

From Local Incident Reports to Shared Preventive Action: A Conceptual Architecture for Cross-Organizational Learning, Feedback Ownership, and Medication Safety Improvement in Community Pharmacy Networks

Peter Novak^{1*}, Sophie Dubois², Thomas Müller³, Anna Weber⁴, Erik Johansson⁵

¹Department of Pharmacy Practice and Quality Improvement, Charles University, Prague, Czech Republic.

²Department of Pharmacy Practice and Continuing Education, Utrecht University, Utrecht, Netherlands.

³Department of Health Services Research and Pharmacy, University of Vienna, Vienna, Austria.

⁴Department of Pharmacy Practice and Patient Safety, University of Cologne, Cologne, Germany.

⁵Department of Pharmacy Practice and Health Systems, Uppsala University, Uppsala, Sweden.

*E-mail ✉ peter.novak@cuni.cz

Abstract

Medication incident reporting provides community pharmacies with opportunities to identify unsafe practices, yet the organizational arrangements required to convert local reports into shared preventive action remain insufficiently specified. Independently operated pharmacies may contribute information to common reporting systems while retaining separate authority over staffing, workflow modification, professional supervision, and implementation. This article develops a conceptual organizational learning architecture connecting incident interpretation, transferable safety knowledge, interorganizational feedback, responsibility allocation, local corrective action, and verification. A critical synthesis of community pharmacy safety research, incident investigation, organizational learning, and healthcare feedback literature informs the architecture. The analysis distinguishes reporting activity from signal quality, knowledge dissemination from accepted responsibility, and documented action from verified implementation. It proposes a distributed arrangement in which network-level functions support interpretation and coordination while individual pharmacies retain explicit responsibility for locally authorized changes. Feedback ownership provides continuity across these organizational interfaces, supported by confidentiality safeguards, documented handoffs, and escalation of unresolved tasks. The architecture also preserves recurring incident patterns and unsuccessful interventions as information for subsequent learning. Its contribution is an operationally interpretable account of how independently governed pharmacies could coordinate preventive action without assuming that reporting, feedback receipt, or administrative closure demonstrates reduced patient harm. Empirical evaluation remains necessary to determine its feasibility, implementation fidelity, and safety consequences.

Keywords: Community pharmacy, Medication incident reporting, Organizational learning, Patient safety, Interorganizational collaboration, Feedback

Introduction

Medication safety in community pharmacy encompasses more than the prevention of isolated dispensing mistakes. Pharmacies operate within interconnected medication-

use systems involving prescriptions, dispensing technologies, medicine availability, professional judgment, patients, and communication across healthcare settings. A systematic review of international community pharmacy research documents variation in how medication errors are defined and measured, creating important limitations for interpreting the safety picture assembled from individual studies [1]. These differences also complicate the aggregation of incident information across organizations.

National surveillance provides an important perspective on the problem. A Finnish retrospective register study

Access this article online

<https://smerpub.com/>

Received: 28 July 2026; Accepted: 30 September 2026

Copyright CC BY-NC-SA 4.0

How to cite this article: Novak P, Dubois S, Müller T, Weber A, Johansson E. From Local Incident Reports to Shared Preventive Action: A Conceptual Architecture for Cross-Organizational Learning, Feedback Ownership, and Medication Safety Improvement in Community Pharmacy Networks. Ann Pharm Educ Saf Public Health Advocacy. 2026;6(2):200-12. <https://doi.org/10.51847/4U9yDBiDuK>

examined dispensing errors voluntarily reported by community pharmacies between 2015 and 2020 [2]. Its findings demonstrate the analytical possibilities of coordinated reporting while also requiring attention to reporting practices and the interpretation of longitudinal trends. A change in recorded incidents cannot independently establish a corresponding change in the underlying occurrence of errors or patient injury.

Incident narratives nevertheless contain information that aggregate counts cannot provide. Australian community pharmacy reporting research characterized medication incidents according to their nature, severity, and contributing circumstances [3]. Such contextual information can illuminate how a medication-use process became vulnerable and identify circumstances that may be relevant to pharmacies operating under comparable conditions.

The Ontario Assurance and Improvement in Medication Safety program illustrates the organizational potential of standardized reporting across participating pharmacies [4]. Its descriptive evaluation establishes the availability of shared incident information and opportunities for analyzing reported events. However, participation and reporting activity remain different constructs from corrective-action implementation and subsequent safety outcomes.

The conditions under which staff recognize, disclose, and discuss incidents are equally important. A systematic review of patient safety culture in community pharmacy identifies organizational culture as a relevant dimension of medication safety [5]. National survey research further supports attention to safety climate as a feature of the pharmacy working environment [6]. These perspectives indicate that reporting cannot be understood solely as an information-technology function.

Community pharmacy quality itself comprises multiple dimensions that require explicit definition and measurement [7]. Incident reporting contributes to this broader quality agenda, although a reporting system alone cannot represent the full range of organizational safety responsibilities. Nationally coordinated medication safety initiatives, including Finland's community pharmacy programme, also demonstrate the practical relevance of combining local activity with wider professional and organizational coordination [8].

The unresolved problem addressed here concerns the organizational journey of incident-derived knowledge. A pharmacy may report an error, a coordinating body may identify a recurring vulnerability, and participating

pharmacies may receive a safety communication. Yet the sequence can end without any organization accepting responsibility for a specific preventive change or establishing whether that change was enacted.

This article develops a conceptual architecture for cross-organizational medication safety learning. Its distinctive contribution is to allocate responsibilities across the interfaces connecting reporting, interpretation, dissemination, feedback, local implementation, and verification. The central question is how independently operated community pharmacies can participate in shared learning while retaining identifiable ownership of the preventive actions that fall within their authority.

