process, and technology. Data minimisation and role-based access ensure barangay workers see only what they need to deliver care, while RHU supervisors access aggregated views for recalls, coverage, and stock planning. Devices use screen locks and encrypted storage, with a lost-device SOP (remote credential revocation and incident log). Offline capture is synced on secure connections; audit trails and data retention schedules are enforced in line with DOH reporting needs and the DPA's storage limitation principle. Consent artefacts (signed forms or audio attestations) are stored alongside the patient's record in the app and are visible on the dashboard for compliance checks, so field teams and supervisors can verify consent status at a glance. We will train all staff on confidentiality, secure handling, and incident reporting, and we will maintain a simple Data Protection Impact Assessment and breach response playbook for the RHU and LGU.

V. Future Outlook

Over the next phase, HealthHive will deepen local ownership, stress-test the DHIS2-based stack under routine field conditions, and build a pragmatic pathway to scale. We will formalise a light but accountable governance cadence led by the RHU with representation from BHWs, barangay leadership, Philos Health, and youth volunteers. This group will set quarterly priorities for coverage, continuity, and data quality; adjudicate trade-offs such as staff time versus new feature requests; and approve changes to forms and indicators so the system evolves with community needs, not around them. International NGOs and specialist implementers will be engaged on clearly scoped, time-bound assignments, while decision-making remains local. This partnership model expands technical reach without diluting community control, and it anchors day-to-day realities, from digital readiness to travel constraints, in governance.

Technically, we will continue to prove reliability on DHIS2 before introducing custom development. In the short term, DHIS2 remains the single source of truth while we harden the current HealthHive Android workflows registry, screening, follow-ups, duplicate resolution, and transparent offline sync. As we meet acceptance thresholds, stable offline capture, predictable sync, and timely dashboard refresh, we will scope a phased transition to a personalised Android client that preserves the DHIS2 data model and APIs. This approach manages today's financial and technical constraints while preserving future headroom for Jagna-specific features and UX, ensuring continuity of data and minimal rework. To mitigate known limitations, we will maintain an "offline-first, sync opportunistically" discipline, provide clinic-based "flush" utilities for delayed uploads from upland sitios, and strengthen recovery tooling and pictorial job aids so device or metadata issues never threaten data integrity.

Service delivery will expand alongside technology maturity. Once the field stack is stable, we will deploy supervised nurse rotations to upland barangays for regular blood-pressure and glucose days, aligning routes with dashboard-identified hot spots such as clusters of uncontrolled readings or overdue recalls. Visit schedules and task lists will be generated directly from the dashboard to ensure each contact has a measurable objective. This closes the loop between data and care, reduces travel burden for patients, and increases the probability of control among high-risk cohorts. In parallel, our analytics will mature from monthly counts to cohort-based retention and outcome tracking at 3, 6, and 12 months, with barangay and age disaggregation. We will add stock visibility and simple adherence proxies (missed recalls, late refills) to sharpen supervision and pharmacy planning. As the dataset grows, we will pilot pragmatic risk-tiering to prioritise home visits and group education.

Evaluation remains our improvement engine. The ongoing study series will generate "Learning Notes" that drive targeted adjustments to training, workflows, configuration, and governance. When hurdles arise—skill decay, sync failures, duplicate spikes, or workflow friction—we will respond with small but frequent fixes: refresher sessions, Tracker audits, and UX trims to remove low-value fields and keep the three core jobs (register, screen, follow-up) fast on low-end devices. Financing will stay lean by front-loading readiness costs (configuration, field testing, training kits) and then shifting to predictable operating costs. Early wins, clean KPIs, improved recall completion, and stable cohort retention will anchor co-funding conversations with the LGU and aligned donors, supported by a rolling twelve-month budget and device rotation plan.

Partnerships will be cultivated with professionals and international NGOs to extend specialised support while prioritising local decision-making and active community participation. We will deepen ties with schools and volunteer networks to sustain trilingual facilitation, backstop data entry during peaks, and provide peer troubleshooting. Knowledge will be codified in a "Jagna Starter Kit"—metadata packages, training scripts, evaluation templates, and a short governance playbook—so neighbouring municipalities can adopt the model without recreating early learning curves, while retaining flexibility for local adaptation of forms, language, and schedules.

HealthHive's future is deliberately incremental: prove reliability on DHIS2, institutionalise learning through continuous evaluation, extend care closer to households via nurse rotations, and only then commission targeted customisation where it clearly adds value. By combining strong local governance with selective external expertise, maintaining an offline-first posture, and maturing our analytics from counts to cohorts, we can manage foreseeable limitations while building an affordable, durable, and community-owned service. This approach positions Jagna to achieve measurable improvements in continuity and control, to protect data integrity as coverage grows, and to share a replicable playbook that neighbouring municipalities can tailor to their context.

VI. Summary

HealthHive offers Jagna a practical route from pilot to durable, community-owned impact: prove reliability on DHIS2 first, reinforce skills through targeted training and mentorship, use dashboards to move from isolated screenings to continuity and cohort outcomes, and keep costs low until customisation clearly adds value. The limitations such as connectivity gaps, device variance, and skill decay are managed by an offline-first posture, simple recovery tooling, tiered training, and continuous evaluation that privileges quick fixes over wholesale rebuilds. Partnerships with professionals and international NGOs are engaged for narrowly scoped technical lifts, while priorities, indicators, and change decisions remain with local governance. As the system stabilises, nurse rotations will bring BP and glucose days closer to upland households, and analytics will mature from counts to cohorts, enabling targeted recalls, smarter pharmacy planning, and earlier risk management. With evidence of reliable capture, routine dashboard use, and improved control, Jagna can share a replicable starter kit and extend the model across neighbouring municipalities, closing the loop between community measurement and better health at scale.

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