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Review article

Use of implementation science theories, models and frameworks in professional pharmacy services: a scoping review

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ABSTRACT

Background: Professional pharmacy services (PPS) such as medication therapy management or medication review improve patient outcomes and contribute to appropriate medicines use, yet their adoption into routine practice requires the systematic approaches of implementation research, particularly where medicines financing is constrained.
Objectives: To identify and characterize the use of implementation science theories, models and frameworks (TMF) in PPS.
Methods: Scoping review following PRISMA-ScR and JBI guidance. EMBASE, PubMed and LILACS were searched (January 2016–December 2025), with citation searching. Studies in English or Spanish applying at least one TMF to PPS implementation were included. Data were synthesized descriptively.
Results: 219 reports were included; 48.9% published in 2023–2025. Europe and Northern America accounted for 76.3%, while low- and middle-income countries contributed 6.8%. Medication management and medication review were the most studied services (46.6%); qualitative and mixed-methods designs predominated (81.3%). Consolidated Framework for Implementation Research, alone or combined, led framework use (35.6%). Determinants were reported in 93.6% of reports, implementation strategies in 45.7% and implementation outcomes in 56.6%; 29.2% reported all three.
Conclusions: Implementation TMF are established in pharmacy research, with output rising from 41 reports in 2016–2019 to 107 in 2023–2025, and their use concentrates on diagnosis, with determinants reported far more often than strategies or outcomes. Priorities are to extend pharmacy implementation research to low- and middle-income health systems, which contribute 6.8% of current evidence; to report strategies and outcomes alongside determinants; and to extend pharmacy-specific frameworks beyond the most studied services.

1. Introduction

Professional pharmacy services (PPS) are services provided in the pharmacy context to patients or populations to optimize the process of care and health outcomes. In the conceptual definition of Moullin et al., they are actions undertaken in or organized by a pharmacy and delivered by a pharmacist or other health practitioner to a patient, a population or other health professionals, to optimize the process of care, with the aim of improving health outcomes and the value of healthcare.[1] Comprehensive medication management, medication review, adherence support, immunization and deprescribing are among the services that have expanded beyond dispensing.[2] An umbrella review of meta-analyses of randomized trials found that pharmacist interventions improve blood pressure, lipid and glucose control and medication adherence, and reduce all-cause mortality in chronic heart failure,[3] and an overview of systematic reviews reports improvements in clinical and behavioral outcomes across community pharmacy services.[4] PPS also contribute to the quality use of medicines, a core objective of essential

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medicines policies for universal health coverage.[5]

The development of these services differs across regions. Australia, Canada, England, the Netherlands, Scotland and the United States have developed strategies to expand the role of community pharmacists in chronic disease management, whereas progress elsewhere has been more limited.[6] In low- and middle-income countries, community pharmacists provide health education, medication review, screening and referral, although they are often not officially recognized as primary health care providers, and unfavorable policies, lack of time and limited collaboration hinder these services.[7]

Sustaining these services and introducing new ones are questions for implementation research, which studies how evidence moves into sustained practice.[8] Implementation in pharmacy is shaped by stakeholder diversity, contextual heterogeneity and interacting determinants at individual, organizational and system levels.[9,10] Implementation research addresses this complexity in real-world settings, identifying what works, for whom and under what circumstances,[11,12] and develops and tests the strategies that support adoption.[12] Theories, models and frameworks (TMF) are central to this work and serve complementary purposes[13]: (1) determinant frameworks describe the barriers and facilitators that influence implementation; (2) process models guide the stages through which implementation unfolds; and (3) evaluation frameworks define implementation outcomes and how to measure them. Dozens of TMF are available; among the most frequently applied are the Consolidated Framework for Implementation Research (CFIR)[14,15]; the Theoretical Domains Framework (TDF), Behavior Change Wheel (BCW) and COM-B model[16–18]; the Framework for the Implementation of Services in Pharmacy (FISpH),[2] with a model for evaluating pharmacy implementation programs[19]; and Proctor's taxonomy of implementation outcomes.[20]

Previous reviews have covered parts of this field. Moullin et al. reviewed implementation frameworks in healthcare and derived a generic framework[21]; Brandt et al. mapped the implementation of medication review in community pharmacy[22]; Seda et al. compared implementation strategies for community pharmacy services[23]; and Paolinelli et al. reviewed the implementation of clinical pharmacy services in primary care.[24] None has mapped TMF use across the full range of PPS types and country income groups, including the evidence from low- and middle-income countries, where constrained medicines financing makes the implementation of PPS more consequential.[5]

Without a map of how TMF have been used across service types and health systems, researchers and decision-makers lack a basis for choosing frameworks, for identifying which aspects of implementation have been studied, and for directing implementation research to the health systems where these services are being introduced. Scoping reviews suit this purpose because they map the extent, range and nature of evidence and identify gaps without requiring the homogeneity of a systematic review with meta-analysis.[25] This scoping review therefore aims to identify and characterize the use of implementation TMF in PPS, examining which services are studied, which frameworks are used, how they are applied, and what gaps remain.