The analysis is non-empirical. It draws on published evidence to establish the problem and relevant organizational mechanisms, then develops proposed relationships and responsibility arrangements requiring subsequent implementation research. No new intervention outcomes, incident frequencies, or injury-reduction effects are claimed.

The limitations of local incident reporting in community pharmacy

Local incident reporting provides a record of recognized events, but the meaning of that record depends on its purpose, classification rules, and analytical treatment. A scoping review of methodological approaches to medication error reporting identifies variation in how reporting-system information is analyzed [9]. For a pharmacy network, this means that reports from different premises require interpretation before apparent similarities can be treated as shared safety problems.

A local report may describe an incorrect medicine, an intercepted near miss, an unclear prescription, or a failure in the communication process. The reporter may identify an immediate contributing circumstance without possessing information about the wider work system. Reporting guidelines therefore require organizational arrangements that support their implementation. Evidence from specialized healthcare settings demonstrates the importance of attending to the practical conditions under which incident reporting and learning guidance operates [10]. Its application to community pharmacy must account for differences in professional roles, staffing, and operational independence.

Reporting software introduces an additional distinction between information submission and learning support. A qualitative systematic review of healthcare professionals' perspectives identifies development needs associated

with incident reporting software [11]. Relevant design considerations include the ability to follow reports, retrieve information, and support feedback. A completed electronic form establishes that information entered a system; it provides no assurance that the account was sufficiently informative, reviewed by an appropriate person, or translated into action.

The completeness of the reporting record also warrants caution. A multicentre pediatric medication safety study compared events identified through audit, staff detection, and incident reporting [12]. Although its clinical setting differs from community pharmacy, the comparison demonstrates why a single detection mechanism should not be treated as a complete representation of medication error occurrence. Network-level analysis must therefore acknowledge selection, recognition, and reporting biases. Incident investigation further requires attention to the evolution of work systems. Vincent and colleagues argue for safety analysis that examines the temporal and organizational context of adverse events [13]. This perspective matters when apparently isolated community pharmacy reports reflect persistent workload conditions, recurring interface difficulties, or changes in established procedures.

The principal limitation of local reporting is consequently organizational as well as informational. A report may be accurate, professionally valuable, and appropriately submitted while its preventive potential remains unrealized.

Four distinct conditions require separate assessment: whether a relevant event was recognized and reported; whether its information was interpretable; whether a suitable organization received actionable feedback; and whether a preventive change was implemented. Subsequent verification constitutes a further responsibility. Combining these conditions into a single reporting-compliance measure would obscure where the learning process had stopped.

From incident information to transferable organizational knowledge

The transformation of incident information into transferable knowledge begins with a change in analytical purpose. Local investigation seeks to understand a particular event within its operational circumstances. Cross-organizational learning must additionally determine which aspects of that event could inform decisions elsewhere.

Research examining specialist patient safety investigation agencies identifies system-wide learning as a distinct organizational challenge, including questions concerning independence, investigation scope, and relationships with the wider healthcare system [14]. The relevance for community pharmacy lies in separating local responsibility from a coordinating function capable of identifying patterns across independently operated premises.

The information being transferred may itself concern organizational interfaces. Research on health information exchange-related patient safety incidents identifies problems arising across institutional communication arrangements [15]. For pharmacy networks, this supports attention to information provenance, handoff conditions, and the possibility that an apparent local error originated partly outside the reporting pharmacy.

Transferability also requires an account of the work system. A multi-stakeholder Delphi study concerning medication safety priorities in Saudi Arabian community pharmacy used a human factors framework to examine safety problems [16]. Stakeholder-derived priorities can inform which contextual features deserve consideration, although consensus on a problem does not establish that a particular intervention will prevent recurrence.

The revised London Protocol provides a systems-oriented foundation for examining incidents while preserving contextual information relevant to subsequent action [17]. Applied conceptually, its principles support analysis that distinguishes immediate error circumstances from the organizational conditions in which an event developed. A transferable account should therefore preserve meaningful dependencies between the reported event, the workflow, and the proposed preventive measure.

Shared representations can support this work, particularly when information passes between organizations using different systems. Standards-based approaches to interoperability offer a relevant perspective on the relationship between fragmented information and patient safety [18]. Technical interoperability, however, must be accompanied by agreed meanings, access permissions, and responsibility for interpreting transferred information.

The proposed transformation has three analytical requirements. First, the report must retain sufficient contextual detail to support interpretation. Second, the coordinating function must distinguish event-specific circumstances from potentially recurring mechanisms.

Third, the resulting learning proposition must identify conditions under which another pharmacy could reasonably consider action.

Removing identifiable information should not remove the features necessary to understand the safety problem. Equally, preserving detail does not justify unrestricted dissemination. The aim is a sufficiently informative, appropriately protected account that another organization can evaluate against its own work system.

Transferable knowledge remains conditional until a receiving pharmacy determines its local relevance. A shared report cannot independently establish that pharmacies with superficially similar incidents have identical contributing factors or require identical corrections. **Table 1** distinguishes the information and analytical requirements involved in this transformation.

