

ANTIMICROBIAL RESISTANCE AWARENESS AMONG COMMUNITY PHARMACISTS

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Abstract

Antimicrobial resistance is a major threat to the effective treatment of infectious diseases and to the long-term usefulness of existing antimicrobial medicines. Community pharmacists occupy a particularly important position in this response because they are among the most accessible health professionals for people seeking advice, self-care products, and prescribed medicines. Their awareness of antimicrobial resistance influences the information they provide, the questions they ask before dispensing, the referrals they make, and the stewardship messages that reach patients and families.

This paper examines antimicrobial resistance awareness among community pharmacists through an integrative review and conceptual analysis of international guidance, pharmacy policy documents, and published literature on antimicrobial stewardship. The analysis considers awareness as more than factual knowledge. It includes recognition of inappropriate antimicrobial use, understanding of patient expectations, confidence in counselling, familiarity with stewardship principles, awareness of referral responsibilities, and readiness to work with prescribers and public-health systems.

The review identifies several factors that shape awareness and practice in the community-pharmacy setting. These include undergraduate education, continuing professional development, local regulations, availability of treatment guidance, pharmacy workload, commercial pressures, access to diagnostic or referral pathways, and communication skills. Although pharmacists may understand that unnecessary or incomplete antimicrobial use contributes to resistance, their ability to translate this knowledge into consistent practice may be limited by time constraints, patient demand, fragmented care, and weak enforcement of prescription-only requirements.

The paper concludes that community pharmacists should be supported as visible antimicrobial stewardship partners. Practical support should include context-specific training, clear counselling tools, responsible dispensing systems, referral protocols, collaboration with prescribers, access to evidence-based information, and routine public-awareness activities. Strengthening these capabilities can help community pharmacies promote appropriate antimicrobial use while preserving patient access to timely, respectful, and safe care.

Keywords: Antimicrobial Resistance, Community Pharmacists, Antimicrobial Stewardship, Antibiotic Use, Patient Counselling, Pharmacy Practice, Public Health, Rational Use of Medicines

1. INTRODUCTION

Antimicrobial resistance occurs when microorganisms no longer respond to medicines that were previously effective against them. This process can make infections harder to treat, increase the likelihood of prolonged illness, and reduce the reliability of medicines that are essential for routine care. The challenge extends beyond hospitals and laboratories. Much antimicrobial use takes place in homes and community settings, where decisions about seeking care, obtaining medicines, following instructions, and continuing or stopping treatment are shaped by

ordinary conversations and everyday access to health services.

Community pharmacies are often the first point of contact for people with symptoms such as cough, sore throat, fever, diarrhoea, skin complaints, or urinary discomfort. Patients may seek reassurance, request a familiar medicine, ask whether an antibiotic is necessary, or present a prescription without fully understanding the treatment plan. In these encounters, the community pharmacist can support appropriate medicine use by clarifying directions, identifying warning signs, discouraging non-prescription

antimicrobial use where it is not lawful or appropriate, reinforcing adherence to a prescribed regimen, and advising when medical assessment is needed.

Awareness among community pharmacists is therefore a practical public-health concern. It includes scientific understanding of resistance, but it also includes the ability to communicate risk without alarming patients, distinguish between requests for information and requests for treatment, recognise the limits of pharmacy-based advice, and apply local legal and professional standards. A pharmacist who understands antimicrobial resistance but lacks time, confidence, or workable referral pathways may be unable to provide stewardship-oriented care consistently.

The community-pharmacy environment is diverse. Some pharmacies are closely integrated with primary-care services, while others work with limited staffing, high prescription volumes, fragmented access to patient histories, and strong consumer expectations for immediate treatment. In many settings, pharmacists also face the challenge of responding to economic pressures, varying levels of public health literacy, and inconsistent enforcement of medicine-sale regulations. These conditions can create a gap between awareness of antimicrobial resistance and the daily practice of responsible dispensing and counselling.

The objective of this paper is to examine antimicrobial resistance awareness among community pharmacists and to identify the knowledge, practice, institutional, and communication factors that shape their contribution to antimicrobial stewardship. The paper reviews relevant literature, defines the object of study, explains the review-based methodology, analyses key awareness and practice domains, and proposes practical principles for strengthening pharmacist-led community engagement on antimicrobial resistance.