2. Methods

A scoping review was conducted following the methodological framework proposed by Levac et al.[26] and the JBI Manual for Evidence Synthesis[25] and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (Supplementary Material 1, PRISMA-ScR checklist).[27]

The protocol for this scoping review was registered in the International Prospective Register of Systematic Reviews (PROSPERO) under registration number CRD420251065437.

This scoping review involved secondary analysis of previously published, publicly available data. No primary data from human participants were collected. Therefore, formal ethical approval was not required.

Two questions, framed with the Population, Concept and Context (PCC) structure (Table 1), guided the review: which TMF have been applied in studies on professional pharmacy services in any healthcare setting, and how they have been used to characterize implementation determinants, strategies and outcomes.

2.1. Search strategy

EMBASE (Elsevier) and PubMed (NLM), the two largest biomedical databases, which index the main pharmacy practice and implementation science journals, were searched together with the Virtual Health Library (VHL/LILACS, bvsalud.org), included to cover Latin American literature not indexed in the other two. The strategy was structured around three conceptual blocks connected by AND: (1) implementation science and frameworks; (2) pharmacist and pharmacy practice; and (3) specific professional pharmacy services (Box 1). Within the first block, generic implementation terms acted as the operative filter. They were combined with Boolean OR with the names of five TMF (CFIR; Reach, Effectiveness, Adoption, Implementation, Maintenance [RE-AIM]; Diffusion of Innovations; TDF; and Normalization Process Theory [NPT]), so that frequently used frameworks would not be missed in studies that do not use implementation science vocabulary. The first four were the frameworks most frequently used by implementation scientists in an international survey,[28] and all five are among the most cited in the field.[29] A sensitivity analysis in PubMed compared the strategy with and without these names (Supplementary Material 1, Table S1.2). Studies using frameworks absent from the strategy, including Exploration, Preparation, Implementation, Sustainment (EPIS), the Implementation Research Logic Model (IRLM), COM-B, BCW, the Active Implementation Frameworks, FISpH and others, were retrieved and included. The complete search strategies as executed for all three databases are provided in Supplementary Material 1.

The definitive search was run on May 12, 2026, in all databases, covering January 2016 to December 2025. The ten-year window starts after the publication of Nilsen's taxonomy in 2015,[13] used to classify the frameworks, and ends in December 2025 so that the temporal analysis covers complete calendar years. The electronic search was complemented by backward citation searching. During full-text review of the included studies retrieved from the databases, the reviewers identified studies whose results were described in the text, not only cited. Each candidate was checked against the studies already identified; new candidates were assessed against the eligibility criteria, first on the abstract and then on the full text, by the reviewer who identified them, and their inclusion was verified by a second reviewer. Reference lists were not screened systematically, and forward citation searching was not

Table 1
Eligibility criteria following the Population, Concept and Context (PCC) framework.

Element	Operational definition	Application during eligibility assessment
Population	Professional pharmacy services: services provided by a health professional in the pharmacy context and directed at patients or populations to optimize the process of care or health outcomes[1]	Reports were excluded when the service studied did not meet this definition (n = 43)
Concept	Application of at least one implementation theory, model or framework (TMF), used in data collection or analysis, to the implementation of the service, with information on implementation determinants, strategies or outcomes	Reports in which no TMF was applied in data collection or analysis were excluded (n = 43)
Context	Any healthcare setting and country	No report was excluded for its setting or country

Box 1
Search terms by conceptual block, combined with AND (PubMed strategy as executed; complete strings for the three databases in Supplementary Material 1).

Block 1. Implementation science and frameworks (title/abstract): implementation science; implementation research; implementation fidelity; implementation outcome(s); knowledge translation; evidence into practice; Consolidated Framework for Implementation Research (CFIR); RE-AIM; Theoretical Domains Framework (TDF); Normalization Process Theory (NPT); diffusion of innovation(s).

Block 2. Pharmacist and pharmacy practice: pharmacists [MeSH]; community pharmacy services [MeSH]; community, hospital or clinical pharmacist(s); pharmacy practice; pharmacist-led; pharmacist intervention(s).

Block 3. Professional pharmacy services: medication review; medication or medicines reconciliation [MeSH]; medication adherence [MeSH]; treatment adherence; medication compliance; pharmacotherapeutic or pharmacotherapy follow-up; follow-up pharmaceutical care; pharmaceutical, pharmacy, dispensing or medication counseling; drug- or medication-related problem(s); negative outcome associated with medication; pharmacotherapy problem; medicines education; pharmaceutical care.

Limits: publication date January 2016 to December 2025. [MeSH] = Medical Subject Headings; the other terms were searched in title or abstract.

performed.

2.2. Study selection

Inclusion: Studies of all designs (qualitative, quantitative, mixed methods, conference abstracts), published in English or Spanish between January 2016 and December 2025, with the full record available (the full text, or the published abstract for conference abstracts), that applied at least one implementation TMF in the context of PPS and reported information on implementation determinants (barriers/facilitators), strategies, and/or outcomes.

Exclusion: protocols; literature reviews, commentaries and editorials; publications in languages other than English or Spanish; studies that did not apply an implementation TMF or were not related to PPS; and reports that could not be retrieved in full text. Reviews and protocols were excluded because the review analyzed reports of primary research applying a TMF; including them would have double-counted studies already captured through the primary literature.