Table 1. Analytical transformation of community pharmacy incident information into transferable learning propositions

Incident information unit	Context required for interpretation	Analytical transformation	Permitted learning output
Reported medication event	Medication-use stage, recorded circumstances, and available consequences	Distinguish event description from inferred contributing conditions	De-identified description of the safety concern
Intercepted near miss	Detection point and conditions enabling interception	Examine both vulnerability and successful interception	Conditional learning concerning detection and interception
Recurring event description	Relevant workflow, technology, and organizational circumstances	Compare reports while preserving contextual differences	Candidate recurring safety pattern
Cross-organizational communication problem	Origin, transmission route, recipient, and documented information gaps	Identify potential dependencies across organizational interfaces	Interface-specific learning proposition
Local corrective suggestion	Problem addressed, proposed mechanism, and implementation context	Assess whether the proposed control addresses the identified vulnerability	Context-qualified preventive option
Uncertain or incomplete report	Missing information and limits of available interpretation	Identify unresolved questions and distinguish observation from inference	Request for clarification or provisional safety signal
Patient-identified concern	Patient account, applicable consent, and contextual corroboration	Preserve the patient perspective during interpretation	Appropriately protected learning contribution

Note: The transformation categories constitute proposed analytical synthesis. They are not an empirically validated classification instrument. Transferable information remains subject to confidentiality, relevance assessment, and local authorization. Evidence-derived premises are traceable through the approved Part 1 evidence matrices.

Development of the cross-organizational medication safety learning architecture

A shared reporting infrastructure creates an information relationship among pharmacies, but organizational learning requires additional responsibility relationships. A rapid review of incident response and learning in the English National Health Service demonstrates the importance of distinguishing reporting, investigation, and subsequent organizational learning [19]. Its findings provide a relevant institutional analogy, although the governance arrangements of a national health service cannot be assumed to apply directly to independently operated community pharmacies.

The proposed architecture differentiates three organizational locations: individual pharmacies where incidents arise and preventive measures are enacted; a

coordinating network function where information is interpreted across sites; and the governance arrangements through which responsibilities and follow-up expectations are established. These locations need not correspond to separate legal entities in every pharmacy network. Their analytical separation identifies which decisions require local authority and which functions benefit from collective coordination.

The first responsibility interface connects the reporting pharmacy with the shared interpretation function. A locally accountable reporter supplies the incident account and available contextual information. A designated network analyst examines its suitability for comparison with other reports and determines whether further information is necessary. The coordinating function can identify a potential shared vulnerability, but it must

preserve uncertainty about the event's underlying mechanism.

The second interface concerns the conversion of an interpreted safety problem into an actionable proposition. Research examining risk controls identified in serious-incident action plans shows why the nature of a proposed corrective measure requires attention beyond the existence of a written plan [20]. A recommendation should identify the vulnerability addressed, its intended preventive mechanism, and the organizational conditions necessary for implementation.

The third interface links shared recommendations to locally authorized decisions. An independent pharmacy cannot be presumed to possess the resources, systems, or professional arrangements required to implement every network-level proposal. Responsibility must therefore be accepted explicitly, with the reason for adaptation, deferral, or rejection retained for subsequent interpretation.

The fourth interface concerns follow-up and closure. Research on the organizational constraints surrounding the closure of patient safety investigations highlights the influence of institutional and relational conditions on learning [21]. In the present architecture, administrative completion and preventive-action verification occupy separate positions. A network record can be administratively complete while local implementation remains unresolved.

Patients may also contribute relevant information. Research developing a patient-reported safety concern tool demonstrates the importance of incorporating patient perspectives into organizational safety information [22]. Such contributions can broaden the range of recognized concerns, although the tool's development does not

establish the effectiveness of the present pharmacy-network arrangement.

Feedback provides the relationship connecting interpretation with action. Clinical Performance Feedback Intervention Theory identifies multiple processes influencing whether healthcare feedback is received, understood, accepted, and translated into behavior [23]. Its applicability to cross-organizational pharmacy incident learning is theoretical: feedback recipients, organizational authority, and responsibility for implementation must be specified rather than assumed.

The resulting architecture assigns distinct functions to report origination, collective interpretation, feedback stewardship, local decision-making, implementation, and verification. A network coordinator may own the communication and tracking process without acquiring authority to change independently operated pharmacy workflows. Conversely, local operational autonomy does not eliminate the pharmacy's responsibility to respond to an accepted safety concern.

A significant design feature is the retention of unresolved action states. If a pharmacy cannot implement a proposed measure, the coordinating function should preserve that information as a potential signal of resource constraints, intervention infeasibility, or a mismatch between the proposed control and local conditions. Repeated unresolved responses may justify reconsidering the shared recommendation itself.

Figure 1 represents these relationships as a proposed organizational arrangement. It distinguishes shared interpretation from local authorization and places verified action downstream of implementation evidence. No connection in the figure represents an experimentally established causal effect on patient harm.

