

Preparing Pharmacists to Disclose Medication Errors and Respond After Harm: An Integrative Review of Ethical Education, Communication Practice, and Professional Support

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Abstract

Medication-error disclosure requires more than recognition that an error occurred. Pharmacists and pharmacy learners may need to interpret ethical obligations, communicate transparently with patients and families, respond professionally to harm, manage their own emotional response, and function within institutional systems that support disclosure and learning. To integrate contemporary evidence relevant to preparing pharmacists for medication-error disclosure and post-harm response, with particular attention to ethical preparation, communication practice, second-victim experiences, and professional or institutional support. An integrative-review approach was used to bring together heterogeneous educational, observational, qualitative, review, and implementation evidence. Search concepts addressed medication-error disclosure, pharmacy education, patient-safety communication, second-victim experiences, and professional support. Evidence was evaluated according to design-relevant methodological features and integrated without assuming equivalence between educational outcomes, practitioner attitudes, staff experiences, patient perspectives, and organizational interventions. Direct pharmacy evidence was identifiable but dispersed across pharmacist disclosure attitudes, student simulation, broader medication-safety education, second-victim experiences, and support preferences. Simulation-based studies generally indicated improved confidence, knowledge, attitudes, or observed communication behaviors, although transfer to real disclosure encounters was rarely demonstrated. Patient and family evidence emphasized openness, timeliness, explanation, acknowledgment, support, and forward-looking communication. Post-harm evidence showed that healthcare professionals and learners may experience substantial emotional and occupational effects and that support preferences extend from peers and supervisors to structured institutional programs. The evidence did not support treating these domains as one undifferentiated communication competency. Preparation for medication-error disclosure in pharmacy should connect ethical reasoning, communication performance, response after harm, and access to organizational support while retaining the distinct educational and evidentiary requirements of each domain. Current evidence supports integrated preparation more strongly than it supports any single standardized educational intervention.

Keywords: Medication error disclosure, Pharmacy education, Patient safety, Communication, Second victim, Professional support

Introduction

Disclosure after a medication error occupies an unusual position in patient safety because the professional task begins after prevention has already failed. Modern approaches emphasize truthful communication, responsiveness to patients and families, acknowledgment of harm, and organizational learning as components of an ethically defensible response to error [1–3]. For pharmacists, the educational problem consequently extends beyond recognizing an erroneous prescription, dispensing event, or medication-use process failure. A

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practitioner may also have to determine what should be disclosed, communicate uncertainty without evasion, answer questions about what occurred, contribute to corrective action, and remain professionally functional after participating in an event that harmed a patient.

Patient experience gives this educational problem practical significance. Greater openness following medical error has been associated with less adverse emotional and behavioral impact among patients and families, although observational associations cannot establish that disclosure alone produces those outcomes [4]. Communication scholarship likewise indicates that error disclosure requires attention to content, timing, explanation, apology, and the needs of those receiving the information [5]. These elements are related, yet they represent more than generic interpersonal fluency.

Pharmacy adds a distinct professional context. Medication errors may arise through prescribing, dispensing, administration, transitions of care, monitoring, or system failures involving several professionals. Pharmacy learners can experience the emotional consequences of involvement in error before independent practice, creating a need to prepare them for both patient-facing disclosure and their own response to adverse events [6]. Pharmacy professionals themselves also report second-victim experiences following patient-safety incidents, indicating that competence after an error includes access to appropriate support as well as the ability to communicate with patients [7].

The available literature is fragmented. Disclosure education is frequently studied through simulation; patient research examines experiences of openness after harm; second-victim studies focus on emotional and professional consequences; and organizational literature addresses communication-and-resolution systems and peer support. An integrative review is therefore appropriate because the educational question cannot be answered by treating one intervention type or one outcome as representative of the entire post-error response. This review asks what educational, ethical, communication, post-harm, and professional or institutional-support evidence should inform preparation of pharmacists to disclose medication errors and respond after patient harm.

Materials and Methods

Problem identification

The review problem was defined as preparation for the professional period beginning when a medication error with actual or potential patient consequences is recognized and extending through disclosure, immediate post-harm response, and subsequent support. Four analytically distinct domains were specified: ethical preparation for disclosure; communication performance during the disclosure encounter; response of the involved learner or professional after harm; and professional or institutional support.

This formulation intentionally separated error prevention from post-error competence. Medication-safety education concerning detection, clinical reasoning, or prevention remained relevant when it illuminated preparation for post-error responsibilities, but it was not treated as equivalent to disclosure education. Similarly, emotional support was examined as a professional and organizational requirement rather than as evidence that a learner possessed disclosure competence.

