

What Do Existing Reviews Establish About Pharmacy-Delivered Vaccination and Preventive Screening? An Umbrella Review of Effectiveness, Equity Reporting, and Healthcare Integration

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Abstract

To synthesize review-level evidence on pharmacy-delivered vaccination and preventive screening while distinguishing effectiveness, equity reporting, healthcare integration and continuity, methodological quality, and dependence created by overlapping primary studies. Umbrella review of systematic reviews and structured evidence syntheses concerning pharmacist- or community-pharmacy-delivered vaccination and preventive screening. Reporting followed PRISMA 2020 and overview-of-reviews principles where applicable. Searches conducted on 14 September 2026 used targeted PubMed-indexed searches supplemented by citation-chain and targeted reference searching. Sixty-three records were identified. Twelve duplicates were removed, leaving 51 unique records for title/abstract screening. Thirty-one were excluded. Twenty reports were retrieved and assessed in full text; six were excluded, leaving 14 included review-level evidence units. Seven principally addressed vaccination and seven preventive screening. Vaccination showed the clearest review-level effectiveness signal, particularly for uptake and coverage. Preventive-screening reviews supported feasibility, acceptability, case identification and referral initiation across mental-health, cancer and cardiovascular domains, but downstream clinical management, completed referral and continuity were less consistently established. Equity was more often represented through population targeting or demographic description than through stratified evidence demonstrating differential reach or reduction of disparities. Similar conclusions across reviews were interpreted cautiously because methodological quality varied and later reviews often covered overlapping intervention eras and populations. Existing reviews support an expanded preventive role for community pharmacy, with the strongest evidence for vaccination uptake. Evidence for equitable reach, completed downstream referral and sustained healthcare integration remains less mature and should not be inferred from initial service effectiveness.

Keywords: Community pharmacy, Vaccination, Preventive screening, Umbrella review, Health equity, Healthcare integration

Introduction

Community pharmacies increasingly contribute to preventive care because they combine broad population

access, repeated patient contact and an established healthcare role with expanding authority to provide vaccination, screening and referral services. Earlier umbrella-level evidence indicated that pharmacist-delivered preventive services could influence clinical, utilization and economic outcomes, although effects varied substantially across services and endpoints [1]. The subsequent growth of vaccination and screening research makes it necessary to determine what the accumulated review literature now establishes and, equally importantly, what it does not.

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Vaccination is the most mature preventive-service domain. Recent systematic review and meta-analysis shows that pharmacist intervention can increase vaccination coverage [2]. Evidence focused on vulnerable and underserved populations also reports favorable uptake associated with pharmacy-based interventions [3]. These findings support pharmacy participation in immunization programmes but do not establish a uniform effect across vaccines, populations, jurisdictions or models of pharmacist involvement. Nor does targeting a vulnerable population automatically demonstrate that inequalities in vaccination have been reduced.

Preventive screening poses a different evidentiary problem. Pharmacist-led mental-health screening reviews demonstrate that pharmacies can identify unmet need and initiate referral, while evidence becomes less complete for subsequent treatment and longer-term outcomes [4]. Community-pharmacy involvement in early cancer diagnosis likewise spans awareness, screening support, recognition of potential warning signs and referral [5]. In these literatures, the initial pharmacy action is generally better documented than what happens after the patient leaves the pharmacy.

Equity requires separate examination. A mixed-methods systematic review of cardiovascular-disease prevention among minority ethnic groups found that community pharmacies can offer accessible and trusted preventive contact while remaining subject to cultural, organizational and structural barriers [6]. Methodological research shows that systematic reviews operationalize health equity inconsistently, from simple demographic description to assessment of differential intervention effects [7]. Review-level analyses of public-health interventions likewise demonstrate incomplete incorporation of equity considerations [8]. Population targeting, representation and evidence of equitable effects therefore cannot be treated as interchangeable.

Healthcare integration is similarly distinct from service effectiveness. Relational continuity in community pharmacy remains comparatively underdeveloped in the review literature [9]. International work on community-pharmacy quality also shows that quality extends beyond technical completion of a single service encounter [10]. For screening in particular, the relevant pathway may include identification, referral acceptance, transfer of information, entry into diagnostic or therapeutic care and subsequent follow-up.