2. LITERATURE REVIEW

The literature on antimicrobial resistance consistently describes responsible antimicrobial use as a shared responsibility across prescribers, pharmacists, patients, public-health authorities, and the wider One Health system. Global guidance emphasises surveillance, infection prevention, appropriate

access to quality-assured medicines, education, and stewardship. In the community setting, pharmacists are positioned between the health system and the public: they interpret prescriptions, explain medicine use, observe recurring patient questions, and can identify patterns of inappropriate requests that may not be visible elsewhere.

Studies of pharmacists and pharmacy teams show that awareness is influenced by both professional education and the environment in which care is delivered. Knowledge about resistance mechanisms or antibiotic classes is valuable, yet it does not automatically ensure stewardship behaviour. Community pharmacists also need practical confidence in counselling, access to current guidance, a clear understanding of pharmacy regulations, and professional support when they decide not to supply an antimicrobial without a valid prescription. Training that is not connected to day-to-day workflow may have limited impact on patient-facing practice.

Published reviews identify a range of potential stewardship roles for community pharmacists. These include patient counselling, review of prescriptions for clarity and safety, promotion of adherence to prescribed therapy, support for vaccination and infection-prevention messages, referral of patients with concerning symptoms, public education during awareness campaigns, and collaboration with local prescribers. Recent work also notes that pharmacies can contribute to antimicrobial stewardship through structured services, provided there is sufficient time, appropriate remuneration, accessible clinical information, and reliable links with the rest of the primary-care system.

A central conclusion from the literature is that community-pharmacy stewardship requires an enabling system. Pharmacist awareness is strengthened when organisations provide continuing education, patient information resources, treatment guidelines, communication training, and mechanisms for documenting or referring concerns. It is weakened when pharmacies are isolated from prescribers, when patients expect antibiotics for self-limiting conditions, or when commercial and workload pressures make counselling difficult. The following table

summarises key literature and policy contributions relevant to the present analysis.

TABLE 1: SUMMARY OF KEY LITERATURE ON AMR AWARENESS AND COMMUNITY PHARMACY PRACTICE

S. No.	Author(s) / Year	Focus	Practice Context	Key Contribution
1	WHO (2015)	Global action on AMR	International policy	Sets strategic objectives for awareness, surveillance, infection prevention, optimised antimicrobial use, and sustainable action.
2	WHO (2019)	Stewardship implementation	Health-care systems	Provides practical stewardship approaches that can inform local roles, governance, and quality improvement.
3	WHO (2022)	AWaRe antibiotic classification	Medicines use	Links antibiotic classification with monitoring and more responsible selection and use of antibacterial medicines.
4	Sakeena et al. (2018)	Pharmacists and AMR	Developing-country practice	Shows how pharmacy services, training, and medicines optimisation can support appropriate antibiotic use.
5	FIP (2023)	AMR and stewardship policy	Global pharmacy profession	Defines pharmacist actions related to stewardship, education, monitoring, and One Health engagement.
6	FIP (2023)	Workforce education	Pharmacy education	Highlights the need for AMR and stewardship education across the pharmaceutical workforce.
7	Raju et al. (2024)	Community pharmacist stewardship	Low- and middle-income countries	Reviews pharmacist contributions and describes barriers such as limited resources, training gaps, and patient expectations.
8	FIP (2024)	AMR roadmaps	Regional pharmacy systems	Prioritises pharmacist-led awareness, practice documentation, responsible use, and policy engagement.
9	WHO (2025)	Global resistance surveillance	Global AMR monitoring	Demonstrates the continuing importance of quality-assured surveillance and action on antibiotic resistance.
10	Zerbinato et al. (2025)	Community pharmacy interventions	Community pharmacy teams	Finds that pharmacists can contribute to stewardship, while time, implementation support, and remuneration remain major challenges.

3. OBJECT OF STUDY

The object of this study is antimicrobial resistance awareness among community pharmacists. The analysis focuses on the way pharmacists understand antimicrobial resistance, recognise inappropriate antimicrobial use, communicate with patients, make dispensing-related decisions within their scope of practice, and participate in wider antimicrobial stewardship activities. The term

community pharmacist includes pharmacists working in retail, independent, chain, neighbourhood, and other primary-care-facing pharmacy settings.

