

Background

- Opioid overdose remains a major U.S. public health crisis; nearly 55,000 deaths were reported in 2024
- Naloxone is an evidence-based medication that reverses opioid-induced respiratory depression and prevents fatal overdose
- Community pharmacies serve as key access points, supported by multiple legal pathways: statewide standing orders, third-party prescribing, and OTC availability.
- However, access remains limited; an estimated 15.8 million Americans live in pharmacy deserts, largely concentrated in rural areas.
- Even where pharmacies are available, naloxone stocking and dispensing are inconsistent due to pharmacist-, pharmacy-, and patient-level factors.
- Prior systematic reviews have examined pharmacist roles broadly but lack rural-specific synthesis, leaving an important evidence gap given the distinct challenges in these settings.

Objectives

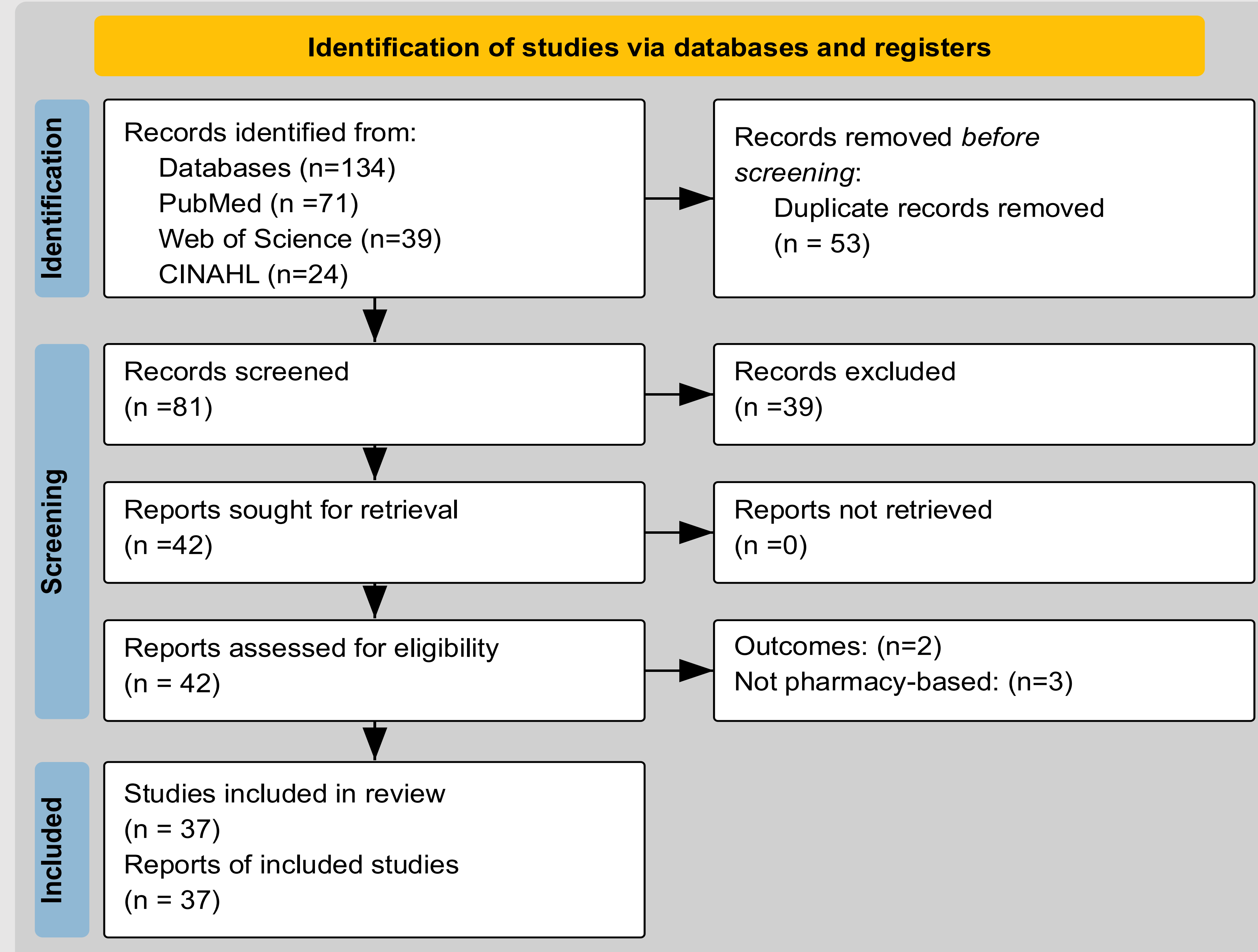
- Synthesize evidence on naloxone stocking, dispensing practices, and multilevel and multilevel factors influencing access in rural U.S. community pharmacies
- Identify implementation strategies and evidence gaps relevant to rural pharmacy-based naloxone services