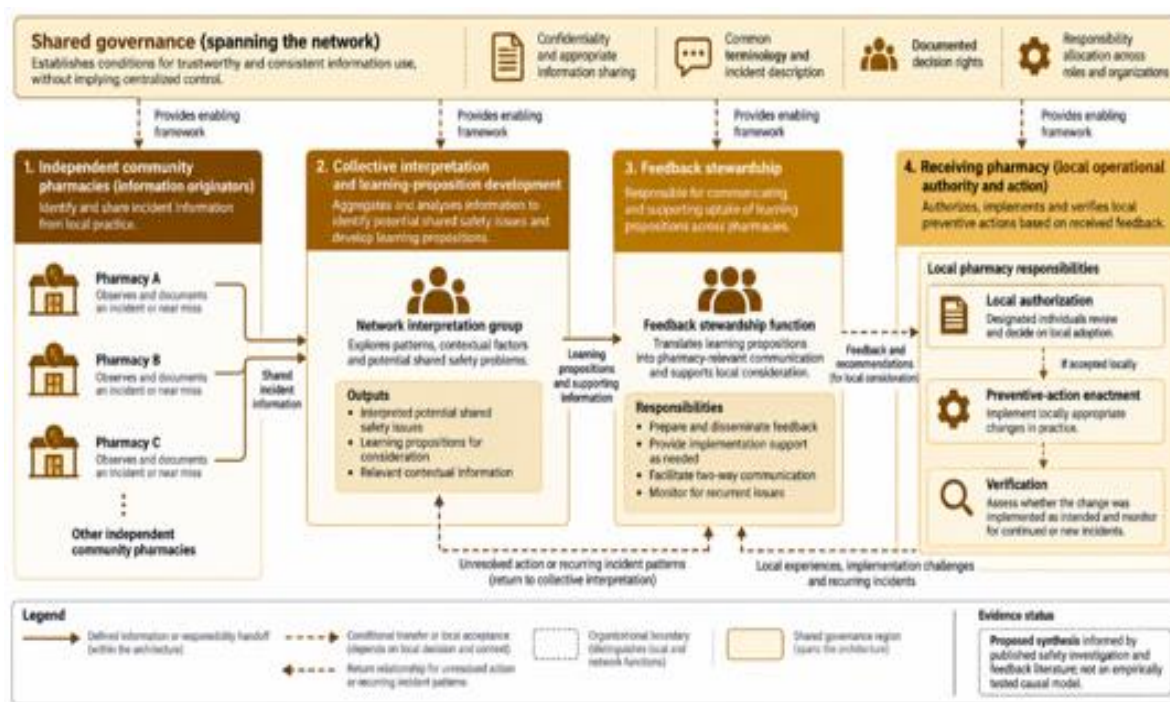


Figure 1. Organizational responsibility and information transfer across independent community pharmacies

Information sharing, confidentiality, and learning governance

Cross-organizational learning requires an information-sharing arrangement that preserves the practical value of incident narratives while protecting patients, pharmacy personnel, and participating organizations. These requirements are interconnected: removing too much information can prevent meaningful analysis, while distributing detailed incident accounts without appropriate controls can undermine participation and confidentiality.

Evidence concerning barriers to implementing patient safety incident reporting and learning guidance identifies organizational conditions that can impede reporting practice [24]. Although obtained from specialized healthcare settings, this work supports consideration of leadership, implementation resources, and the conditions necessary for sustained participation. The corresponding community pharmacy arrangements must be developed within the authority and operational circumstances of the participating organizations.

The proposed governance arrangement distinguishes information ownership from analytical access. The reporting pharmacy retains responsibility for its original record and any locally required follow-up. The coordinating function receives information under an

agreed purpose, access arrangement, and retention policy. Identifiable information should be limited to what is necessary for authorized investigation and follow-up. Contextual detail must be evaluated before dissemination. An unusual medicine combination, distinctive event chronology, or uncommon operational circumstance may permit indirect identification even when names have been removed. Consequently, de-identification should be assessed in relation to the intended recipients and the information they already possess. Network-wide learning summaries can communicate a safety mechanism without circulating every detail contained in the original report.

Information governance also includes the usability of reporting systems. Research examining healthcare professionals' perspectives on incident reporting software reinforces the relevance of how users interact with reporting and follow-up functions [25]. The conceptual requirement here is continuity between the original report, its interpretation, the resulting communication, and the response received. Software should support that relationship without allowing its administrative status indicators to substitute for substantive safety assessment. A further governance issue concerns the interpretation of differences between pharmacies. Variations in reporting activity may reflect staffing, workload, local confidence

in the reporting process, or the availability of professional support. Research on community pharmacy resilience during the COVID-19 pandemic illustrates the importance of understanding how pharmacy teams adapt their work under changing operational pressures [26]. Pandemic-specific findings cannot be treated as representative of ordinary operations, but they reinforce the relevance of local capacity and work-system conditions when interpreting network information.

Participation arrangements should therefore specify who may submit information, who may request clarification, who can access identifiable records, who authorizes dissemination, and who may initiate escalation. A network analyst's authority to identify a possible recurring problem does not automatically confer authority to inspect unrestricted local records or impose operational changes.

The proposed governance arrangement also requires a documented response to uncertainty. Where the evidence is incomplete, the coordinating function should retain the provisional status of its interpretation and communicate the information needed for further assessment. Where participating pharmacies disagree about a proposed explanation, those differences should remain available for subsequent analysis.

A credible learning network must accommodate reporting without automatically treating every report as evidence of professional failure. At the same time, confidentiality arrangements cannot be represented as an exemption from applicable professional, organizational, or regulatory responsibilities. Those obligations must be established within the participating jurisdiction and reflected in the network's operating agreements.

The governance function ultimately protects the conditions under which information can remain both shareable and interpretable. It also establishes the accountability required for the subsequent movement from shared recommendations to locally authorized preventive action.

Feedback ownership and responsibility for preventive action

The movement of incident-derived knowledge between organizations requires identifiable responsibility for both communication and response. A scoping review of healthcare outcome feedback emphasizes that feedback arrangements involve more than providing information to recipients [27]. For community pharmacy networks, this distinction becomes particularly important when the organization producing the analysis differs from the organization authorized to modify practice.

The proposed arrangement assigns a named feedback steward to each actionable learning proposition. This individual or designated organizational function ensures that the relevant pharmacies receive the communication, understand its intended purpose, and have an opportunity to respond. Ownership includes documenting acceptance, requested clarification, justified non-applicability, and unresolved implementation responsibilities.

Realist research examining audit and feedback at scale identifies context-sensitive mechanisms relevant to implementing feedback strategies [28]. Network-level recommendations should consequently specify their intended recipients and acknowledge differences in local authority and operational capacity.

Feedback design also requires restraint in interpreting recipient responses. A randomized fractional factorial experiment found that individual modifications to audit feedback did not independently improve its primary intention outcome across the participating audit programmes [29]. Comprehension, intention, and completed preventive action must therefore remain distinct in the proposed pharmacy arrangement.