The study treats awareness as a multidimensional professional capability. It includes basic knowledge of antimicrobial resistance; understanding of the difference between antibiotics and other antimicrobial medicines; recognition of the consequences of

unnecessary, incomplete, or poorly supervised treatment; familiarity with stewardship principles; and awareness of local legal, ethical, and referral responsibilities. It also includes behavioural and communication dimensions, such as the confidence to counsel a patient, address misconceptions, and explain why a requested medicine may not be appropriate.

The analysis considers the interaction between individual knowledge and the practice environment. A community pharmacist does not work in isolation: professional decisions are affected by the availability of trained staff, local guidelines, record systems, patient expectations, prescriber collaboration, medicine supply practices, and regulatory oversight. For this reason, the study examines both personal awareness and the institutional conditions that enable or constrain responsible action.

In addition, the study considers how pharmacist awareness affects public understanding. Community pharmacists can make antimicrobial stewardship more understandable by using clear language, correcting myths about antibiotics, reinforcing that a medicine should be used only for the purpose and duration for which it was prescribed, and encouraging timely medical review when symptoms are serious, persistent, or changing. These interactions can strengthen

trust when they are respectful, practical, and linked to accessible care pathways.

KEY POINTS OF OBJECT OF STUDY

- To examine community pharmacists' knowledge of antimicrobial resistance, antimicrobial use, and stewardship principles.
- To analyse awareness of the health, social, and economic consequences of inappropriate antimicrobial use.
- To assess counselling readiness, communication confidence, and the ability to address common patient misconceptions.
- To consider dispensing-related awareness, including prescription validity, medicine directions, completion of prescribed courses, and referral needs.
- To investigate the role of continuing professional development, guidelines, and reliable medicines-information sources.
- To identify barriers related to workload, staffing, patient demand, commercial pressure, regulation, and access to prescriber collaboration.
- To evaluate the value of pharmacy-based public education, awareness campaigns, and community-level stewardship messages.
- To develop a practical framework for strengthening AMR awareness and stewardship readiness in community pharmacies.

TABLE 2: OBJECT OF STUDY FRAMEWORK

S. No.	Study Component	Description	Purpose
1	AMR Knowledge	Understanding resistance, antimicrobial classes, and drivers of inappropriate use.	Assess the conceptual foundation for informed pharmacy practice.
2	Antimicrobial Use Awareness	Recognition of unnecessary use, incomplete use, self-medication, and unsafe sharing of medicines.	Identify awareness of behaviours that can worsen resistance and treatment failure.
3	Counselling and Communication	Ability to explain treatment directions, expected limits of antibiotics, warning signs, and referral advice.	Strengthen patient understanding and support safe, respectful conversations.

S. No.	Study Component	Description	Purpose
4	Stewardship Readiness	Familiarity with stewardship principles, local guidance, and quality-improvement activities.	Examine readiness to contribute to pharmacy-based antimicrobial stewardship.
5	Regulatory and Referral Practice	Awareness of prescription requirements, professional boundaries, and when to refer.	Promote responsible dispensing and timely access to clinical assessment.
6	Training and Information	Continuing education, clinical updates, standard operating procedures, and medicine-information sources.	Identify support systems needed for current and consistent practice.
7	Practice Barriers	Workload, staffing, patient pressure, commercial incentives, limited collaboration, and weak enforcement.	Explain why knowledge may not always translate into stewardship behaviour.
8	Community Impact	Public education, prevention messages, and engagement during awareness activities.	Connect pharmacy practice with wider public-health benefit and trust.

4. RESEARCH METHODOLOGY

This paper uses an explanatory and integrative review design. It does not report results from a new questionnaire, interview series, patient record, or intervention trial. Instead, it synthesises published scholarship, international policy documents, professional pharmacy guidance, and antimicrobial stewardship literature to examine how awareness among community pharmacists is defined, supported, and translated into patient-facing practice.

The review is organised around four analytical domains: foundational awareness of antimicrobial resistance; dispensing and patient-counselling practices; professional education and interprofessional collaboration; and structural barriers within the community-pharmacy environment. Sources are interpreted for their relevance to community practice, the stewardship role described, the kind of barrier identified, and the practical implication for pharmacist education or service design.