Records were imported and treated for deduplication and screening. Two reviewers independently screened titles and abstracts and subsequently assessed full texts against eligibility criteria. Disagreements were resolved by consensus. The selection process is summarized in the PRISMA-ScR flow diagram (Fig. 1).

2.3. Data extraction and synthesis

Data were extracted using a standardized, pilot-tested form covering: author(s), year, country, study design, PPS type, implementation TMF(s) used, implementation components reported (determinants, strategies, outcomes), and key findings. Data were extracted by two reviewers, each verifying the other's extraction; discrepancies were resolved by discussion. Three implementation domains were coded for each report. Determinants were factors reported as barriers or facilitators of implementation, as defined by the constructs of the framework applied. Implementation strategies were actions classified in the Expert Recommendations for Implementing Change (ERIC) compilation[30] and directed at the delivery system, that is, the clinicians and organizations that provide the service. Following Smith et al.,[31] the clinical components of the service and the adjunctive interventions directed at patients to support their uptake of and adherence to the service were not coded as strategies, nor were the research procedures of each study. Strategies used or recommended in a report were coded. Implementation outcomes were those defined by Proctor et al.[20] and the implementation dimensions of RE-AIM (reach, adoption, implementation, maintenance); clinical, patient and service outcomes were not coded as implementation outcomes.

The unit of analysis was the report, and each report was assigned to one TMF category. Reports applying more than one TMF were assigned to the framework whose purpose came first in Nilsen's sequence (understanding, describing and evaluating implementation),[13] and, between frameworks with the same purpose, to the one that structured data collection or analysis. Three categories grouped frequent combinations: CFIR with other TMF (n = 11), COM-B or the Behavior Change Wheel, alone or with TDF (n = 8), and FISpH with RE-AIM (n = 4). Two reviewers classified each framework independently according to Nilsen's taxonomy,[13] and disagreements were resolved by consensus. Frameworks listed by Nilsen were assigned to the category he proposes when their application in the included reports matched it; otherwise, and for frameworks not listed by Nilsen, the category followed the purpose for which the framework was applied, using Nilsen's definitions. Supplementary Material 2 gives the coding criteria (Table S2.1), the coding framework (Table S2.2) and every TMF applied in each report (Table S2.3).

Data were analyzed using descriptive synthesis with absolute and relative frequencies, organized by pharmacy service type (inductive from data), TMF used, study methodology, geographic origin, and implementation components reported. Services were grouped from the names and descriptions reported. Services named medication review, whose definition has wider consensus, formed one category. Comprehensive medication management, medication therapy management and medication review with follow-up were grouped because they aim at the optimization of pharmacotherapy and share the same way of collecting information, assessing, deciding and intervening, with continuity of care. Each report was assigned to the country where the study was conducted, and multinational studies to the country of the corresponding author's institution. Countries were classified by income group using the World Bank classification for fiscal year 2026, in force at the time of the search,[32] and grouped into regions following the United Nations M49 standard.[33] Cross-tabulation of service types and TMF was performed.

3. Results

The search retrieved 439 records; after deduplication, 334 were screened and 251 reports were assessed in full text, of which 165 were included (Fig. 1). Citation searching identified 54 additional reports, all of which met the eligibility criteria on full-text assessment, for a total of 219 included reports. Candidates that did not meet the criteria at abstract level were not recorded. The 219 included reports correspond to 217 studies; two studies were reported both as a conference abstract and as a full article. Of the 219 reports, 166 were full articles, 52 conference abstracts and one a preprint. In the sensitivity analysis, removing the