The central responsibility distinction is between the person communicating the learning proposition and the person authorized to act on it. A network coordinator may track responses and escalate unresolved concerns, but local operational responsibility must be accepted by the pharmacy or other actor controlling the relevant process. **Table 2** specifies the proposed allocation of these responsibilities. A documented handoff connects the network's responsibility for maintaining the learning process with the receiving organization's responsibility for determining and enacting an appropriate response.

Table 2. Responsibility allocation for feedback and preventive action across pharmacy organizations

Decision or feedback duty	Accountable actor	Evidence of responsibility transfer	Unresolved-response procedure
Interpret a shared safety signal	Designated network analyst	Documented interpretation and uncertainty	Request further contextual information

Communicate an actionable proposition	Named feedback steward	Recorded recipient and communication	Confirm delivery and identify missing recipients
Determine local applicability	Receiving pharmacy's authorized professional	Documented acceptance, adaptation, or reasoned non-applicability	Request clarification or reconsideration
Authorize preventive change	Local operational decision-maker	Assigned action owner and authorized plan	Refer resource or authority constraints appropriately
Confirm implementation	Designated local verification owner	Recorded evidence of execution	Retain an open action requiring follow-up
Reconsider a recurring concern	Network learning function	Reopened analysis with relevant local responses	Escalate unresolved shared risks through agreed governance

Note: This responsibility allocation is original proposed synthesis. Roles may be combined within smaller organizations, but each responsibility must remain identifiable. A recorded response is not evidence that an intervention has been implemented or has reduced patient harm.

Translation of shared learning into local practice improvement

A shared recommendation acquires operational meaning when a receiving pharmacy examines the conditions necessary to implement it. Research on adapting a community pharmacy medication safety intervention demonstrates the relevance of site-specific implementation considerations [30]. That intervention concerned over-the-counter medication safety; its findings support attention to adaptation without validating the present interorganizational architecture.

Local assessment should establish whether the proposed intervention addresses the identified vulnerability, whether the pharmacy possesses the required resources, and whether the relevant professional has authority to change the process. Adaptation may preserve the preventive mechanism while changing its operational form. Where that mechanism cannot be preserved, the pharmacy should communicate the limitation rather than record nominal compliance.

Learning opportunities also extend beyond reported failures. A mixed-methods systematic review examining approaches to learning from work that goes well identifies an additional perspective for healthcare safety improvement [31]. Community pharmacies may therefore consider how successful detection, interruption, and recovery practices could inform preventive work, while retaining the distinction between demonstrated local performance and transferable expectations.

Evidence from a cluster-randomized trial of audit and feedback implementation strategies in emergency departments further illustrates that the method of delivering improvement support can influence implementation outcomes [32]. Its institutional and clinical setting differs from community pharmacy, making direct effect transfer inappropriate.

Pharmacy-specific self-assessment offers another means of examining local safety arrangements. A Finnish study developed a high-alert medication safety self-assessment tool for community pharmacies [33]. Such tools can assist structured examination of existing practices, although developing an assessment instrument does not itself establish improved patient outcomes.

Within the proposed architecture, local implementation requires an authorized action owner, a documented modification, and an explicit account of how execution will be established. An adapted recommendation remains connected to its original safety concern through a recorded explanation. This preserves the network's ability to interpret implementation differences and reconsider recommendations that repeatedly prove impracticable.

Verification of corrective actions and sustained safety learning

Preventive-action records must distinguish authorization, execution, continued use, and safety outcomes. A study describing the design of a randomized community pharmacy intervention explicitly separates adaptation, effectiveness, and sustainment phases [34]. This provides a relevant methodological distinction, although it does not validate the present network model.

Verification should examine the actual risk control rather than rely exclusively on a statement that an action was completed. Depending on the intervention, relevant evidence might include direct observation, a documented workflow check, or assessment of the modified dispensing process. The appropriate method depends on the original safety concern and the nature of the preventive measure.

Qualitative research combining Safety I and Safety II perspectives in remote primary care demonstrates the value of examining both incident circumstances and the

adaptive practices through which staff maintain safety [35]. Its findings cannot establish community pharmacy outcomes, but they support attention to how controls function during routine work.

The proposed architecture consequently distinguishes immediate confirmation of execution from subsequent assessment of continued implementation. Repeated incidents, unsuccessful controls, and changing local

conditions can reopen an earlier learning proposition. A renewed report should be linked to the previous interpretation without automatically assuming identical causation.

Table 3 specifies the evidentiary distinctions required before a network can characterize an action as implemented, sustained, or associated with a subsequent safety change.

Table 3. Verification requirements for preventive action and sustained medication safety learning

Corrective-action state	Execution evidence	Check mechanism	Residual uncertainty
Action authorized	Named owner and approved local response	Confirm authority and resources	Implementation has not occurred
Action reportedly completed	Documented change to the relevant process	Examine the implementation record	Recorded completion may differ from practice
Control operating	Evidence from the affected workflow	Observe or otherwise assess routine application	Performance may vary by context
Control sustained	Evidence from subsequent practice	Repeat the relevant implementation check	Future durability remains uncertain
Recurrent incident identified	New report linked to earlier concern	Reassess mechanism and prior control	Similar events may have different causes
Safety outcome examined	Appropriately defined outcome information	Use a suitable evaluation design	Attribution remains dependent on ascertainment and comparison

Note: These distinctions constitute proposed synthesis informed by implementation and safety research. No numerical threshold, verification interval, or treatment effect is asserted. Administrative closure does not establish sustained control or reduced patient injury.