The review followed integrative-review logic in which problem identification, literature search, evaluation, analysis, and presentation remain traceable across heterogeneous evidence [8]. Transparent reporting principles for review identification, screening, eligibility, and inclusion were also used as a reporting reference [9].

Literature search

Searches combined terms from five concept clusters: pharmacy or pharmacist, medication or medical error, disclosure or open disclosure, education or simulation, and second victim or professional support. Searches also used broader patient-safety communication terminology to capture evidence from healthcare education and disclosure programs that could inform pharmacy preparation.

The evidence search emphasized literature published through 2025 and incorporated PubMed-indexed scholarly records, targeted title and DOI verification, publisher records, and citation chaining from directly relevant reviews and studies. Supplementary searching was used to identify pharmacy-specific disclosure studies, simulation reports, second-victim evidence, and organizational support literature that would be missed by a disclosure-only search.

Because the review question crossed educational, ethical, experiential, and organizational literatures, searches were intentionally broader than a single intervention search. Records were retained for assessment when their primary contribution concerned error disclosure, preparation for

disclosure, patient or family experience after disclosure, professional response to patient-safety incidents, or systems intended to support professionals after harm.

Eligibility

Eligible evidence addressed at least one of the four review domains and had a clear connection to healthcare error, medication error, disclosure, professional response after harm, or post-incident support. Populations could include pharmacists, pharmacy learners, other health-profession learners, healthcare professionals, patients or families, provided that the evidence contributed directly to the review question.

Educational studies were eligible when they evaluated teaching, simulation, feedback, assessment, or curricular exposure relevant to disclosure or post-error response. Observational and qualitative studies were eligible when they examined disclosure attitudes, behavior, patient experience, second-victim experience, coping, support needs, or organizational conditions. Systematic, scoping, and narrative reviews were retained when they synthesized a review domain not adequately represented by individual studies. Organizational program reports were considered when their intervention concerned communication-and-resolution processes or structured staff support.

Evidence was not treated as higher quality simply because it appeared in a high-ranked journal. Journal status applied to the final manuscript reference policy, not to study eligibility. Studies were also not excluded because their findings were descriptive, context specific, null, or unfavorable to an educational intervention.

Data evaluation/appraisal

Methodological evaluation was matched to study design. Educational intervention studies were examined for participant selection, comparator structure where present, assessment method, timing of measurement, and whether outcomes represented knowledge, attitudes, observed simulation performance, or real-practice behavior. Cross-sectional evidence was appraised with attention to sampling, response rate, construct measurement, and the limits of association.

Qualitative studies were examined for alignment between research question, sampling, data collection, analytic procedure, and interpretation. Reviews were evaluated for search transparency, eligibility specification, appraisal methods, and correspondence between included evidence and synthesis claims. Program and

implementation studies were evaluated for clarity of intervention components, setting, implementation process, and outcome attribution.

Methodological limitations were carried into synthesis rather than converted into a simple quality hierarchy. A simulation study could inform teachable communication behaviors without demonstrating transfer to clinical practice; a cross-sectional survey could identify professional experience without establishing prevalence beyond its sampled context; and an organizational program could demonstrate feasibility without proving superiority over alternative support models.

Data extraction

Extraction captured study design, jurisdiction, professional or educational setting, participant group, reported sample size, intervention or exposure, comparator where applicable, assessment approach, temporal design, principal findings, stated limitations, and applicability to pharmacy education or practice.

Evidence was also coded for the point in the post-error trajectory that it addressed: preparation before an event, recognition of disclosure responsibility, the disclosure encounter, immediate professional response after harm, longer-term recovery or learning, and organizational support. Separate coding distinguished directly evaluated educational practices from review-level educational implications.

For disclosure studies, extraction emphasized what participants were taught or assessed to communicate, including acknowledgment of the error, explanation, apology, prevention of recurrence, and responses to patient questions. For second-victim and support studies, extraction emphasized emotional or occupational effects, coping, preferred sources of support, institutional structures, and limitations on generalizability.

Data analysis and integration

Analysis used iterative comparison across the four review domains. Evidence was first examined within design type so that simulation outcomes were not pooled conceptually with patient surveys, qualitative accounts, or organizational program evaluations. Findings were then compared across designs to identify recurring educational requirements, disagreements, untested transitions, and gaps between what is taught and what practitioners may encounter after harm.

The integration distinguished three evidence statuses. Direct evidence referred to findings reported in the

source studies. Cross-study synthesis referred to patterns that became visible when multiple evidence types were considered together. Educational integration was reserved for implications that logically connected the domains but had not necessarily been evaluated as a complete curriculum.