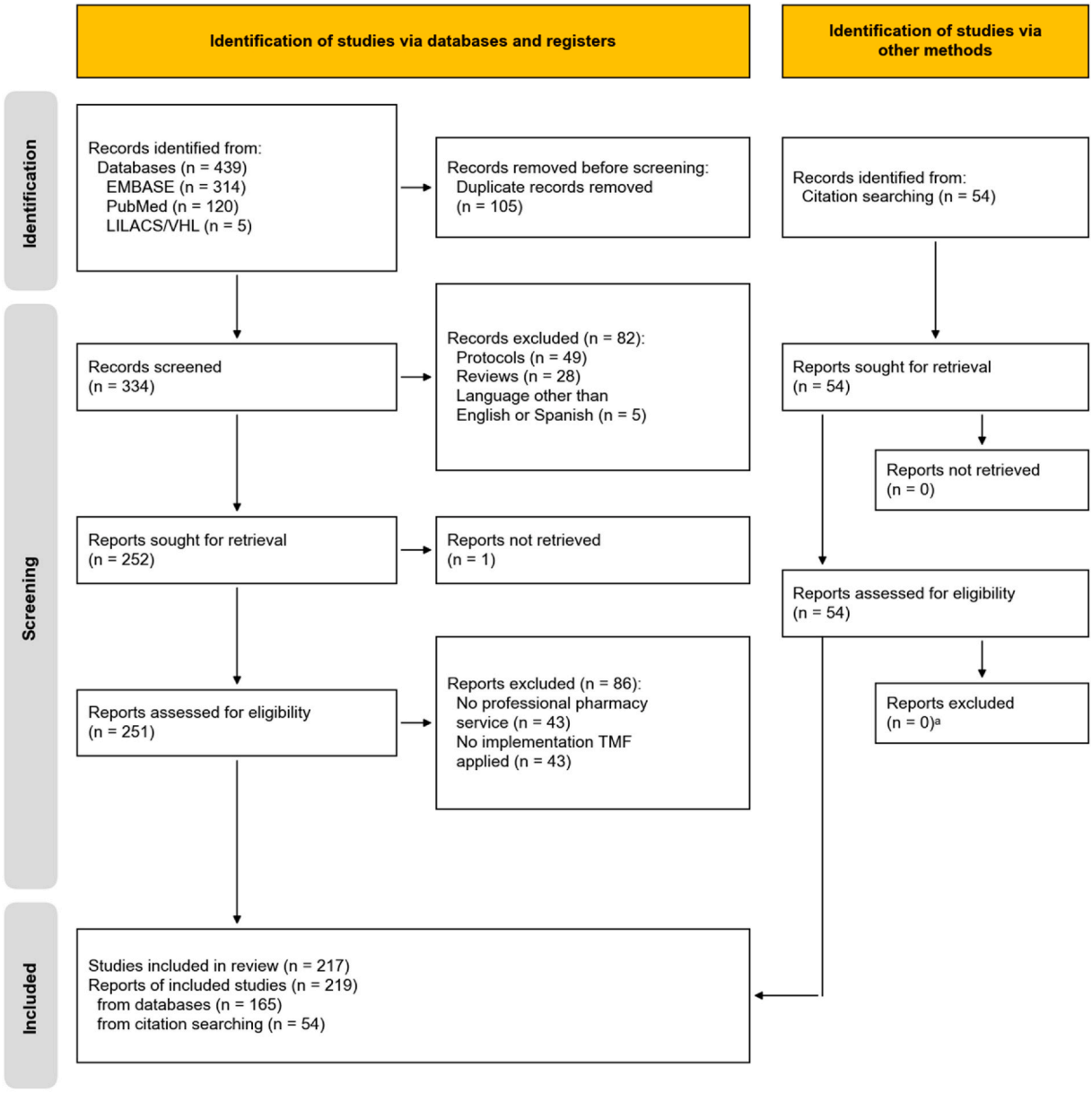

Fig. 1. PRISMA-ScR flow diagram of the selection of sources of evidence, drawn with the PRISMA 2020 template. *TMF = implementation theories, models or frameworks.*

framework names reduced the PubMed records from 119 to 76 and missed 28 of the 74 included reports retrieved by PubMed: 18 of 19 applying TDF, 7 of 8 applying NPT, 2 of 7 applying RE-AIM and 1 of 25 applying CFIR (Supplementary Material 1, Table S1.2).

3.1. Temporal and geographic mapping of included reports

The 219 included reports spanned from 2016 to 2025. Forty-one reports (18.7%) were published in 2016–2019, 71 (32.4%) in 2020–2022, and 107 (48.9%) in 2023–2025 (Supplementary Material 2, Figure S2.1).

Twenty-nine countries were represented. Reports came from Europe (n = 91), Northern America (n = 76), Oceania (n = 24), Western Asia (n = 17), Latin America and the Caribbean (n = 5), South-eastern and Southern Asia (n = 5) and sub-Saharan Africa (n = 1); Europe and Northern America together accounted for 76.3% (167/219). The four countries with the most reports, the United States (n = 66), the United Kingdom (n = 29), the Netherlands (n = 23) and Australia (n = 23), accounted for 64.4%. By income group, 204 reports (93.2%) came from high-income countries, 12 (5.5%) from upper-middle-income countries, 2 (0.9%) from lower-middle-income countries and 1 (0.5%) from a low-income country (Fig. 2; Supplementary Material 2, Table S2.4).

3.2. Characteristics of included reports

Comprehensive Medication Management/Medication Therapy Management (CMM/MTM) and related medication management services constituted the most frequently studied service type (n = 54, 24.7%). Medication review services (n = 48, 21.9%) were the second most represented category; together, these two groups accounted for nearly half of all included reports (46.6%). Medication reconciliation and transitions-of-care services followed (n = 28, 12.8%), while