The relationship between verification and renewed analysis is illustrated in **Figure 2**. Unresolved action and repeated incident patterns remain visible within the

network, while independent pharmacies retain responsibility for their authorized local changes.

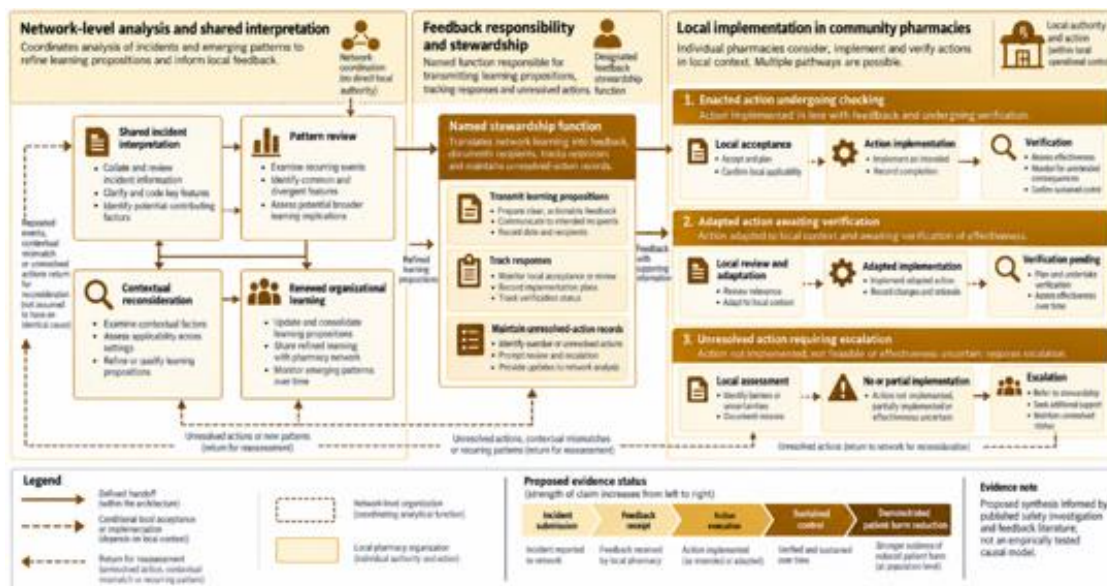


Figure 2. Verification and return of shared safety learning

Implications for pharmacy networks, regulators, and quality improvement

The architecture assigns complementary responsibilities to participating pharmacies, coordinating networks,

professional associations, and regulatory bodies. These actors may contribute to the same learning process while retaining different operational mandates.

For pharmacy networks, the principal function is to maintain the integrity of shared interpretation and feedback. This includes consistent terminology, appropriate information access, designated stewardship, and records that distinguish dissemination from recipient response. The national Finnish medication safety programme provides an example of coordinated pharmacy safety development [8], although its reported activities cannot establish the effectiveness of the present arrangement.

Individual pharmacies retain responsibility for evaluating local applicability, authorizing preventive changes, and documenting implementation. A shared recommendation must therefore be accompanied by sufficient contextual information to support professional judgment. Resource constraints or legitimate differences in workflow should remain visible within network learning records.

Professional associations can facilitate common reporting conventions, training, and exchange of practical implementation knowledge. Regulators may establish applicable accountability and reporting expectations within their jurisdictions. Neither role requires treating the network as the direct manager of independently operated pharmacies.

Quality improvement programmes should distinguish indicators of participation, knowledge transfer, action acceptance, implementation, and verification. The multidimensional character of community pharmacy quality supports this differentiation [7]. Where patient safety outcomes are examined, evaluation must additionally address reporting completeness, observation periods, and plausible alternative explanations.

Results and Discussion

This article specifies an organizational learning architecture in which the movement of incident information is accompanied by identifiable responsibility for interpretation, feedback, implementation, and verification. Its contribution lies in connecting independently governed pharmacies through a shared learning process without assuming that collective information access creates collective operational authority.

Several limitations qualify the proposed relationships. Voluntary incident reporting provides an incomplete and

potentially selective account of medication safety events [2]. Changes in reporting activity may reflect differences in recognition, reporting confidence, or system accessibility. These variations complicate comparisons between pharmacies and interpretation of repeated incident patterns.

The distinction between shared interpretation and local implementation is particularly important. A network-level proposition may identify a plausible preventive mechanism, yet its suitability depends on the receiving pharmacy's resources, workflow, professional responsibilities, and local circumstances. Evidence concerning feedback mechanisms supports attention to recipient and contextual characteristics [28], while the present responsibility arrangements remain untested.

Alternative explanations must also be considered when evaluating subsequent improvement. A reduction in reported events could arise from altered reporting behavior, changes in workload, a modification of the patient population, or unrelated developments in the medication-use system. Conversely, increased reporting may accompany improved recognition and disclosure without indicating deteriorating safety.

The proposed model is intended to preserve these uncertainties. Its unresolved-action register prevents administrative closure from erasing implementation problems, while its return pathway allows recurrent concerns to challenge earlier interpretations. Neither feature guarantees that subsequent decisions will be appropriate or effective.

Empirical assessment should examine whether named responsibility improves the continuity of feedback, whether pharmacies can document locally authorized action, and whether verification distinguishes reported completion from routine implementation. Subsequent research could compare organizational arrangements and investigate feasibility, professional acceptability, implementation fidelity, sustained control, and independently assessed safety outcomes.

The architecture's applicability is also contingent on the governance arrangements of participating jurisdictions. Data-sharing permissions, pharmacy ownership structures, professional responsibilities, and regulatory requirements may vary. These differences require contextual adaptation before operational use.