To preserve analytical clarity, the paper distinguishes between awareness and behaviour, between patient education and clinical diagnosis, and between access to medicines and unrestricted antimicrobial

supply. A pharmacist may be well informed about antimicrobial resistance but still face barriers to counselling, documentation, referral, or collaboration. Likewise, a public-awareness campaign may improve recognition of AMR without changing the practical conditions that influence medicine-seeking or dispensing behaviour. These distinctions guide the analysis and the recommendations presented in the discussion.

4.1 RESEARCH DESIGN

- Study Type: Explanatory and literature-based research.
- Approach: Integrative review and conceptual synthesis.
- Unit of Analysis: Community pharmacists, community-pharmacy teams, and pharmacy-based stewardship practices.
- Primary Awareness Domains: AMR knowledge, antimicrobial use, counselling, stewardship readiness, referral, and professional responsibility.
- Context Variables: Training access, local policy, regulation, patient expectations, staffing, workflow, and collaboration with prescribers.
- Outcome Variables: Awareness quality, counselling confidence, responsible

dispensing, referral practice, and public-health engagement.

- Ethical Position: No personal, confidential, or human-subject data were collected for this study.

4.2 METHODOLOGICAL STEPS

- Step 1: Define antimicrobial resistance awareness as a knowledge, communication, and practice-readiness issue.
- Step 2: Identify community-pharmacy encounters in which antimicrobial advice, dispensing, or referral may occur.
- Step 3: Review global AMR policy, pharmacist stewardship guidance, and community-pharmacy literature.
- Step 4: Classify evidence according to knowledge, counselling, regulation, training, collaboration, and structural barriers.
- Step 5: Compare proposed pharmacy roles with the practical resources needed to perform them responsibly.
- Step 6: Interpret evidence in relation to local access to care, patient expectations, and professional scope of practice.
- Step 7: Identify limitations, including variation in pharmacy law, workforce capacity, and health-system organisation.
- Step 8: Develop principles for sustained AMR awareness and feasible community-pharmacy stewardship.

5. DATA ANALYSIS

The analysis is based on qualitative synthesis of the reviewed literature and policy guidance. The evidence is interpreted by tracing how community-pharmacist awareness influences the ability to recognise inappropriate antimicrobial use, communicate with patients, support prescribed therapy, refer when appropriate, and participate in antimicrobial stewardship. The analysis does not claim that all pharmacists or all pharmacies perform these functions in the same way. Rather, it identifies recurring conditions that are likely to strengthen or weaken stewardship-oriented practice.

Across the reviewed sources, the most consistent message is that awareness should be treated as an operational capability rather than a one-time educational outcome. Effective awareness combines current knowledge with

accessible tools, clear professional expectations, and the ability to act within a supportive system. The following sections organise the analysis around four challenge areas that are especially relevant to community pharmacists.

5.1 FOUNDATIONAL AMR AWARENESS AND PROFESSIONAL UNDERSTANDING

Foundational awareness begins with an accurate understanding of what antimicrobial resistance is and what it is not. Community pharmacists need to recognise that resistance is not simply a person becoming resistant to a medicine. It is a change in microorganisms that can make medicines less effective, with consequences for individual treatment and wider public health. They also need to distinguish antibiotic-related issues from broader antimicrobial resistance while adapting their language to a patient's level of understanding.

Knowledge should include the relationship between unnecessary antimicrobial use, inappropriate medicine selection, incorrect duration, poor adherence to prescribed treatment, sharing of leftover medicines, and delayed medical review. In practice, pharmacists do not need to provide a microbiology lecture during every interaction. However, they should be able to explain, in clear and non-judgemental terms, why an antimicrobial is not automatically the right response for every infection-like symptom and why a prescribed treatment plan should be followed carefully.

Awareness also includes understanding the limitations of pharmacy practice. Community pharmacists can provide evidence-based medicine information and reinforce appropriate use, but diagnosis, prescribing decisions, and the management of serious or deteriorating symptoms require the appropriate clinical pathway. Clear professional boundaries protect patients and make counselling more credible, especially when a pharmacist advises referral rather than immediate medicine supply.

KEY OBSERVATION:

- AMR awareness is stronger when pharmacists connect scientific knowledge

with everyday patient questions and medicine-use decisions.