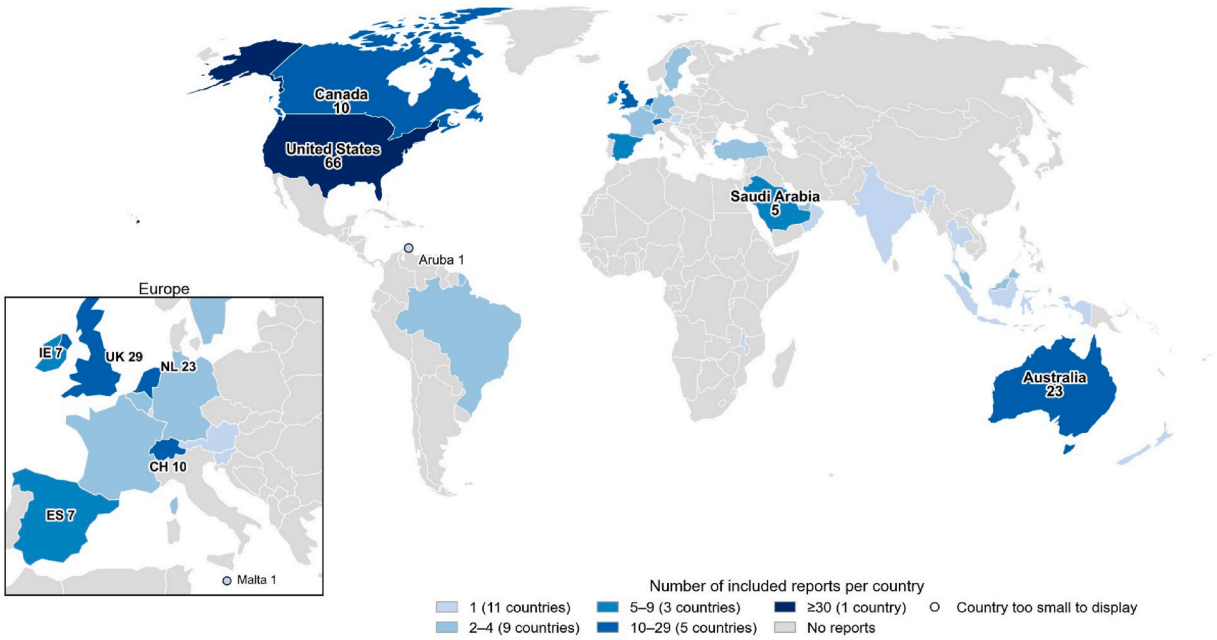

Fig. 2. Geographic distribution of included reports (n = 219), by number of reports per country; multinational studies are assigned to the country of the corresponding author's institution. Countries in gray contributed no reports; circles mark countries too small to display. Inset: detail of Europe.

population-level services such as screening, antimicrobial stewardship, and vaccination were less represented (combined n = 17, 7.8%).

The methodological profile was qualitative: 44.7% of reports used exclusively qualitative designs (n = 98) and 36.5% employed mixed methods (n = 80), together comprising 81.3% of all included reports. Quantitative designs were in the minority, with only three randomized controlled trials (1.4%). The growth of the field over the review period concentrated on qualitative designs, which rose from 41.5% of reports in 2016–2019 to 50.5% in 2023–2025, while mixed-methods designs fell from 46.3% to 32.7% (Supplementary Material 2, Table S2.3).

CFIR was the most used framework (n = 67, 30.6%), with an additional 11 reports combining CFIR with other frameworks, yielding a total CFIR presence across 78 reports (35.6%). This was followed by TDF alone (n = 38, 17.4%), RE-AIM (n = 18, 8.2%) and NPT (n = 13, 5.9%). The pharmacy-specific framework (FISpH) appeared as the sole framework in 6 reports and in combination with RE-AIM in 4 additional reports.

Table 2 summarizes the included reports by PPS type, study design and TMF, and Supplementary Material 2 (Table S2.3) details each report.

3.3. TMF use and completeness of implementation analysis

The majority of included reports (93.6%, n = 205) reported implementation determinants (barriers and facilitators). Implementation strategies were reported in 45.7% (n = 100) and implementation outcomes in 56.6% (n = 124); 64 reports (29.2%) reported determinants, strategies and outcomes together, and another 64 (29.2%) reported determinants alone.

CFIR was concentrated in CMM/MTM (n = 18), medication review (n = 11) and medication reconciliation (n = 11); it was also the most used framework in minor ailment service/pharmacist prescribing (n = 8). TDF, alone or combined with COM-B, totaled 46 applications and was most frequent in medication review (n = 13) and MUR/adherence support (n = 8). NPT, as implementation theory, concentrated in medication review (n = 5) and MUR/adherence support services.

Table 3 cross-tabulates included reports by pharmacy service type and implementation TMF. Services were arranged along a patient-to-population gradient, and TMF were classified according to Nilsen's purpose-based taxonomy[13]: determinant frameworks (n = 128), implementation theories (n = 13) and classic theories (n = 7), oriented toward understanding implementation; process models (n = 26), toward describing it, most frequently in medication review (n = 10); and evaluation frameworks (n = 45), toward evaluating it, concentrated in CMM/MTM and medication reconciliation.

4. Discussion

This scoping review mapped 219 reports (2016–2025) that applied implementation TMF to PPS. The field is expanding and concentrated in high-income countries, with gaps in the reporting of implementation strategies and outcomes, dominated by qualitative approaches, and led by the CFIR.

The concentration of reports in the United States, the United Kingdom, the Netherlands and Australia marks a geographic inequity. Low- and middle-income countries, where pharmacy workforce capacity and healthcare infrastructure differ, contributed 15 reports (6.8%), and Latin America and the Caribbean, with growing pharmacy practice research communities, contributed 5 (2.3%). Western Asia contributed 17 reports, 12 of them from high-income Gulf states. Since implementation determinants are context-sensitive,[11] findings validated in high-income settings require adaptation before application in low- and middle-income contexts. The evidence on how to embed these services therefore accumulates where they are already established and remains scarce where medicines financing is most constrained.