This umbrella review therefore asks what existing reviews establish about pharmacy-delivered vaccination and preventive screening across three substantive dimensions: effectiveness, equity reporting and healthcare integration. Methodological quality and primary-study overlap are examined because multiple reviews reaching similar conclusions cannot automatically be regarded as independent replication.

Materials and Methods

The study was conducted as an umbrella review of systematic reviews and related structured evidence syntheses. PRISMA 2020 informed reporting of identification, screening, eligibility and inclusion [11]. The PRIOR statement informed overview-specific considerations, particularly transparent characterization of included reviews and attention to overlap among their underlying primary studies [12].

Methodological appraisal was informed by AMSTAR 2, which is designed for systematic reviews containing randomized or non-randomized healthcare-intervention studies [13]. Pharmacy-specific meta-research indicates that appraisal judgments can change materially according to interpretation of critical AMSTAR 2 domains [14]. Broader meta-research likewise demonstrates that stating adherence to AMSTAR 2 does not guarantee strong review methods [15]. Methodological limitations were therefore used to condition interpretation rather than converted into an uncritical numerical hierarchy.

The 39-reference manuscript bibliography was analytically separate from the umbrella-review inclusion set. Journal quartile was not used as an eligibility criterion for review evidence. Sources concerning review methodology, equity measurement, continuity, implementation or broader community-pharmacy practice could support interpretation without being counted as included review-level vaccination or screening evidence.

Eligibility of reviews

Eligible evidence units were review-level syntheses published from 2017 through 14 September 2026 that systematically identified and synthesized primary evidence on vaccination or preventive screening delivered, promoted, supported or coordinated by pharmacists or community pharmacies.

Vaccination reviews were eligible when they examined pharmacist administration, recommendation, advocacy

or another identifiable vaccination role and reported uptake, coverage, access or closely related preventive outcomes. Screening reviews were eligible when they examined pharmacy-based screening, risk identification, early detection or case finding and reported participation, acceptability, detection, referral, follow-up or related outcomes.

The principal setting of interest was community pharmacy. Reviews spanning multiple pharmacy or healthcare settings were eligible only when relevant pharmacy-delivered preventive evidence could be distinguished. Primary studies were not treated as umbrella-review evidence units.

Scoping reviews, protocols, narrative reviews without systematic eligibility methods, broad pharmacy-service reviews without separable vaccination or screening findings, prior umbrella reviews or reviews of reviews, treatment-only pharmacist interventions and reviews of professional knowledge without an eligible delivered preventive-service component were excluded from the core evidence set. Relevant excluded reviews could still provide contextual or methodological support.

Information sources/search

Searches were executed on 14 September 2026 using targeted PubMed-indexed search routes supplemented by citation-chain and targeted reference searching. Four linked concept families were used: pharmacy vaccination; pharmacy preventive screening or case finding; equity and vulnerable-population preventive services; and referral, healthcare integration or continuity.

Vaccination searches combined variants of *community pharmacy*, *community pharmacist* and *pharmacist* with *vaccination*, *immunization* or *immunisation* and review-design terminology. Screening searches combined pharmacy terms with *screening*, *case finding*, *early diagnosis*, *cancer screening*, *mental health screening*, *depression screening* and *preventive services*. Additional searches targeted vulnerable or underserved populations, minority populations, health inequalities, referral, follow-up and healthcare integration.

Nineteen targeted PubMed-indexed query executions yielded 61 record instances. Supplementary citation-chain and targeted searching added two records, producing 63 records before deduplication. Records were reconciled using DOI, PMID, title, authorship and publication metadata. Twelve duplicate retrievals arising

from overlapping search routes were removed, leaving 51 unique records for screening.

Review selection

All 51 unique records underwent title/abstract screening against the predefined eligibility criteria. Thirty-one records were excluded at this stage because they fell outside the eligible review design or publication window, concerned unrelated pharmacy services, represented protocols or corrections, evaluated treatment without an eligible preventive-screening component, or otherwise failed to address the review question.

Twenty reports remained and were sought for full-text assessment. All 20 were retrieved. Six were excluded after full-text assessment: two were prior umbrella reviews or reviews of reviews rather than direct syntheses of eligible primary evidence; two were broad pharmacy or preventive-service reviews without sufficiently separable vaccination or screening outcomes; one addressed continuity without vaccination- or screening-specific evidence; and one examined pharmacist cancer knowledge or awareness without an eligible delivered screening outcome.

