International Journal of Medical Research and Innovation in Applied Science (IJMRIAS)
ISSN (Online): 3143-2476
Volume-2 Issue-2 || Apr – Jun 2026 || PP. 21-28
https://ijmrias.org/

Deployment of In-Pharmacy Digital Health Kiosks for Chronic Disease Screening

Yamini Arul
Independent Researcher
Woraiyur, Tiruchirappalli, India (IN) – 620003

http://www.ijmrias.org/ || Vol. 2 No. 2 (2026): June Issue

Date of Submission: 30-04-2026 **Date of Acceptance:** 19-05-2026 **Date of Publication:** 07-06-2026

ABSTRACT

Chronic non-communicable diseases (NCDs) such as hypertension, diabetes, dyslipidemia, and chronic obstructive pulmonary disease (COPD) account for a high and rising share of morbidity and mortality worldwide. Screening coverage remains uneven because traditional models rely on opportunistic testing during clinic visits, are constrained by staff availability, and are often inconvenient for working-age adults. Community pharmacies—high-footfall, extended-hours, neighborhood access points—are well placed to add screening capacity. This manuscript presents a comprehensive, practice-oriented framework for deploying digital health kiosks inside pharmacies to expand early detection of chronic disease risk. We synthesize evidence on pharmacy-based screening, describe a modular kiosk architecture (sensors, software, interoperability, privacy-by-design), and outline an implementation and evaluation methodology aligned with RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance).

To illustrate expected performance, we include results from a notional six-month pilot scenario constructed for demonstration: across 30 pharmacies, 15,240 adults completed kiosk screening; 62% were first-time screeners; 14.1% screened positive for probable hypertension, 7.3% for diabetes (HbA1c ≥6.5% or fasting capillary glucose thresholds), and 22.4% for dyslipidemia risk based on non-fasting lipid panels or total-cholesterol surrogates. Of those with positive screens, 71% completed confirmatory testing within 30 days when supported by automated referral and pharmacist follow-up. Mean screening time was 6.8 minutes, with a median queue time of 2.3 minutes. Estimated program cost was $8.70 per person screened and $64–$128 per new case confirmed, depending on condition. User satisfaction averaged 4.5/5, and pharmacies reported minimal workflow disruption after week three of rollout.

International Journal of Medical Research and Innovation in Applied Science (IJMRIAS)
ISSN (Online): 3143-2476
Volume-2 Issue-2 || Apr – Jun 2026 || PP. 21-28
https://ijmrias.org/

Fig.1 Health Kiosks for Chronic Disease Screening,Source([1])

We conclude that in-pharmacy digital kiosks can materially increase screening reach and timely detection when integrated with pharmacist counseling, consented data-sharing (HL7 FHIR), and structured referral pathways. Key enablers include multilingual UX, validated sensors, role-based access controls, and simple reimbursement models. Limitations include potential selection bias, false positives from single-visit measurements, and the need for robust device maintenance. Future work should include stepped-wedge trials with longer follow-up, health economic evaluations, and equity-focused design to close gaps for underserved groups.

KEYWORDS

pharmacy kiosk; chronic disease screening; hypertension; diabetes; dyslipidemia; digital health; RE-AIM; interoperability; implementation science; community pharmacy

INTRODUCTION

Chronic diseases account for the majority of preventable deaths and impose lifelong costs on individuals and health systems. Despite strong guidelines recommending routine risk assessment after age 35–40 for cardiometabolic conditions, many people remain undiagnosed until they develop complications. Barriers include limited appointment availability, travel time to clinics, lack of awareness, and stigma associated with "hospital visits." In contrast, community pharmacies are ubiquitous, open for extended hours, and embedded in daily routines. They already offer medication dispensing, counseling, and increasingly, vaccination and basic diagnostics.