The increase from 41 reports in 2016–2019 to 107 in 2023–2025 reflects the growing integration of implementation science in pharmacy practice and responds to the need to evaluate the processes and determinants underlying the adoption of professional pharmacy services into routine care, alongside their clinical outcomes, as a step toward sustainability.[34] Three contributions may have shaped this growth: Moullin et al.'s systematic review establishing the need for implementation frameworks in pharmacy (2015),[21] Livet et al.'s primer on implementation science for pharmacists (2018),[35] and Shoemaker et al.'s adaptation of CFIR for community pharmacy (2017).[14]

Table 2
Characteristics of included reports: professional pharmacy service type, study design, and implementation theory, model or framework (TMF) (n = 219).

Variable	n	%
Professional Pharmacy Service (PPS) type		
Comprehensive Medication Management/Medication Therapy Management/Medication review with follow-up	54	24.7
Medication review/Comprehensive medication review	48	21.9
Medication reconciliation/Transitions of care	28	12.8
Medicines Use Review (MUR)/Adherence support	24	11.0
Minor ailment service/Pharmacist prescribing service	13	5.9
Deprescribing	10	4.6
Screening	8	3.7
Patient education	5	2.3
Dispensing	5	2.3
Antimicrobial stewardship program	5	2.3
Vaccination	4	1.8
Others/Various	15	6.8
Study design		
Qualitative	98	44.7
Mixed methods	80	36.5
Quantitative – cross-sectional	17	7.8
Quantitative – longitudinal	16	7.3
Randomized controlled trial	3	1.4
Other designs	5	2.3
Implementation TMF		
CFIR	67	30.6
CFIR + other framework combination	11	5.0
TDF	38	17.4
TDF + COM-B	8	3.7
NPT	13	5.9
Diffusion of Innovations Theory	4	1.8
Active Implementation Frameworks	7	3.2
FISpH	6	2.7
FISpH + RE-AIM	4	1.8
RE-AIM	18	8.2
Implementation Outcomes (Proctor)	15	6.8
Implementation Fidelity Frameworks	10	4.6
Other Theories (n = 3), models (n = 9) and frameworks (n = 6) n ≤ 2 studies each	18	8.2
Total	**219**	**100.0**

Abbreviations: TMF = Theory, Model or Framework; CFIR = Consolidated Framework for Implementation Research; TDF = Theoretical Domains Framework; COM-B = Capability, Opportunity, Motivation–Behavior; NPT = Normalization Process Theory; FISpH = Framework for the Implementation of Services in Pharmacy; RE-AIM = Reach, Effectiveness, Adoption, Implementation, Maintenance. Note: Reports applying more than one TMF are counted once, in the category of their main framework (see Methods). Percentages calculated over total included reports (n = 219).

Qualitative designs account for 44.7% of the corpus, and CMM/MTM and medication review for 46.6% of the services studied. Both patterns suggest that the field has grown by asking what happens to these services in practice, an exploratory phase in which understanding determinants precedes the assessment of implementation outcomes at scale.[21,34] The structural complexity of these services, spanning patient, pharmacist, organizational and health system levels,[9] makes that question a reasonable starting point, and implementation research is being used to decipher that complexity. For these services, with a growing clinical effectiveness evidence base, this pattern is consistent with a shift of attention from whether they work to how they can be sustainably embedded,[34] although our data do not test that shift directly. Two reviews[22,35] reported the same predominance of qualitative approaches across pharmacy practice settings. Advancing beyond this phase calls for a broader evidence base, built with other designs and methods, and for moving from understanding implementation to explaining it and acting on it.

Progress of the field also depends on an unresolved taxonomic problem. PPS lack agreed definitions across health systems, which adds a layer of complexity to implementation research. For the analytical purposes of this review, services were categorized according to their primary orientation, either toward elements of the medication-use process or toward the outcomes resulting from it[1]; a distinction that remains subject to professional debate, given the difficulty of separating the causes embedded in the medication-use process from the clinical outcomes that result from it.[36]

Estimates of how widely TMF are applied in PPS depend on how a review is framed. Paolinelli et al.[24] identified 22 clinical pharmacy implementation studies using a TMF in primary care, indicating sparse adoption. The larger volume retrieved here (n = 219) reflects differences in scope and search strategy. Unlike reviews that screen for implementation studies irrespective of framework use, this review targeted literature in which a TMF was applied and included all professional pharmacy service types and settings. These findings therefore map how TMF are used in pharmacy services implementation research, a different question from how often they are adopted.

CFIR's dominance (n = 78, 35.6%) did not depend on the search terms and is consistent with its position as the framework most frequently used by implementation scientists.[28] Its application has been deployed to map barriers and facilitators,[37] with fewer applications translating that diagnosis into strategy selection.[30,38,39] The proportion of reports with determinants alone differed by framework, 34.6% (27/78) for CFIR and 63.0% (29/46) for TDF alone or with COM-B; these descriptive differences may reflect the research questions for which each framework was chosen. The distance between barrier identification (93.6%), strategy reporting (45.7%) and outcome evaluation (56.6%) is a central finding of this review.