Fourteen reviews therefore constituted the final umbrella evidence base: seven principally addressing vaccination and seven principally addressing preventive screening.

Data extraction

Data were extracted at review level using a structured evidence matrix. Fields included publication year, review design, geographic scope where reported, pharmacy setting, population, number and type of included primary studies where available, preventive service, comparator where applicable, outcome definitions, follow-up characteristics, main conclusions, direction or magnitude of reported effects, methodological limitations, contradictory or null findings, equity dimensions and referral or integration characteristics.

Outcome classes were kept separate. Vaccination uptake or coverage was not combined with screening participation, detection, referral, completed follow-up or clinical outcome. Likewise, referral offered and referral completed were treated as different events.

Missing characteristics were retained as not reported rather than inferred. Methodological and contextual sources were extracted separately from the 14 included evidence reviews so that review-methods papers did not become additional umbrella evidence units.

Methodological quality appraisal

AMSTAR 2 domains provided the appraisal structure. Particular attention was directed to protocol specification, comprehensiveness of searching, description of excluded studies, risk-of-bias assessment, appropriateness of meta-analytic methods, incorporation of risk of bias into interpretation and assessment of publication bias where relevant.

No review was excluded solely because of methodological limitations. Instead, weaknesses affected the confidence assigned to its conclusions. Across the evidence base, the most important interpretive constraints were heterogeneity of included primary studies, variable incorporation of observational evidence, limited downstream follow-up in screening reviews and incomplete separation of intervention components in multicomponent pharmacy services.

The appraisal therefore functioned as a qualification of review-level evidence rather than a numerical ranking system.

Primary-study overlap assessment

Overlap was considered because successive pharmacy reviews frequently cover similar service periods, populations and intervention roles. A review-by-primary-study matrix is the preferred basis for formal overlap assessment, but its construction is sensitive to assumptions about duplicate reports and study identity [16]. Weighted corrected covered area has been proposed as one way to refine interpretation of informational overlap [17]. Pairwise analysis is also important because a modest overall overlap measure can conceal strong dependence between particular review pairs [18]. Reproducible computation can be supported by dedicated overlap-analysis tools [19]. Meta-research has demonstrated meaningful disagreement between overall and pairwise overlap interpretations [20]. Overlap may also differ according to whether reviews reuse the same studies for different questions or outcomes [21].

Complete primary-study citation lists were not available in an equivalent form for every included review. Accordingly, no unsupported CCA statistic was generated. Dependence was instead considered when reviews substantially overlapped in population, intervention era and service scope, and review agreement was not treated as equivalent to wholly independent replication.

Coding of effectiveness outcomes

Effectiveness coding was based on the event directly measured. Vaccination reviews were coded primarily for vaccination uptake or coverage and, where reported, vaccine type, population and pharmacist role. Screening reviews were coded separately for acceptability or participation, risk or case identification, referral initiation, completed follow-up and subsequent clinical outcomes.

This distinction prevented upstream process outcomes from being converted into downstream clinical effects. A screening service could increase case identification while evidence of completed referral or clinical improvement remained absent.

Equity-reporting framework

Equity reporting was classified across four analytically distinct forms: demographic description; explicit targeting of a vulnerable or underserved population; stratified analysis across population groups; and evidence of differential or equitable reach or effect.

These categories were not treated as progressive stages that every review should contain. They instead identify different evidentiary claims. A review could focus on an underserved population without testing whether the intervention changed disparities, and demographic reporting alone could not establish equitable reach.

Healthcare-integration framework

Integration was coded using distinct downstream events: referral initiated, referral accepted, information transferred to another healthcare provider, entry into subsequent care, follow-up completed and continuity established.

The framework therefore distinguished accessibility from integration. Pharmacy delivery could improve access to vaccination or screening while remaining weakly connected to subsequent healthcare. Evidence of repeated pharmacy contact was also not treated automatically as relational continuity.

Synthesis

Because the 14 included reviews differed in preventive service, population, intervention role, primary-study design and outcome definition, no second-order pooled effect estimate was calculated. Contemporary umbrella-review methods show substantial variation in how higher-level evidence is analysed and displayed,

reinforcing the need to align synthesis with the structure of the underlying review evidence [22].

The synthesis therefore compared review-level conclusions while maintaining five separate dimensions: vaccination effectiveness; preventive-screening outcomes; equity reporting; referral, integration and continuity; and confidence conditioned by methodological quality and likely primary-study dependence.