Methods

- Study Design: Systematic review conducted per PRISMA 2020 guidelines;(PROSPERO: CRD420251133957)
- Data Sources: PubMed, Web of Science, CINAHL; supplemented by Google Scholar and gray literature; searches conducted Sept. 2025 and updated May 2026
- Population: U.S. rural community pharmacies, pharmacists, patients, and community members
- Inclusion: English-language peer-reviewed original research (Jan 2000 to May 2026) reporting pharmacy-level stocking/dispensing, pharmacist knowledge, attitudes, practices, or patient/community-level factors
- Exclusion: Non-U.S. studies, non-community pharmacy settings, studies not addressing naloxone, and non-original research (e.g., editorials, commentaries, reviews)
- Risk of Bias: Assessed using validated design-specific tools (Crombie's, JBI, MINORS, NIH quality assessment); categorized as low ($\geq 70\%$), moderate (50–69%), or high ($\leq 49\%$)
- Screening: Independent dual-reviewer title/abstracts and full-text review

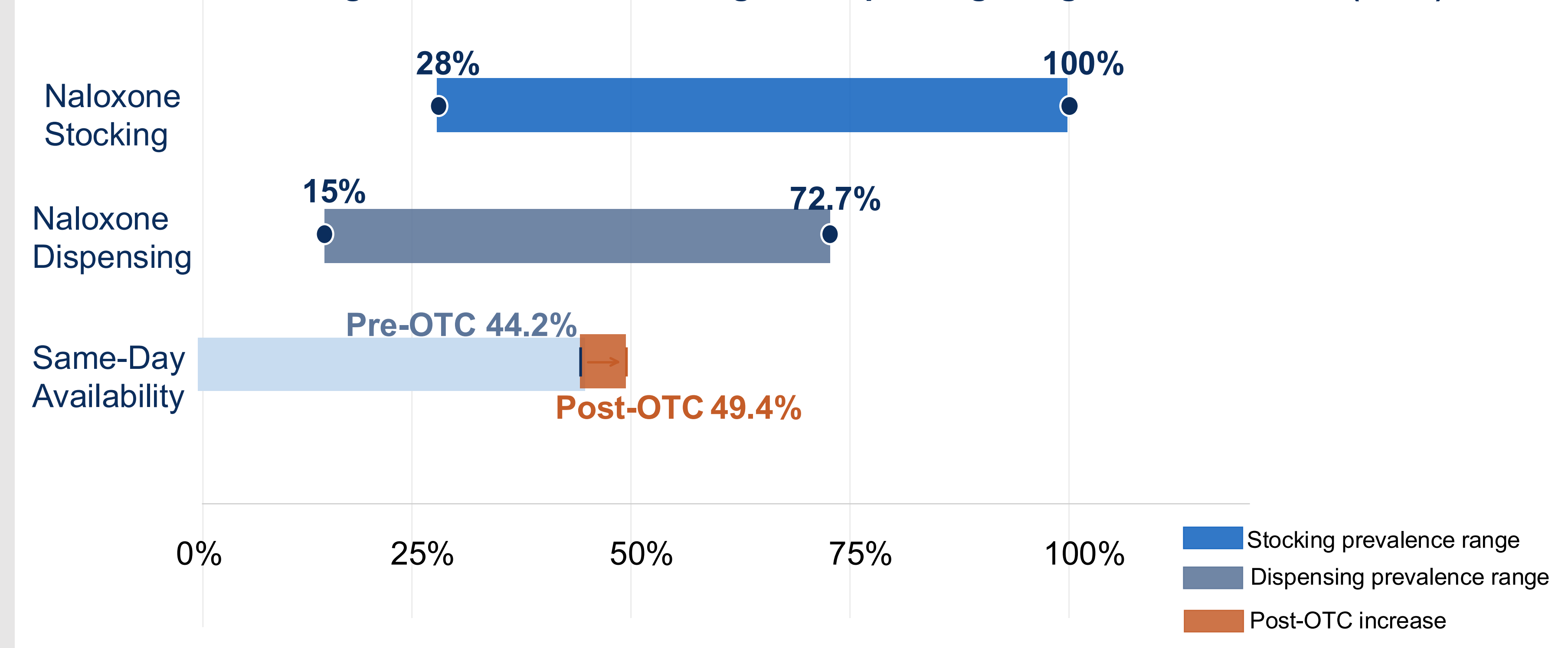
Results

Figure 1: PRISMA Flow Diagram



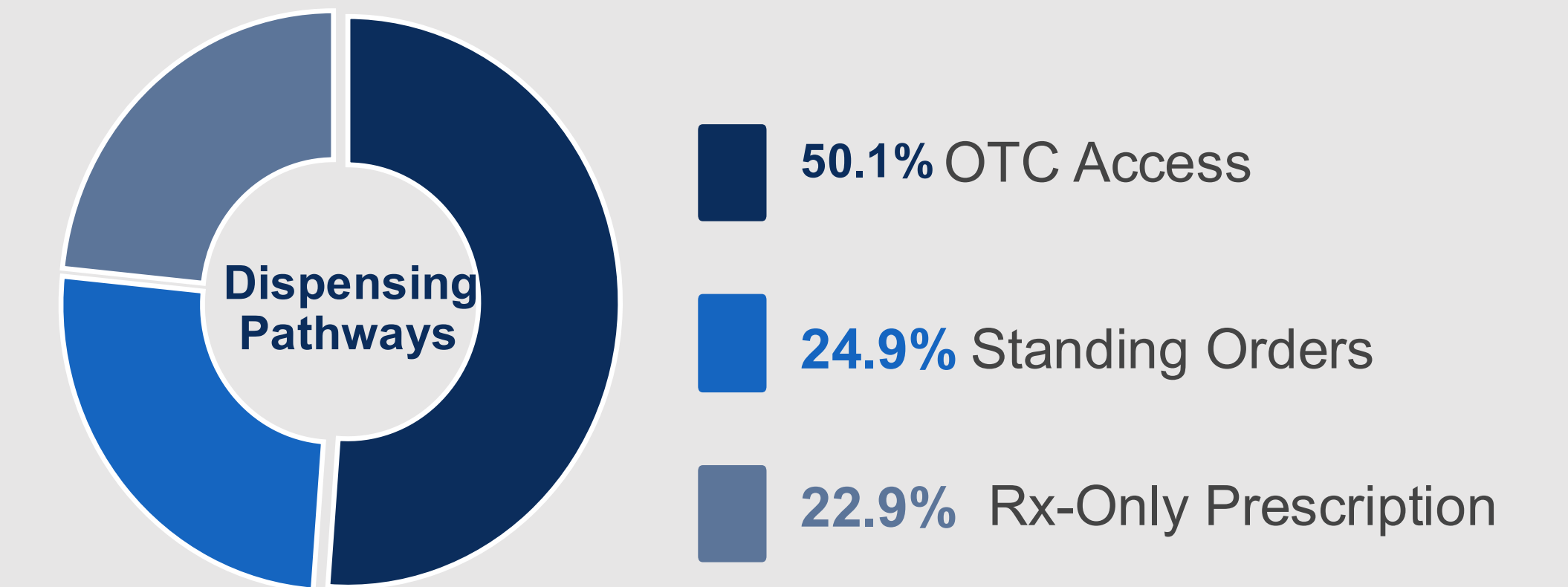
- A total of 37 studies were included, with 16 specifically examining stocking and dispensing patterns in rural U.S. community pharmacies
- Naloxone stocking varied widely (28–100%); nasal spray was the predominant formulation (62–85%), while high-dose 8-mg products were available in only 4.9% of pharmacies
- Following OTC approval, same-day availability increased modestly from 44.2% to 49.4%, indicating a limited impact of regulatory change on routine access.
- Dispensing prevalence ranged from 15% to 72.7%; with most rural pharmacies dispensing via OTC pathways (50.1%), standing orders (24.9%), and prescription-only pathways (22.9%)

Figure 2: Naloxone Stocking vs. Dispensing Range Across Studies (n=16)



Ranges reflect variability across 16 studies in rural U.S. community pharmacies. Same-day availability: secret shopper study post-OTC approval