Within Nilsen's taxonomy,[13] determinant frameworks account for most applications (Table 3). These categories reflect the purpose for which each framework was applied in the included reports, and the same framework can serve other purposes: the Active Implementation Frameworks, classified by Nilsen as a determinant framework, were applied in all seven reports to guide the stages of implementation. Process models describe and guide the implementation process across its phases, from exploration and preparation onwards,[13] and their limited presence (n = 26) leaves the decisions taken before and during the introduction of a service largely undocumented. The FISpH/RE-AIM application, closest to what Nilsen classifies as process models, remains concentrated in medication review, and extending these pharmacy-contextualized tools across the full range of professional pharmacy services is one opportunity. A second lies in how frameworks are used. Applying a limited set of established TMF as analytic templates constrains theoretical development and reduces sensitivity to the heterogeneity and temporality of implementation.[40] Treating them as resources open to refinement and extension through empirical engagement would allow the field to build tools suited to pharmacy practice.

The map shows six gaps in the evidence. Reports from low- and middle-income countries are few (6.8%). Research concentrates on determinants (93.6%), and implementation strategies (45.7%) and implementation outcomes (56.6%) are reported less often, with all three domains in 29.2% of reports. Process models, including the pharmacy-specific FISpH, were the main framework in 26 reports. Designs concentrate on qualitative and mixed methods (81.3%), with three randomized trials. The taxonomy of professional pharmacy services differs across health systems.

5. Implications for research and practice

Implementation research on professional pharmacy services in low- and middle-income health systems would generate context-specific evidence where medicines financing is most constrained; where this research is starting, the assessment of determinants with established frameworks offers an entry point. Studies that select implementation strategies for the determinants identified and measure implementation outcomes would provide the evidence the field lacks. Their design should follow the implementation question and the maturity of the service; hybrid effectiveness-implementation designs, which combine

Table 3
Distribution of included reports (n = 219) by Professional Pharmacy Service type and implementation theory, model or framework.

Service level	Professional Pharmacy Service	Understanding implementation							Describing implementation				Evaluating implementation				Total (n)
		Determinant Frameworks (n = 128)					Impl. theories (n = 13)	Classic theories (n = 7)	Process Models (n = 26)				Evaluation Frameworks (n = 45)				
		CFIR	CFIR combined	TDF	TDF + COM-B/ BCW	Other determinant fw.	NPT	Diffusion of Innovations, other	Active Impl. Frameworks	FISpH	FISpH + RE-AIM	Other process models	RE-AIM	Impl. Fidelity Fw.	Impl. Outcomes	Other evaluation fw.	
Individual-focused patient care Population/ community-oriented services	Comprehensive Medication Management/ Medication Therapy Management/ Medication review with follow-up	18	1	7		2	1	3	3	2		2	6	3	6		**54**
	Medication review/ Comprehensive medication review	11	5	10	3		5		1	1	4	4	1	2	1		**48**
	Medication reconciliation/ Transitions of care	11	1	1		2	1	2				1	2	3	4		**28**
	Medicines Use Review (MUR)/ Adherence support	4	3	8			4						2	2		1	**24**
	Minor ailment service/Pharmacist prescribing service	8		3						1					1		**13**
	Dispensing	3		1	1												**5**
	Patient education	1	1				1						2				**5**
	Deprescribing	1		4	2							1	1		1		**10**
	Screening	3						1					2		1	1	**8**
	Vaccination	2							2								**4**
	Antimicrobial stewardship program	1		2	2												**5**
	Others/Various	4		2			1	1	1	2		1	2		1		**15**
	Total (n)	**67**	**11**	**38**	**8**	**4**	**13**	**7**	**7**	**6**	**4**	**9**	**18**	**10**	**15**	**2**	**219**

Note: Values are numbers of reports; empty cells indicate that no report used that framework–service combination. Column groups follow the purposes of Nilsen's taxonomy: understanding, describing and evaluating implementation. The Service level column orders services from individual-focused patient care to population/community-oriented services. Abbreviations: CFIR = Consolidated Framework for Implementation Research; TDF = Theoretical Domains Framework; COM-B = Capability, Opportunity, Motivation–Behavior; BCW = Behavior Change Wheel; NPT = Normalization Process Theory; Diffusion of Innovations, other = Diffusion of Innovations, Theory of Reasoned Action, Theory of Planned Behavior and Efficiency–Thoroughness Trade-Off; FISpH = Framework for the Implementation of Services in Pharmacy; RE-AIM = Reach, Effectiveness, Adoption, Implementation, Maintenance; other process models = EPIS, IRLM and others; Impl. = Implementation; fw. = frameworks.

both aims in different proportions, are one option. Pharmacy-specific tools such as FISpH, used mainly in medication review, could be applied to other services. Explanatory and experimental designs would broaden a methodological base that is mostly exploratory. An agreed international taxonomy of professional pharmacy services would make findings comparable across health systems. For practitioners and health system planners, the selection of a TMF should follow the construct under study, the service type and the implementation stage.