Positive, null and context-dependent findings were retained. A favorable vaccination meta-analysis was interpreted as evidence about uptake under its own service and population conditions, whereas acceptability or case identification in screening reviews was not upgraded into evidence of downstream clinical effectiveness.

Results and Discussion

The searches identified 63 records: 61 from targeted PubMed-indexed searches and two from supplementary

citation-chain or targeted reference searching. Twelve duplicate records were removed, leaving 51 unique records for title/abstract screening.

Thirty-one records were excluded during initial screening. Twenty reports were sought for retrieval, all 20 were retrieved, and all underwent full-text assessment. Six reports were excluded: two prior umbrella/review-of-reviews publications, two broad pharmacy or preventive-service reviews without sufficiently separable eligible outcomes, one continuity review without vaccination- or screening-specific evidence, and one pharmacist knowledge/awareness review without an eligible delivered screening outcome.

Fourteen reviews were included: seven vaccination reviews and seven preventive-screening reviews. The selection arithmetic reconciled as 63 identified minus 12 duplicates equals 51 screened; 51 minus 31 initial exclusions equals 20 full-text reports; and 20 minus six full-text exclusions equals 14 included reviews.

The complete selection pathway is shown in **Figure 1**.

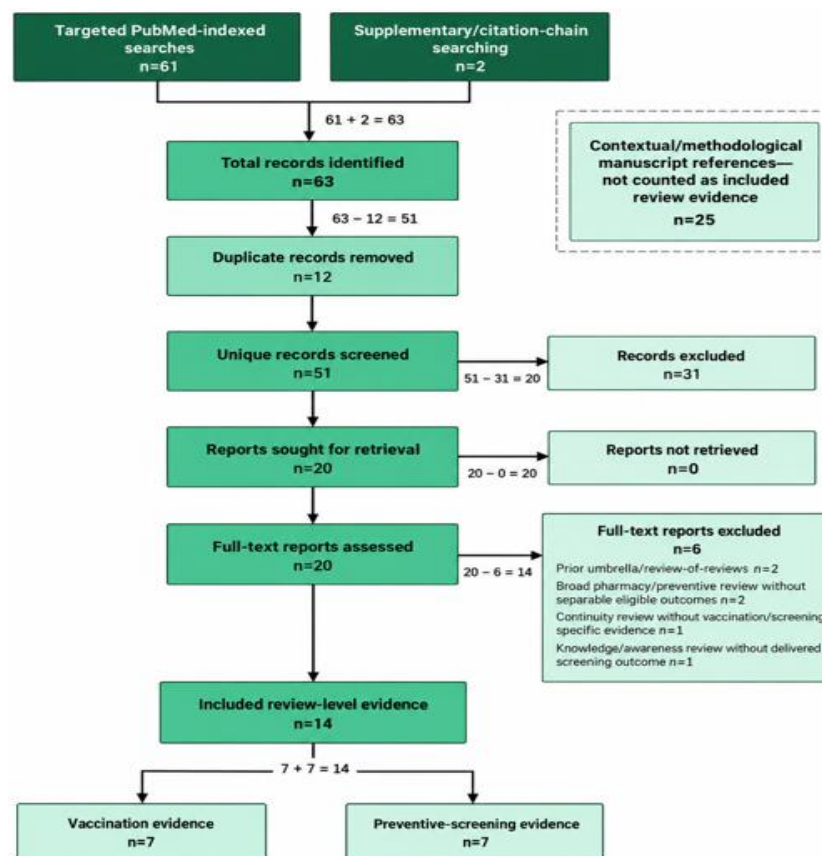


Figure 1. PRISMA-compatible selection flow for the umbrella review

Review characteristics

The 14 included reviews divided evenly between vaccination and preventive screening. Vaccination reviews ranged from broad pharmacist-intervention syntheses to reviews focused on older adults, children, vulnerable populations and particular healthcare contexts. Screening reviews covered mental health, depression, early cancer diagnosis, colorectal-cancer

screening, cardiovascular prevention and depression screening among people with diabetes.

Vaccination reviews generally evaluated uptake or coverage. Screening reviews more often evaluated process outcomes including participation, acceptability, detection and referral. This difference limited direct comparison across the two evidence families.

Table 1 characterizes the included review base.