The resulting conceptual contribution is a more explicit account of where shared safety learning can become disconnected from preventive action. It provides testable organizational distinctions while preserving the

difference between a plausible learning mechanism and demonstrated improvement in patient safety.

Conclusion

Cross-organizational medication safety learning requires continuity between incident interpretation, shared feedback, local responsibility, preventive action, and verification. The proposed architecture assigns identifiable ownership to these functions while preserving the operational independence of participating community pharmacies.

Its central contribution is the separation of learning opportunities from completed and verified preventive work. Unresolved actions, contextual differences, and recurring incident patterns remain available for renewed interpretation.

The architecture offers an organizational basis for designing and evaluating pharmacy-network learning arrangements. Its effectiveness, sustainability, and consequences for patient safety require empirical investigation.

Acknowledgments: None

Conflict of Interest: None

Financial Support: None

Ethics Statement: None

References

1. El Hajj MS, Asiri R, Husband A, Todd A. Medication errors in community pharmacies: A systematic review of the international literature. *PLoS One*. 2025;20(5):e0322392. doi:10.1371/journal.pone.0322392
2. Mäkinen E, Holmström AR, Airaksinen M, Schoultz A. Trends in dispensing errors reported in Finnish community pharmacies in 2015–2020: A national retrospective register-based study. *BMC Prim Care*. 2024;25(1):183. doi:10.1186/s12875-024-02428-y
3. Adie K, Fois RA, McLachlan AJ, Walpole RL, Chen TF. The nature, severity and causes of medication incidents from an Australian community pharmacy incident reporting system: The QUMwatch study. *Br J Clin Pharmacol*. 2021;87(12):4809-22. doi:10.1111/bcp.14924
4. Ledlie S, Gomes T, Dolovich L, Bailey C, Lallani S, Sinclair Frigault D, et al. Medication errors in community pharmacies: Evaluation of a standardized safety program. *Explor Res Clin Soc Pharm*. 2023;9:100218. doi:10.1016/j.rcsop.2022.100218
5. Kwon KE, Nam DR, Lee MS, Kim SJ, Lee JE, Jung SY. Status of patient safety culture in community pharmacy settings: A systematic review. *J Patient Saf*. 2023;19(6):353-61. doi:10.1097/PTS.0000000000001147
6. Ljungberg Persson C, Nordén Hägg A, Södergård B. Measuring the patient safety climate in community pharmacies: An updated national survey. *BMJ Open*. 2025;15(1):e088323. doi:10.1136/bmjopen-2024-088323
7. Hindi AMK, Campbell SM, Jacobs S, Schafheutle EI. Developing a quality framework for community pharmacy: A systematic review of international literature. *BMJ Open*. 2024;14(2):e079820. doi:10.1136/bmjopen-2023-079820
8. Mäkinen E, Koskenkorva T, Holmström AR, Airaksinen M, Kuusisto M, Kyllönen H, et al. Promoting outpatient medication safety in Finland: A mid-term review of a national medication safety programme for community pharmacies (2021–2026). *Health Policy*. 2025;155:105285. doi:10.1016/j.healthpol.2025.105285
9. Tchijevitch O, Hansen SMB, Hallas J, Bogh SB, Mulac A, Walløe S, et al. Methodological approaches for analyzing medication error reports in patient safety reporting systems: A scoping review. *Jt Comm J Qual Patient Saf*. 2025;51(1):46-73. doi:10.1016/j.jcjq.2024.10.005
10. Gqaleni TM, Mkhize SW, Chironda G. Patient safety incident reporting and learning guidelines implemented by health care professionals in specialized care units: Scoping review. *J Med Internet Res*. 2024;26:e48580. doi:10.2196/48580
11. Koskiniemi S, Syyrilä T, Hämeen-Anttila K, Manias E, Härkänen M. Health professionals' perceptions of the development needs of incident reporting software: A qualitative systematic review. *J Adv Nurs*. 2024;80(9):3533-46. doi:10.1111/jan.16106
12. Li L, Badgery-Parker T, Merchant A, Fitzpatrick E, Raban MZ, Mumford V, et al. Paediatric medication incident reporting: A multicentre comparison study of medication errors identified at audit, detected by staff and reported to an incident system. *BMJ Qual*