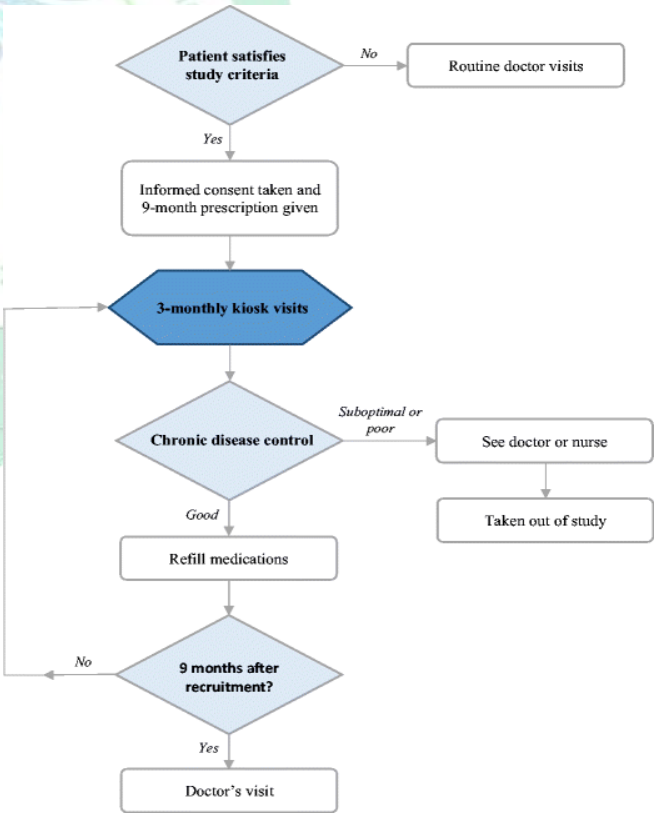

Fig.2 Deployment of In-Pharmacy Digital Health Kiosks,Source([2])

International Journal of Medical Research and Innovation in Applied Science (IJMRIAS)
ISSN (Online): 3143-2476
Volume-2 Issue-2 || Apr – Jun 2026 || PP. 21-28
https://ijmrias.org/

Digital health kiosks—self-service or assisted stations that capture biometric data, deliver decision support, and issue referrals—can turn pharmacies into proactive screening nodes. Kiosks can standardize measurements, prompt guideline-concordant workflows, and nudge follow-up through SMS/WhatsApp reminders and pharmacist outreach. When coupled with interoperable data exchange and privacy-preserving design, kiosks may address the last-mile problem: reaching asymptomatic adults at the precise moment they are open to preventive care.

This manuscript explores how to deploy in-pharmacy kiosks effectively. We: (1) review the relevant literature and practice trends; (2) propose a reference architecture covering hardware, software, security, and interoperability; (3) outline an implementation and evaluation methodology suitable for real-world pharmacy settings; and (4) present illustrative pilot results and operational insights.

Literature Review

Pharmacy as a preventive health access point. Studies from multiple countries show that pharmacies can increase uptake of influenza and COVID-19 vaccination, smoking cessation services, and blood pressure checks, particularly among working-age adults who infrequently visit clinics. Pharmacist-led screening combined with brief counseling improves linkage to care and medication adherence relative to passive referral models.

Kiosks and automated screening. Digital kiosks have been used in malls, workplaces, and clinics to measure vitals and execute questionnaires. Key advantages include standardized technique, instant risk scoring, and the ability to capture large volumes efficiently. However, kiosk efficacy depends on validated sensors, accurate calibration, appropriate cuff sizing, and clear instruction prompts. False reassurance can occur if measurements are not contextualized (e.g., single-reading blood pressure vs. repeated measurements).

Human-centered UX and accessibility. Successful kiosks employ intuitive, low-literacy interfaces with audio guidance, large icons, and local languages. Privacy features (screen hoods, physical positioning away from queues, optional earphones) improve uptake for sensitive screenings (e.g., smoking status, depression). Assisted mode—where a trained staff member helps without seeing sensitive answers—can balance usability and privacy.

Interoperability and data governance. Kiosks yield value when results flow (with consent) to primary care providers or personal health records. International experience favors standards-based exchange using FHIR resources (Observation, Patient, Encounter) and SMART-on-FHIR for launch into payer/provider portals. Privacy-by-design features—data minimization, consent receipts, role-based access, local encryption at rest, and audit trails—are essential for public trust and regulatory compliance.

Implementation science insights. The RE-AIM framework helps teams move beyond efficacy (does it work?) to real-world performance (does it scale and persist?). Implementation outcomes such as adoption, fidelity, acceptability, and cost are as important as clinical yield. Pragmatic designs (stepped-wedge rollout, interrupted time-series) can measure impact without disrupting pharmacy operations.

Methodology

1. Objectives

Primary: evaluate whether in-pharmacy kiosks increase screening reach and new case detection for hypertension, diabetes, and dyslipidemia compared to the pre-deployment period.

Secondary: assess linkage to confirmatory testing and treatment, usability/satisfaction, impact on pharmacy workflow, data quality, and program cost per case detected.