5.1. Limitations

The search was restricted to three databases; pharmacy-specific (International Pharmaceutical Abstracts), nursing and allied health (CINAHL) and multidisciplinary (Scopus, Web of Science) databases were not searched, and studies indexed only in them may have been missed. The restriction to English and Spanish excluded five records (1.5% of those screened), so the observed geographic concentration is unlikely to be an artifact of language; one of these records was published in Japanese, and the restriction may bear more heavily on research from Asia, where findings are also reported in national languages. Residual bias from database indexing may still limit representation of Portuguese-language research from Latin America. The five framework names gave those frameworks an additional route to retrieval. The sensitivity analysis showed that CFIR studies were retrieved through the generic terms, whereas most studies applying TDF or NPT were retrieved only through the names, so frameworks with a similar profile that were not named may be under-represented. In PubMed, pharmacy practice and pharmaceutical care were entered as MeSH terms but are not MeSH headings, and studies indexed under related headings without the free-text terms of the strategy may have been missed. Conference abstracts (n = 52) were included and may contain incomplete information; information they did not report was coded as not reported. Citation searching was limited to studies whose results were described in the text of included studies and did not follow a systematic protocol. This route contributed 54 of the 219 included reports; it may have favored studies that are widely discussed in the literature, and eligible studies cited only in reference lists may have been missed. The setting in which each service was delivered was not extracted, so results were not analyzed by setting.

Classifying frameworks according to Nilsen's taxonomy required judgement where a framework could serve more than one purpose. The focus of each study, whether determinants, strategies or outcomes, was extracted and informs its position within that taxonomy, but the depth with which each framework was applied was not assessed. Consolidating CMM/MTM with Medication Review with Follow-up[1] may mask implementation nuances specific to each service model, including differences in regulatory scope, reimbursement mechanisms and clinical depth. As a scoping review, the quality of individual studies was not formally appraised.

6. Conclusions

Implementation TMF are established in pharmacy research. Their use concentrates on identifying determinants, and the evidence comes mostly from high-income countries, with 6.8% of reports from low- and middle-income countries. Research in low- and middle-income health systems, and studies that select implementation strategies for the determinants identified and measure implementation outcomes, with designs matched to the question and to the maturity of each service, would move the field from diagnosis to action. Pharmacy-specific frameworks, used mainly in medication review, and established frameworks adapted to pharmacy practice could guide the implementation of other services.

Informed consent

Not applicable. No human participants were enrolled, contacted or observed, and no individual data were used, so informed consent could not apply.

Data availability statement

The authors confirm that the data supporting the findings of this study are available within the article and/or its supplementary materials. All data supporting this review are derived from publicly available published sources cited in this manuscript. No primary data were generated.

Author contributions (CRediT)

Jaime Alejandro Hincapíe-García: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Data curation, Writing - original draft, Writing - review & editing, Visualization, Project administration.

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Pedro Amariles: Conceptualization, Methodology, Resources, Supervision, Funding acquisition, Writing - review & editing.

Mónica Patricia Rivera-Cadavid: Methodology, Software, Formal analysis, Investigation, Writing - review & editing.

Andrea Salazar-Ospina: Methodology, Validation, Investigation, Writing - review & editing.

Fernando Fernandez-Llimos: Conceptualization, Methodology, Supervision, Writing - review & editing.

Study type

This work is a scoping review. The unit of analysis is the published study. All data analyzed were extracted from previously published, publicly available scientific literature retrieved from bibliographic databases. The review involves no human participants, no animal subjects, no identifiable personal data and no biological material. No intervention was applied and no primary data were collected or generated.

Ethics approval

Because the study analyses only published aggregate information and involves no human participants, review and approval by an Institutional Review Board or Research Ethics Committee were not required and were not sought. The authors confirm that no ethics committee waiver or exemption certificate exists for this study, since the study falls outside the scope of human subjects research.

Protocol registration and reporting

The review protocol was prospectively registered in the International Prospective Register of Systematic Reviews (PROSPERO) under registration number CRD420251065437. Reporting follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR), as recommended by the EQUATOR Network. The completed PRISMA-ScR checklist is submitted as Supplementary Material 1.

Declaration

The authors confirm the accuracy of this statement and take responsibility for the ethical conduct of the work reported in the manuscript.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this manuscript, the authors used Claude (Anthropic; Sonnet 4.5 and Opus 5 releases) for the following purposes:

(1) language editing and redrafting of specific passages from drafts written by the authors; (2) checking the internal consistency of the reported frequencies, the flow of studies and the reference list against the authors' dataset; and (3) writing the Python code that produced the flow diagram (Fig. 1), reproducing the layout of the PRISMA2020 package, and the map of geographic distribution, from counts and data supplied by the authors. All AI-assisted outputs were reviewed, critically evaluated, and revised by the authors. The study design, the search strategy, study selection, data extraction, data analysis, the conceptual framework classification, the initial drafts, the interpretation of findings and the final intellectual content remain the full responsibility of the authors. Generative AI was not used for the systematic literature search, for study selection, or for data extraction from the included studies.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cegh.2026.102536.

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