Table 1. Included review-level evidence on pharmacy-delivered vaccination and preventive screening

Included review	Evidence family	Population/service focus	Main outcome contribution
Elghanam & Kim, 2025	Vaccination	Pharmacist vaccination intervention	Vaccination coverage
Borlini <i>et al.</i> , 2026	Vaccination	Vulnerable/underserved populations	Uptake and equity-relevant targeting
Amare <i>et al.</i> , 2025	Vaccination	Adults aged ≥ 60 years	Uptake across recommended vaccines
Amare <i>et al.</i> , 2026	Vaccination	Children	Pediatric vaccine uptake
Le <i>et al.</i> , 2022	Vaccination	Pharmacist immunization roles	Vaccine uptake
Abd Rahim <i>et al.</i> , 2023	Vaccination	Pharmacist vaccination interventions	Immunization uptake
Perman <i>et al.</i> , 2018	Vaccination	UK community-pharmacy programmes	Uptake, access and acceptability
Ou <i>et al.</i> , 2024	Screening	Mental-health screening	Identification, referral and follow-up
El-Den <i>et al.</i> , 2022	Screening	Community-pharmacy screening	Stakeholder acceptability
Miller <i>et al.</i> , 2020	Screening	Depression screening	Detection, referral and follow-up
Konya <i>et al.</i> , 2026	Screening	Early cancer diagnosis	Detection and referral functions
Abi Saad <i>et al.</i> , 2026	Screening	Colorectal-cancer screening	Participation and pharmacist contribution
Al-Hawamdeh <i>et al.</i> , 2026	Screening	Depression screening in diabetes	Screening and management linkage
Duley <i>et al.</i> , 2026	Screening	CVD prevention in minority ethnic groups	Screening, access and equity barriers

Methodological quality

Methodological quality varied across the included reviews. Meta-analytic vaccination reviews provided stronger quantitative synthesis than process-oriented screening reviews, but interpretation was often constrained by heterogeneity in intervention roles, populations and underlying study designs.

The presence of pooled estimates did not eliminate these concerns. Reviews combining randomized and

observational evidence could produce precise summary estimates while retaining substantial design heterogeneity. Screening reviews were often limited by sparse downstream follow-up even where initial screening feasibility was well documented.

Methodological confidence was therefore interpreted together with evidence dependence rather than as a standalone label. **Table 2** shows the main review-level confidence considerations.

Table 2. Methodological quality and evidence-dependence considerations across review families

Review family	Main methodological consideration	Overlap/dependence concern	Umbrella-level interpretation
Broad vaccination reviews	Mixed intervention roles and designs	Reuse of established immunization studies likely	Direction more transferable than a single pooled magnitude
Vulnerable-population vaccination	Population-specific relevance	Partial reuse of broader vaccine evidence Shared	Adds equity relevance, not necessarily independent replication
Older-adult vaccination	Focused population	influenza/pneumococcal/COVID-era studies possible	Interpret as subgroup-focused evidence

Pediatric vaccination	Small, geographically concentrated evidence	Dependence on limited study pool	Geographic transferability restricted
Mental-health/depression screening	Process outcomes dominate	Related reviews may share depression-screening studies	Detection evidence stronger than clinical-outcome evidence
Cancer-screening reviews	Predominantly observational service evidence	Colorectal studies may recur in broader cancer reviews	Participation/detection distinct from downstream outcomes
CVD prevention/equity	Mixed quantitative and qualitative evidence	Lower direct overlap with vaccine reviews	Primarily informs access, equity and implementation

Overlap

Successive vaccination reviews often examined similar intervention eras and pharmacist roles, making some primary-study reuse highly plausible. Similar dependence was possible between broad mental-health screening and depression-specific reviews and between general early-cancer-diagnosis and colorectal-cancer reviews.

Because formal CCA requires complete and consistently identifiable primary-study matrices, no numerical overlap statistic was manufactured from incomplete citation information. Apparent review agreement was therefore interpreted as convergence at review level while preserving the possibility that part of that convergence arose from reuse of primary evidence.

Vaccination evidence

Recent vaccination syntheses generally support pharmacist involvement in increasing vaccine uptake. Among older adults, pharmacist-led interventions have been associated with increased uptake across several recommended vaccines [23]. Pediatric evidence also indicates a positive pharmacist contribution, although the available review base is smaller and geographically concentrated [24].