This distinction was particularly important when considering transfer. Improved confidence after simulation was not interpreted as evidence of competent disclosure in real clinical encounters. Likewise, the existence of second-victim distress did not establish that a particular support program improves disclosure performance or patient outcomes.

Presentation of integrated evidence

Results are presented first by study selection and evidence characteristics and then by the four substantive domains. Ethical preparation and communication skills are separated because understanding professional responsibility does not ensure competent patient-facing communication. Response after harm is then considered separately from institutional support, allowing personal experience and organizational response to remain analytically distinguishable.

The final results section integrates educational gaps across those domains. This organization permits

evidence from pharmacy to remain visible while using transferable evidence from medicine, nursing, interprofessional education, patient experience, and healthcare organizations only where the underlying professional task is sufficiently comparable.

Results and Discussion

Study selection

The retained search history supported verification of the included evidence and its bibliographic identity but did not preserve a complete record-level export from which identification, duplicate-removal, title/abstract exclusion, and full-text exclusion totals could be reconstructed with confidence. Those values were therefore not retrospectively inferred. In particular, the fixed manuscript reference allocation was not used as a substitute for a search or inclusion count.

The final evidence reservoir contained direct pharmacy studies together with transferable healthcare-education, patient, second-victim, communication-and-resolution, and staff-support evidence. Sources serving only methodological or broad contextual functions were kept analytically separate from evidence contributing to the substantive synthesis.

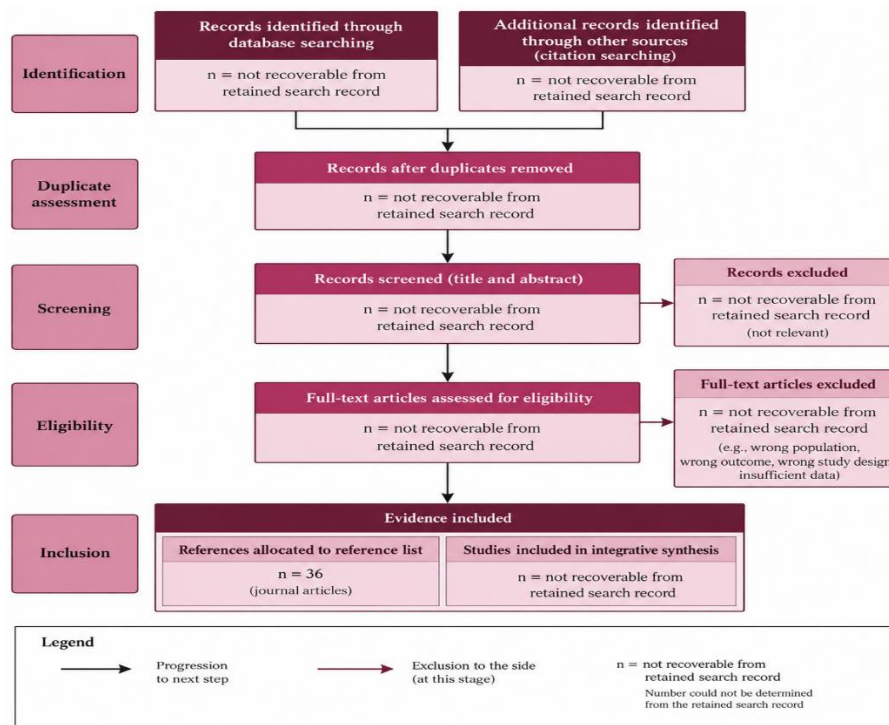


Figure 1. Integrative-review search and selection pathway

Study characteristics

The evidence base was heterogeneous in both design and professional proximity to pharmacy. Pharmacy-specific evidence included pharmacist surveys, pharmacy-student and interprofessional simulations involving pharmacy learners, studies of second-victim experience among pharmacy professionals, and investigations of pharmacy education relevant to medication-safety competence. Broader healthcare evidence included patient and family surveys, medical and interprofessional disclosure education, qualitative research with healthcare learners, reviews of second-victim experience, and evaluations of organizational communication or staff-support programs.

The evidence also differed by outcome. Some educational studies measured self-reported confidence or attitudes; others assessed performance during simulated disclosure. Practitioner surveys addressed beliefs, experiences, or support preferences. Patient studies addressed perceived openness and consequences of communication after harm. Second-victim studies focused on distress, coping, recovery, or work-related outcomes, while organizational studies examined implementation of communication-and-resolution or peer-support programs. These outcomes were treated as complementary but non-equivalent.