- Saf. 2024;33(10):624-33. doi:10.1136/bmjqs-2023-016711
13. Vincent C, Carthey J, Macrae C, Amalberti R. Safety analysis over time: Seven major changes to adverse event investigation. *Implement Sci.* 2017;12(1):151. doi:10.1186/s13012-017-0695-4
 14. Crompton A, Waring J, Macrae C, Overton C, Benneyworth R. How can specialist investigation agencies inform system-wide learning for patient safety? A qualitative study of perspectives on the early years of the English Healthcare Safety Investigation Branch. *J Health Serv Res Policy.* 2025;30(1):31-9. doi:10.1177/13558196241291816
 15. Hyvämäki P, Sneek S, Meriläinen M, Pikkarainen M, Kääriäinen M, Jansson M. Interorganizational health information exchange-related patient safety incidents: A descriptive register-based qualitative study. *Int J Med Inform.* 2023;174:105045. doi:10.1016/j.ijmedinf.2023.105045
 16. Al Juffali LA, Knapp P, Al-Aqeel S, Watson MC. Medication safety problems priorities in community pharmacy in Saudi Arabia: A multi-stakeholder Delphi study using the human factors framework. *BMJ Open.* 2019;9(11):e032419. doi:10.1136/bmjopen-2019-032419
 17. Vincent C, Irving D, Bellandi T, Higham H, Michel P, Staines A, et al. Systems analysis of clinical incidents: Development of a new edition of the London Protocol. *BMJ Qual Saf.* 2025;34(6):413-20. doi:10.1136/bmjqs-2024-017987
 18. Wong ZSY, Gong Y, Ushiro S. A pathway from fragmentation to interoperability through standards-based enterprise architecture to enhance patient safety. *NPJ Digit Med.* 2025;8(1):41. doi:10.1038/s41746-025-01442-3
 19. Louch G, Macrae C, Talbot R, McHugh S, O'Hara JK. How were patient safety incidents responded to, investigated, and learned from within the English National Health Service before the implementation of the Patient Safety Incident Response Framework? A rapid review. *J Patient Saf.* 2025;21(5):e42-e55. doi:10.1097/PTS.0000000000001349
 20. Peerally MF, Carr S, Waring J, Martin G, Dixon-Woods M. Risk controls identified in action plans following serious incident investigations in secondary care: A qualitative study. *J Patient Saf.* 2024;20(6):440-7. doi:10.1097/PTS.0000000000001238
 21. Mesinioti P, Macrae C, Sheard L, Hampton S, Louch G, O'Hara J. Closing investigations: The role of national policy in shaping structural, organisational and relational constraints on learning from patient safety incidents. *Saf Sci.* 2025;192:106999. doi:10.1016/j.ssci.2025.106999
 22. Sha'aban A, Torrens-Burton A, Williams D, Carson-Stevens A, Edwards A, Joseph L, et al. Coproducing data-driven organizational safety with patients: Development and cognitive testing of a multisetting patient-reported safety concern tool. *Int J Qual Health Care.* 2025;37(3):mzaf056. doi:10.1093/intqhc/mzaf056
 23. Brown B, Gude WT, Blakeman T, van der Veer SN, Ivers N, Francis JJ, et al. Clinical Performance Feedback Intervention Theory (CP-FIT): A new theory for designing, implementing, and evaluating feedback in health care based on a systematic review and meta-synthesis of qualitative research. *Implement Sci.* 2019;14(1):40. doi:10.1186/s13012-019-0883-5
 24. Gqaleni TMH, Mkhize SW. Barriers to implementing patient safety incident reporting and learning guidelines in specialised care units, KwaZulu-Natal: A qualitative study. *PLoS One.* 2024;19(3):e0289857. doi:10.1371/journal.pone.0289857
 25. Koskinen S, Syrilä T, Hämeen-Anttila K, Mikkonen S, Manias E, Rafferty AM, et al. Patient safety incident reporting software: A cross-sectional survey of nurses and other users' perspectives. *J Adv Nurs.* 2025;81(9):5401-13. doi:10.1111/jan.16364
 26. Peat G, Olaniyan J, Fylan B, Breen L, Grindey C, Hague I, et al. Mapping the resilience performance of community pharmacy to maintain patient safety during the Covid-19 pandemic. *Res Social Adm Pharm.* 2022;18(9):3534-41. doi:10.1016/j.sapharm.2022.01.004
 27. Ali MP, Visser EH, West RL, van Noord D, van der Woude CJ, van Deen WK. Reporting feedback on healthcare outcomes to improve quality in care: A scoping review. *Implement Sci.* 2025;20(1):14. doi:10.1186/s13012-025-01424-9
 28. Sarkies M, Francis-Auton E, Long J, Roberts N, Westbrook J, Levesque JF, et al. Audit and feedback to reduce unwarranted clinical variation at scale: A realist study of implementation strategy mechanisms. *Implement Sci.* 2023;18(1):71. doi:10.1186/s13012-023-01324-w

29. Wright-Hughes A, Willis TA, Wilson S, Weller A, Lorencatto F, Althaf M, et al. A randomised fractional factorial screening experiment to predict effective features of audit and feedback. *Implement Sci.* 2022;17(1):34. doi:10.1186/s13012-022-01208-5
30. Berbakov ME, Hoffins EL, Stone JA, Gilson AM, Chladek JS, Watterson TL, et al. Adapting a community pharmacy intervention to improve medication safety. *J Am Pharm Assoc* (2003). 2024;64(1):159-68. doi:10.1016/j.japh.2023.11.009
31. Birkeli G, Lindahl AK, Hammersbøen ÅM, Deilkås ECT, Ballangrud R. Strategies and tools to learn from work that goes well within healthcare patient safety practices: A mixed methods systematic review. *BMC Health Serv Res.* 2025;25(1):538. doi:10.1186/s12913-025-12680-2
32. Vaughan CP, Burningham Z, Kelleher JL, McGwin G, Jasien CL, Hastings SN, et al. A cluster-randomized trial of two implementation strategies to deliver audit and feedback in the EQUIPPED medication safety program. *Acad Emerg Med.* 2023;30(4):340-8. doi:10.1111/acem.14697
33. Koleva R, Währn A, Celikkayalar E, Kallio S, Laaksonen R. Developing a medication safety self-assessment tool for high-alert medications in community pharmacies. *Explor Res Clin Soc Pharm.* 2025;20:100664. doi:10.1016/j.rcsop.2025.100664
34. Chui MA, Berbakov ME, Gilson AM, Morris AO, Stone JA. Effectiveness and sustainment of a tailored over-the-counter medication safety intervention in community pharmacies: A randomized controlled trial. *Res Social Adm Pharm.* 2022;18(11):3953-63. doi:10.1016/j.sapharm.2022.06.008
35. Payne R, Clarke A, Swann N, van Dael J, Brenman N, Rosen R, et al. Patient safety in remote primary care encounters: Multimethod qualitative study combining Safety I and Safety II analysis. *BMJ Qual Saf.* 2024;33(9):573-86. doi:10.1136/bmjqs-2023-016674