The updated systematic review by Le and colleagues found that pharmacist involvement generally favored immunization uptake across randomized and observational evidence [25]. Abd Rahim and colleagues likewise reported a favorable pooled effect, but extremely high heterogeneity limits interpretation of one transferable magnitude [26].

An earlier UK review provides a useful counterpoint. Perman and colleagues reported convenience and acceptability advantages but substantially weaker evidence that community-pharmacy programmes consistently increased routine immunization uptake [27]. Differences between this finding and later reviews may reflect changes in pharmacist authority, vaccination infrastructure, programme maturity and the underlying primary-study base.

Vaccination encounters may additionally provide opportunities for broader prevention. Recent review work has considered cardiovascular screening within pharmacy vaccination services, although this evidence principally supports service-integration opportunities rather than established downstream effectiveness [28].

These distinctions are summarized in **Table 3**.

Table 3. Vaccination evidence across effectiveness, population context, equity and integration

Evidence domain	Review-level pattern	Population context	Equity/integration signal	Principal boundary
Broad pharmacist vaccination	Generally favorable uptake	Mixed populations	Equity usually secondary	Intervention and design heterogeneity
Vulnerable/underserved populations	Favorable uptake	Explicitly vulnerable populations	Strong targeting signal	Targeting ≠ demonstrated disparity reduction
Adults ≥60 years	Favorable uptake	Older adults	Age-specific access relevance	Vaccine heterogeneity
Pediatric vaccination	Positive contribution	Children	Limited equity analysis	Small/geographically concentrated base
Updated immunization evidence	Generally favorable	Mixed populations	Variable	Randomized and observational evidence coexist

Earlier UK programmes	Less convincing uptake effect	UK pharmacy users	Convenience/access emphasized	Older service context
Vaccination plus screening	Preventive co-delivery feasible	Vaccination attendees	Integration opportunity	Downstream outcomes not established

Preventive-screening evidence

Screening evidence most consistently supports community pharmacy as an accessible site for engagement, identification and referral initiation. Stakeholder-focused synthesis indicates that pharmacist-led screening is generally acceptable, although privacy, time, workflow and remuneration can constrain delivery [29].

Depression screening illustrates the distinction between detection and completed care. Pharmacists can identify adults who screen positive and initiate referral, but follow-up is much less consistently documented [30].

Screening effectiveness therefore weakens when the endpoint shifts from identification to demonstrated clinical management.

Cancer-related evidence shows a similar pattern. Community pharmacists can support colorectal-cancer screening participation and related preventive activities [31]. Pharmacist involvement in depression screening among patients with diabetes also demonstrates the importance of coordination with subsequent management rather than treating screening as an isolated event [32].

Table 4 separates initial screening functions from downstream healthcare linkage.

Table 4. Preventive-screening evidence from initial engagement to downstream care

Screening domain	Initial pharmacy function	Most consistent evidence	Downstream evidence	Main interpretive boundary
Mental health	Risk/symptom identification	Feasibility and detection	Referral/follow-up variable	Detection ≠ improved health outcome
General screening	Preventive assessment	Acceptability/participation	Service-dependent	Acceptability is a process outcome
Depression	Case finding	Screening and referral	Follow-up comparatively sparse	Referral initiation ≠ completed care
Early cancer diagnosis	Awareness/detection/referral	Potential detection role	Heterogeneous pathway evidence	Early activity ≠ diagnostic resolution
Colorectal cancer	Screening facilitation	Participation	Follow-through variable	Predominantly observational evidence
Depression in diabetes	Screening plus management	Identification/selected management	Coordination important	Multicomponent effects difficult to isolate
CVD prevention	Risk assessment/prevention	Access and barriers/facilitators	System dependent	Strong contextual dependence

Effectiveness

The review-level effectiveness signal was strongest for vaccination. Multiple reviews converged on increased uptake associated with pharmacist involvement, although the magnitude varied by intervention, population, vaccine and study design.

Screening reviews supported a different conclusion. Community pharmacies can successfully conduct or facilitate screening, increase opportunities for participation, identify risk and initiate referrals. Evidence was weaker for completed diagnostic evaluation, sustained treatment and longer-term health outcomes. Effectiveness should therefore be specified by stage of

the preventive pathway rather than treated as a single property of pharmacy-based screening.

Equity reporting

Equity was represented more often through population targeting than through direct demonstration of differential effect. Reviews focusing on vulnerable populations establish that pharmacy services can be directed toward groups experiencing access barriers, but such targeting does not establish that disparities were reduced.