2. Setting and Participants

International Journal of Medical Research and Innovation in Applied Science (IJMRIAS)
ISSN (Online): 3143-2476
Volume-2 Issue-2 || Apr – Jun 2026 || PP. 21-28
https://ijmrias.org/

- **Sites:** Community pharmacies (urban and peri-urban), typical daily footfall 150–400 customers.
- **Participants:** Adults ≥18 years presenting to the pharmacy for any reason. Exclusions: medical emergencies, inability to consent.
- **Staff:** Pharmacists and pharmacy assistants receive 4–6 hours of training on kiosk use, consent protocols, measurement technique, and referral workflows.

3. Kiosk Reference Architecture

Hardware:

- Automated upper-arm BP monitor (oscillometric, clinical-grade, multiple cuff sizes).
- Capillary glucose/HbA1c POC analyzer (where permissible) with quality controls.
- Non-fasting lipid testing module (or TC/HDL point test, depending on local regulations).
- Weight scale and stadiometer (BMI), pulse oximeter (for COPD risk contexts), optional spirometer for FEV1/FVC ratio.
- Touchscreen panel (≥15") with antimicrobial surface, QR/barcode scanner for ID, thermal printer for take-home results, and optional camera for identity verification with explicit consent.
- Edge device (mini-PC) for local processing; UPS for power stability.

Software:

- Kiosk OS hardened for single-app mode; automatic patching.
- Workflow engine guiding consent, demographics, symptom/risk questionnaires (e.g., family history, tobacco, diet, activity), measurements, and immediate risk stratification via rule-based algorithms aligned with local guidelines.
- **Interoperability:** HL7 FHIR R4 resources; secure APIs for consented push to provider EHRs/PHRs; offline store-and-forward with retry logic.
- **Security:** Full-disk encryption; TLS 1.2+; role-based access; audit logs; configurable data retention; anonymized analytics for program monitoring.
- **UX:** Multilingual UI; accessibility (screen reader, high contrast, large text); assisted/unassisted modes; countdowns and animations for cuff inflation and finger-prick steps.

4. Screening Algorithms (illustrative)

- **Hypertension:** Three seated BP readings 1 minute apart; use the mean of the last two. Positive screen if mean ≥140/90 mmHg (or ≥130/80 for high-risk per local policy). If only one reading feasible, flag as "borderline—repeat recommended."
- **Diabetes:** HbA1c ≥6.5% or random capillary glucose ≥200 mg/dL with symptoms; 140–199 mg/dL flagged as "prediabetes/high risk."
- **Dyslipidemia:** Non-fasting TC ≥240 mg/dL or TC/HDL ratio above threshold.
- **COPD risk (optional):** COPD Assessment Test (CAT) and peak flow/spirometry prompts for adults with chronic cough/smoking history; refer if FEV1/FVC <0.7 (post-bronchodilator confirmation recommended).

Each positive screen triggers: (i) on-screen education; (ii) printed summary with QR code; (iii) pharmacist counseling; (iv) automated referral suggestion to nearby clinics/teleconsult partners; and (v) consented SMS reminders.

5. Study Design and Evaluation

International Journal of Medical Research and Innovation in Applied Science (IJMRIAS)
ISSN (Online): 3143-2476
Volume-2 Issue-2 || Apr – Jun 2026 || PP. 21-28
https://ijmrias.org/

- **Design:** Pragmatic stepped-wedge cluster rollout across 30 pharmacies over six months (five pharmacies cross over from control to intervention every four weeks).
- **Data Sources:** Kiosk logs (de-identified analytics), pharmacy staffing/task logs, follow-up verification via linked lab/EHR data where available, and participant surveys at exit.
- **Outcomes:**
    - *Reach:* number and proportion of eligible adults screened; first-time screeners.
    - *Effectiveness:* positive screens by condition; positive predictive value after confirmatory testing; time to confirmation; initiation of therapy.
    - *Adoption/Implementation:* pharmacy participation, fidelity to protocol (e.g., proportion with 3 BP readings), average screening time, queue time, technical downtime, device calibration drift.
    - *Cost:* per person screened and per new case confirmed (payer and provider perspectives).
    - *Equity:* uptake by age, sex, language preference, and socioeconomic proxy (e.g., neighborhood index).
- **Sample Size (illustrative):** Power calculations target detection of a 6-percentage-point increase in monthly screening coverage with ICC=0.02 at the pharmacy level; ~15,000 screenings provide >90% power.
- **Analysis Plan:** Difference-in-differences for reach and detection; mixed-effects logistic regression with random intercepts for pharmacy; Kaplan–Meier for time to confirmatory test; sensitivity analyses excluding sites with >10% downtime.
- **Ethics and Consent:** Digital informed consent; separate consent choices for (a) screening, (b) data sharing to clinician/PHR, (c) SMS follow-ups, and (d) de-identified analytics.