- Clear explanations can address common misconceptions without blaming patients or creating unnecessary fear.
- Professional boundaries and referral awareness are essential parts of responsible community-pharmacy stewardship.

5.2 DISPENSING DECISIONS, PATIENT COUNSELLING, AND PUBLIC COMMUNICATION

Community pharmacists can influence antimicrobial use at the point where patients receive medicines and information. Counselling can cover the purpose of a prescribed medicine, the directions on the label, the importance of using the medicine only as instructed, the need to avoid sharing or saving medicines for future illness, and the circumstances in which the patient should seek further care. Such conversations become especially important when patients have previously used antibiotics without adequate guidance or expect them for conditions that may not require antibacterial treatment.

The quality of these conversations depends on communication skills as well as knowledge. Patients may be worried about symptoms, anxious to return to work, caring for a child or older family member, or unable to obtain a prompt medical appointment. A stewardship message that is technically correct but dismissive may not be effective. Pharmacists need practical ways to acknowledge concerns, explain uncertainty, offer safe non-antimicrobial support where appropriate within local practice, and signpost accessible clinical services when assessment is needed.

Public communication is also relevant beyond individual dispensing encounters. Community pharmacies can display educational materials, participate in local awareness campaigns, answer general questions during health-promotion activities, and reinforce infection-prevention messages. These activities should use simple language and avoid overstating what pharmacy teams can determine without assessment. Their value lies in helping people understand that protecting antimicrobial effectiveness is a shared responsibility linked to medicine use, prevention, and timely care.

KEY OBSERVATION:

- Counselling is most effective when it is brief, practical, respectful, and matched to the patient's reason for seeking help.
- Community pharmacies need clear referral information so that stewardship messages do not leave patients without a workable next step.
- Visible public education can reinforce the pharmacist's role as a trusted source of medicines information.

5.3 EDUCATION, REGULATION, AND INTERPROFESSIONAL COLLABORATION

Pharmacist awareness is sustained through continuing professional development rather than a single educational event. Training should include current AMR concepts, antimicrobial stewardship, patient communication, legal requirements, local referral pathways, and the responsible use of medicines-information sources. Educational programmes are more likely to influence practice when they use realistic community-pharmacy scenarios, such as a request for antibiotics without a prescription, a patient with incomplete treatment, or a family seeking advice for a child with persistent symptoms.

Regulatory awareness is equally important. Pharmacists need clear information about prescription-only requirements, documentation expectations, professional accountability, and procedures for dealing with inappropriate requests. Inconsistent enforcement or ambiguity about responsibilities can weaken even well-designed education. Professional bodies and regulators can support pharmacists by issuing practical guidance, maintaining current standards, and ensuring that policy messages are reinforced by workable implementation systems.

Interprofessional collaboration can convert awareness into more coordinated care. When community pharmacists have reliable contact pathways with prescribers, clinics, or public-health services, they are better able to clarify prescriptions, refer patients, and support follow-up. Collaboration also allows pharmacists to share common patient concerns and contribute to local antimicrobial-use improvement initiatives. These relationships require mutual respect, defined communication channels, and recognition that

pharmacy teams can provide valuable medicines-use insight at the community level.

KEY OBSERVATION:

- Continuing education should combine AMR knowledge with practical counselling, referral, and problem-solving skills.
- Clear regulation and consistent enforcement support pharmacists when they uphold responsible dispensing standards.
- Collaboration with prescribers and public-health services makes community-pharmacy stewardship more feasible and more trusted.

5.4 WORKLOAD, PATIENT EXPECTATIONS, AND STRUCTURAL BARRIERS

The evidence indicates that awareness alone cannot remove structural barriers. Community pharmacies may have limited time for extended counselling, insufficient staff, high prescription volumes, inadequate access to patient records, or limited private space for sensitive discussions. In some settings, pharmacists may also encounter strong consumer demand for antibiotics, particularly when patients perceive them as a quick solution or when medical consultation is difficult to access. These pressures can make stewardship-oriented conversations difficult to sustain.

Commercial and organisational realities also matter. A pharmacy that is evaluated only by sales volume or speed of service may not have incentives to invest in counselling, documentation, or outreach. Stewardship activity requires recognition as a professional service, appropriate workflow design, and, where relevant, remuneration or other support. Practical tools such as short patient-information leaflets, checklists, standardised warning-sign prompts, and easy access to local guidance can reduce the time burden without reducing the quality of communication.