Vaccine-promotion strategies aimed at vulnerable populations further demonstrate the potential to design community-pharmacy services around access needs [33].

However, service intention, demographic representation, stratified analysis and reduction of inequity remain different evidentiary claims.

The same distinction applies to screening. Community pharmacy accessibility may create opportunities to reach people poorly served by conventional preventive services, but accessibility alone does not establish equal usability, participation, follow-up or clinical benefit.

Referral/integration/continuity

Evidence supporting healthcare integration was less developed than evidence supporting initial pharmacy service delivery. Screening reviews commonly described referral, but evidence on referral acceptance, successful

information transfer, attendance in subsequent care, diagnostic resolution and longitudinal follow-up was less consistent.

This distinction matters because a technically successful screening encounter can still fail to produce clinical benefit if downstream services are unavailable or disconnected. Review evidence from community retail pharmacies in lower- and middle-income settings similarly demonstrates the potential to widen access to non-communicable-disease services while emphasizing dependence on broader health-system conditions [34].

The cross-service evidence landscape is synthesized in **Figure 2**.

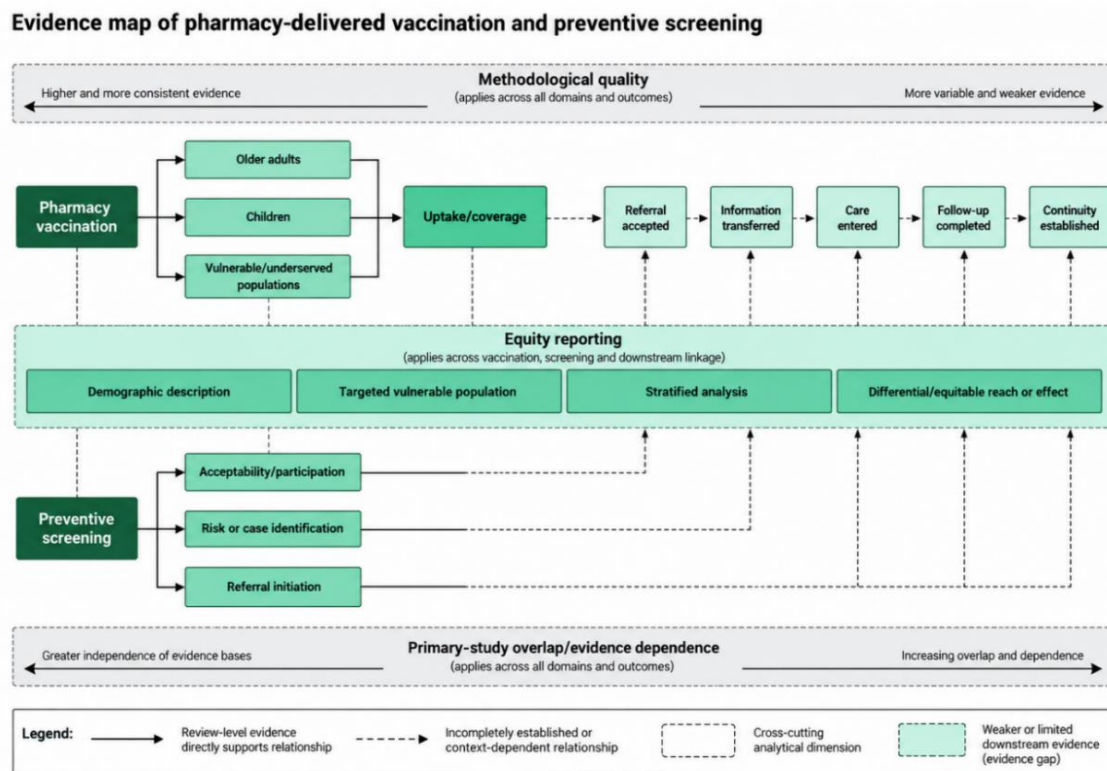


Figure 2. Evidence landscape linking pharmacy vaccination and preventive screening with effectiveness, equity, integration and continuity

This umbrella review identified 14 review-level evidence units and demonstrates that the strength of the pharmacy-prevention evidence depends heavily on the outcome being claimed. Vaccination is supported by the most consistent review-level evidence, with multiple contemporary syntheses reporting improved uptake associated with pharmacist involvement. Screening evidence is also substantial, but its most secure

conclusions concern accessibility, acceptability, participation, case identification and referral initiation rather than completed downstream clinical pathways.