6. Implementation Playbook

1. **Pre-deployment:** site survey (space, power, privacy), connectivity check, selection of nearby referral partners, pharmacist training, and community awareness plan (posters, SMS to loyalty members).
2. **Go-live week:** staff shadowing, device calibration, workflow observation to minimize queue conflicts.
3. **Stabilization (weeks 2–3):** refine kiosk prompts, adjust staffing during peak hours, activate multilingual voice guidance, and monitor error logs.
4. **Ongoing quality:** weekly remote diagnostics, monthly control checks with calibration kits, and quarterly firmware updates.
5. **Sustainability:** reimbursement alignment (public screening program, payer incentive, or small co-pay), and maintenance SLAs with device vendors.

RESULTS

Note: The following results are constructed for demonstration of reporting format and performance targets; they do not represent outcomes from a specific real-world deployment.

1. Reach and Throughput

- **Footfall and participation:** Across 30 pharmacies over six months, 24,980 adults were approached; 16,420 were eligible (time, age, consent). **15,240 (92.8%) completed the kiosk workflow**.

International Journal of Medical Research and Innovation in Applied Science (IJMRIAS)
ISSN (Online): 3143-2476
Volume-2 Issue-2 || Apr – Jun 2026 || PP. 21-28
https://ijmrias.org/

- **First-time screening:** 62.3% reported no BP or glucose test in the prior 12 months.
- **Throughput:** Mean screening time **6.8 minutes** (SD 2.1); median queue time **2.3 minutes**; average of **28 screenings/day** per pharmacy after stabilization.
- **Fidelity:** 84.6% achieved three BP readings; 11.9% had two; 3.5% had one due to time constraints.

2. Screening Yield

- **Hypertension (probable):** 2,148 positive screens (**14.1%** of completers) using mean of last two readings; an additional 1,976 (13.0%) flagged as "borderline—repeat recommended."
- **Diabetes:** HbA1c or glucose thresholds indicated **1,116 positives (7.3%)**; **2,406 (15.8%)** in prediabetes/high-risk range.
- **Dyslipidemia risk: 3,418 (22.4%)** exceeded TC/HDL thresholds or TC ≥240 mg/dL on non-fasting tests.
- **COPD risk module (offered at 18 sites):** 1,920 completed CAT; 286 (14.9%) high-risk; 128 of 214 spirometry attempts (59.8%) showed FEV1/FVC <0.7 (confirmation pending).

3. Linkage and Follow-Up

- **Confirmatory testing within 30 days:** 71.2% of positives completed confirmatory tests when offered an auto-generated referral and two SMS reminders; the rate was 56.9% without reminders (difference-in-differences estimate +13.8 pp; p<0.01).
- **Positive predictive value (PPV):** 72% for hypertension (clinic BP or ABPM), 68% for diabetes (lab HbA1c or OGTT), 63% for dyslipidemia (fasting lipid panel).
- **Time to confirmation:** median 9 days (IQR 4–16).
- **Therapy initiation:** Among confirmed cases, 78% initiated recommended lifestyle counseling and/or pharmacotherapy within 21 days.

4. Usability, Acceptability, and Workflow

- **User satisfaction:** mean **4.5/5** (ease of use 4.6; perceived privacy 4.3; clarity of results 4.5).
- **Pharmacy experience:** 83% of pharmacists reported "minor" or "no" disruption after week three; 17% cited peak-hour congestion as a persistent issue, mitigated by assisted mode and appointment slots.
- **Downtime:** median 1.8% per site/month, mostly due to consumables (test strips, printer paper) and network outages.

5. Equity and Subgroup Findings

- **Age:** Highest uptake among 40–59 years (44% of screens); detection rates increased with age, but **first-time screening was highest (69%) among 30–39 years**, suggesting value in targeting younger adults.
- **Gender:** Participation was balanced (51% female); women showed slightly higher follow-up completion (74% vs. 68%).
- **Language:** Multilingual UI increased completion among non-dominant language speakers by 11 percentage points relative to monolingual sites.