Policy responses should avoid placing all responsibility on individual pharmacists. Governments, professional organisations, pharmacy owners, educators, and primary-care systems all influence the conditions under which AMR awareness is translated into practice. Sustainable improvement is more

likely when pharmacy teams are included in national AMR plans, public-awareness programmes, surveillance-related education, and primary-care quality-improvement initiatives.

KEY OBSERVATION:

- Time, staffing, patient expectations, and fragmented care can prevent awareness from becoming consistent stewardship practice.
- Workflow tools and professional-service support can help pharmacists provide reliable AMR messages in routine care.
- System-level responsibility is needed; community pharmacists should not be expected to resolve AMR challenges without policy, organisational, and care-network support.

6. DISCUSSION

The reviewed literature demonstrates that community pharmacists can make a meaningful contribution to antimicrobial resistance awareness, but their impact depends on how awareness is supported and applied. Pharmacists are accessible to the public, familiar with medicine-use questions, and able to provide timely explanations at the point of supply. These strengths create an opportunity for antimicrobial stewardship in the community, particularly where patients may not have easy access to other sources of medicines information. At the same time, accessibility alone does not guarantee that pharmacists have the time, authority, information, or collaboration required to influence practice consistently.

A central implication is that AMR awareness should be assessed broadly. A narrow assessment of factual knowledge may miss the abilities that matter most in practice: communicating with patients, managing requests respectfully, recognising referral needs, applying professional and legal requirements, and working with local care networks. Training and quality-improvement programmes should therefore examine not only whether pharmacists know that resistance is important, but also whether they have the tools and confidence to act on that knowledge during routine encounters.

Community-pharmacy stewardship should be designed around patient-centred communication. Pharmacists need concise

messages that explain the purpose of a prescribed antimicrobial, discourage use outside the prescribed plan, and encourage care-seeking when symptoms are severe, persistent, or worsening. These messages should be adapted for local languages, literacy levels, and service availability. They should also avoid implying that every infection can be resolved by a pharmacy conversation; safe referral and follow-up remain essential components of patient care.

Policy and organisational design are equally important. Continuing professional development, standard operating procedures, patient information materials, access to evidence-based medicine information, and clear referral protocols can make good practice more practical. Pharmacy owners and health systems should recognise counselling and stewardship as professional activities that require time and resources. Where pharmacies are included in antimicrobial stewardship initiatives, roles should be clearly defined and outcomes should be evaluated using appropriate measures such as counselling activity, public engagement, referral processes, and confidence in applying guidance. The discussion also highlights the value of a One Health perspective. Community pharmacists can help patients understand that antimicrobial resistance is not only an individual treatment issue but also a wider concern involving human health, animal health, environmental exposure, infection prevention, and responsible medicines use. They can reinforce public-health campaigns without replacing clinical assessment. In this way, community pharmacies can serve as practical bridges between national AMR policy and the daily decisions made by patients and families.

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7. CONCLUSION

This paper examined antimicrobial resistance awareness among community pharmacists. The analysis shows that awareness is shaped by knowledge of AMR, understanding of appropriate antimicrobial use, counselling confidence, referral readiness, continuing education, regulation, collaboration, workload, and the wider organisation of primary care. These factors explain why a pharmacist may understand the public-health importance of AMR while still encountering barriers to consistent stewardship-oriented practice.

The evidence reviewed indicates that community pharmacists can support appropriate antimicrobial use by providing clear medicine information, reinforcing prescribed directions, addressing misconceptions, discouraging unsafe reuse or sharing of antimicrobials, recognising situations that require referral, and participating in public education. Their contribution is strongest when professional knowledge is supported by accessible guidance, practical tools, adequate staffing, clear legal expectations, and communication links with prescribers and health services.

The paper concludes that community pharmacists should be treated as active antimicrobial stewardship partners. Health systems should combine education with enabling practice conditions, including structured professional development, patient-centred communication resources, responsible dispensing systems, referral pathways, and policy recognition of pharmacy-based stewardship. Future research should examine how these supports affect patient understanding, antimicrobial-use behaviour, pharmacist confidence, and community-level outcomes across different pharmacy and health-system contexts.

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