Figure 3: Naloxone Dispensing Pathways in Rural Pharmacies (Post-OTC Secret Shopper Study)



OTC = Over-the-Counter; Rx = Prescription. Percentages reflect rural pharmacy dispensing in a post-OTC secret shopper study.

- Multilevel barriers, including pharmacist time and training gaps, pharmacy workflow constraints, and patient-level factors such as stigma, cost, and transportation, were consistently identified across studies
- Structured pharmacist-led interventions were associated with higher dispensing rates; proactive counseling increased naloxone dispensing to 33.8% of eligible patients

Figure 4: Barriers to Naloxone Access

Multilevel Barriers to Naloxone Provision in Rural Community Pharmacies

Pharmacist-Level	Pharmacy-Level	Patient-Level
<ul style="list-style-type: none"> Time constraints Inadequate training Discomfort initiating overdose conversations Reimbursement uncertainty 	<ul style="list-style-type: none"> Staffing shortages High workflow demands No private counseling space Independent chain capacity 	<ul style="list-style-type: none"> Out-of-pocket cost Low Naloxone awareness Stigma & privacy concerns Transportation challenges

Barriers identified across the pharmacist, pharmacy, and patient domains

Conclusion

- Naloxone is widely stocked in rural pharmacies, but dispensing remains inconsistent due to multilevel barriers at the pharmacist, pharmacy, and patient levels
- Regulatory expansion (e.g., OTC, standing orders) translated into routine dispensing, highlighting the need for workflow-integrated strategies, targeted pharmacist training, and proactive patient identification
- Limited patient and community awareness continues to hinder uptake, emphasizing the need for targeted education alongside pharmacy-based interventions
- Future research should focus on scalable, sustainable models that integrate pharmacy services with community outreach and evaluate long-term outcomes