Broader overviews of community-pharmacy care similarly show that pharmacy interventions span heterogeneous clinical and service outcomes [35]. Reviews of other preventive functions, including continence promotion, reinforce the capacity of

community pharmacy to participate in public-health activity while revealing variation in implementation and outcome measurement [36]. Heterogeneity has also been documented in pharmacist-led medication-review research, demonstrating that intervention labels can conceal important differences in delivery [37].

The vaccination evidence is therefore best characterized as directionally consistent but context dependent. More recent reviews generally support increased uptake, yet older evidence from the UK was less conclusive. These differences may reflect historical scope-of-practice restrictions, vaccine availability, reimbursement, programme design or greater public familiarity with pharmacist vaccination.

For preventive screening, the dominant challenge is the transition from access to completion. Screening provides value only partly through the act of identifying risk. Its ultimate contribution depends on whether patients receive appropriate subsequent assessment and treatment. Review-level evidence currently documents the earlier parts of this pathway more consistently than the later ones.

The equity synthesis adds another qualification. Community pharmacies may be geographically and operationally accessible to populations experiencing barriers to conventional care, but opportunity for access is not synonymous with equitable use or outcome. Reviews more commonly identify vulnerable groups or describe demographic characteristics than directly test whether pharmacy delivery narrows disparities.

The evidence also demonstrates why review counts cannot be interpreted as independent votes. Later vaccination and screening reviews may partially reuse earlier primary studies while reframing questions around different populations or services. Agreement across reviews consequently strengthens confidence only when interpreted together with methodological quality and evidence dependence.

Strengths and limitations

This umbrella review has three principal strengths. First, it separates the 14 included evidence reviews from the wider 39-reference manuscript bibliography, preventing contextual and methodological sources from being mistaken for included review units. Second, the selection arithmetic is explicitly reconciled from 63 identified records to 14 included reviews. Third, effectiveness, equity reporting, healthcare integration, methodological quality and evidence dependence are analysed separately.

Limitations arise from the underlying evidence and the overview process. Included reviews differ in population, health system, pharmacist authority, intervention design and outcome definition. Several vaccination syntheses include observational as well as randomized evidence. Screening reviews frequently emphasize process outcomes and provide less complete downstream follow-up. Formal quantitative overlap could not be estimated without constructing a complete review-by-primary-study matrix across all included reviews, so evidence dependence is interpreted cautiously rather than assigned an unsupported CCA value.

These limitations mean that the umbrella review supports comparative evidence statements more strongly than precise cross-review quantitative ranking.

Implications

Preventive pharmacy research should increasingly evaluate what happens after the initial service encounter. Vaccination studies should determine when pharmacist involvement adds genuinely new coverage, which groups benefit and whether increased access reduces disparities rather than redistributing vaccination between providers. Screening studies should report referral acceptance, transfer of results, entry into subsequent care, diagnostic resolution and follow-up. Broader health-promotion evidence, including pharmacist involvement in physical-activity promotion, indicates that community pharmacies can support preventive activity beyond vaccination and screening [38]. However, implementation research demonstrates that delivery of public-health interventions depends on professional, organizational, resource and system conditions [39].

Future systematic reviews should therefore specify both the preventive outcome and its position in the care pathway. Equity analyses should distinguish population representation, targeted access, stratified uptake and actual reduction of disparities. Reviews should also report primary-study overlap more routinely as the density of pharmacy evidence syntheses increases.

Conclusion

Fourteen included reviews—seven principally addressing vaccination and seven preventive screening—support an expanded preventive role for community pharmacy. The strongest and most consistent evidence concerns vaccination uptake. Preventive-screening reviews support community pharmacy as an accessible

setting for engagement, participation, case identification and referral initiation, but downstream clinical management, completed referral and continuity are less consistently established.

Evidence of equity is also less mature than evidence of service effectiveness. Targeting vulnerable populations or improving opportunities for access does not demonstrate that disparities have been reduced. Similarly, successful vaccination or screening delivery does not by itself establish healthcare integration.

The most defensible conclusion is therefore conditional: community pharmacies can expand preventive-service capacity, particularly for vaccination, while equitable reach and durable integration with downstream healthcare remain important evidence gaps.

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