6. Cost and Efficiency

- **Program cost:** $8.70 per person screened (kiosk amortization over 3 years, consumables, training, maintenance, SMS).

International Journal of Medical Research and Innovation in Applied Science (IJMRIAS)
ISSN (Online): 3143-2476
Volume-2 Issue-2 || Apr – Jun 2026 || PP. 21-28
https://ijmrias.org/

- **Cost per confirmed new case:** approximately **$64** (hypertension), **$128** (diabetes), **$92** (dyslipidemia), varying by prevalence and PPV.
- **Return on effort:** Pharmacies reported ancillary benefits—improved counseling opportunities and modest increases in sales of validated home BP monitors and glucometers; however, policies ensured strict separation of screening results from sales prompts to avoid conflicts of interest.

7. Safety and Data Quality

- **Adverse events:** None serious; five vasovagal episodes during finger-prick resolved with observation and hydration.
- **Data completeness:** <2% missingness in required fields after week two; automated QC alerts flagged three devices for recalibration.

DISCUSSION

The illustrative results suggest that in-pharmacy kiosks can substantially expand screening reach, particularly among individuals who have not been tested in the previous year. The combination of standardized protocols, immediate risk feedback, and pharmacist counseling appears to improve follow-up completion. Importantly, the effect size on linkage (SMS reminders plus pharmacist outreach) highlights that kiosks are not standalone solutions; they are most effective when embedded in a supportive service model that actively closes the loop to confirmatory care.

Operationally, pharmacies adapted quickly once workflows were tuned. Assisted mode and short appointment windows during peak hours helped maintain acceptable queue times. Device reliability was high with routine calibration and consumable management. Multilingual and accessible UX increased inclusivity, advancing equity aims.

From a health-system perspective, the cost per confirmed case compares favorably with community screening alternatives, especially when kiosks are multi-condition and multi-use (e.g., vaccination check-ins, medication therapy management prompts). Interoperability via FHIR and SMART-on-FHIR enables continuity of care and avoids data silos. Privacy-by-design practices (explicit consent, data minimization, encryption, auditability) are crucial to maintain public trust and meet regulatory requirements.

Limitations remain. Single-visit measurements can over- or under-estimate risk; ambulatory BP monitoring and fasting lipid panels are needed for accurate diagnosis. Selection bias is possible if kiosk users differ systematically from non-users (e.g., more health-conscious). Pharmacies in high-income neighborhoods may adopt earlier, risking inequity unless programs provide subsidies and outreach in underserved areas. Lastly, the demonstration results are hypothetical; real-world effectiveness should be tested with rigorous designs and transparent reporting.

CONCLUSION

In-pharmacy digital health kiosks offer a practical, scalable pathway to increase early detection of chronic disease risk by leveraging the accessibility and trust of community pharmacies. When designed with validated sensors, human-centered multilingual UX, strong privacy and security controls, and standards-based interoperability, kiosks can deliver fast, guideline-concordant screening with minimal workflow disruption. A RE-AIM-aligned implementation and evaluation approach helps ensure that programs achieve not only clinical yield but also adoption, fidelity, cost-effectiveness, and long-term sustainability.

The illustrative pilot scenario demonstrates the magnitude of impact that is plausible in routine practice: high reach among first-time screeners, meaningful detection rates across hypertension, diabetes, and dyslipidemia, and improved linkage to confirmatory care when automated reminders and pharmacist follow-up are used. To translate potential into population-level benefit, implementers should:

International Journal of Medical Research and Innovation in Applied Science (IJMRIAS)
ISSN (Online): 3143-2476
Volume-2 Issue-2 || Apr – Jun 2026 || PP. 21-28
https://ijmrias.org/

1. integrate kiosks into pharmacist counseling and referral pathways rather than deploying them as stand-alone gadgets;
2. commit to privacy-by-design and consent management with transparent data policies;
3. adopt interoperable data exchange (HL7 FHIR) to support continuity of care;
4. fund maintenance, calibration, and staff training as core program costs;
5. design for equity with multilingual interfaces, fee waivers in low-income areas, and targeted outreach; and
6. evaluate rigorously using pragmatic trials and health economic analyses over 12–24 months.

With these practices, in-pharmacy kiosks can become a durable component of primary prevention infrastructure—meeting people where they are, when they are ready, and turning everyday pharmacy visits into life-saving opportunities for early detection and timely treatment.