Table 1. Evidence configurations contributing to pharmacist preparation for disclosure and post-harm response

Evidence configuration	Participant group	Setting	Primary educational/professional focus	Disclosure-stage contribution	Principal evidentiary boundary
Disclosure education program	Healthcare learners	Educational/clinical training	Ethical recognition and disclosure preparation	Pre-encounter preparation	Educational outcomes do not demonstrate clinical transfer
Pharmacist disclosure survey	Practising pharmacists	Community and hospital pharmacy	Attitudes, responsibility, intended disclosure behavior	Recognition and disclosure decision	Self-reported behavior
Disclosure simulation	Health-profession learners	Simulation	Acknowledgment, apology, explanation, recurrence prevention	Disclosure encounter	Simulated performance
Interprofessional medication-error simulation	Pharmacy and other health-profession learners	Interprofessional education	Team communication after error	Disclosure encounter	Short-term educational assessment
Telehealth disclosure simulation	Pharmacy and medical learners	Simulated consultation	Remote interprofessional disclosure	Disclosure encounter	Real-patient transfer untested
Learner disclosure-preparation survey	Health-profession students	University education	Perceived preparation and curriculum exposure	Pre-encounter preparation	Descriptive educational evidence
Feedback intervention	Resident physicians	Simulation	Refinement of disclosure performance	Disclosure encounter	Non-pharmacy population
Student second-victim qualitative evidence	Healthcare students/graduates	Education/clinical learning	Experience, coping and learning after error	Post-harm response	Context-specific qualitative transfer
Student second-victim review evidence	Healthcare learners	Multiple settings	Frequency, experience and curricular support	Post-harm response	Heterogeneous measures and populations
Curriculum-focused second-victim evidence	Nursing/medical learners	Multicountry education	Formal curricular attention to post-error experience	Preparation and recovery	Limited direct pharmacy representation
Communication-and-resolution evidence	Healthcare organizations	Hospital systems	Disclosure process and organizational response	Disclosure and follow-through	Implementation context influences outcomes
Pharmacy second-victim consensus evidence	Community pharmacists	Pharmacy practice	Stressors and preferred support	Post-harm response/support	Consensus does not establish intervention efficacy
Pharmacy second-victim measurement evidence	Pharmacy professionals	Practice settings	Assessment of second-victim experience	Post-harm response	Measurement validity does not equal treatment effect
Pharmacy support-education qualitative evidence	Community pharmacists	Pharmacy practice	Perceived educational and support needs	Preparation/support	Perceived usefulness is not effectiveness

Second-victim measurement review	Healthcare professionals	Multiple settings	Measurement quality and construct coverage	Post-harm assessment	Instrument heterogeneity
International support review	Healthcare professionals	Multiple systems	Multilevel support options	Professional/institutional support	Predominantly heterogeneous observational evidence
Intensive-care second-victim review	ICU professionals	Acute care	Burden, risk and recovery	Post-harm response	High-intensity setting may limit pharmacy transfer
Staff-support systematic review	Healthcare staff	Multiple settings	Desired, available and effective support	Professional/institutional support	Intervention heterogeneity
Institutional support standards	Healthcare organizations	International	Structured second-victim support	Institutional follow-through	Framework implementation exceeds outcome evidence
Peer-support program evaluation	Healthcare professionals	Health system	Scalable peer support	Institutional follow-through	Context-specific program evaluation
Open-disclosure practitioner study	General practitioners/trainees	Primary care	Disclosure and practitioner experience	Disclosure/post-harm interface	Non-pharmacy professional setting
Pharmacy patient-safety education review	Pharmacy students	Entry-to-practice programs	Error recognition, disclosure and management	Preparation	Broad patient-safety scope
Pharmacy-inclusive disclosure simulation	Interprofessional students	Simulation	Disclosure knowledge and attitudes	Disclosure encounter	Predominantly short-term outcomes
Medication-error reasoning study	Pharmacy students	Pharmacy education	Detection and resolution of error	Pre-error/recognition interface	Detection competence cannot substitute for disclosure competence
Nontechnical-skills simulation	Senior pharmacy students	Simulation	Communication and other nontechnical skills	Preparation	Does not directly test real error disclosure

Ethical preparation for disclosure

Ethical preparation begins with recognizing that disclosure is a professional obligation involving the patient, not simply a risk-management decision. Educational work has shown that explicit instruction can increase learners' confidence in discussing errors and can make disclosure expectations more visible within patient-safety training [10]. Direct pharmacist evidence also indicates broad support for disclosure while revealing differences in how pharmacists understand responsibility, the completeness of disclosure, and appropriate responses after a medication error [11]. These differences matter educationally because agreement that patients should be informed does not specify who should communicate, what should be said, or how uncertainty and shared responsibility should be handled.

Social and psychological influences complicate this ethical task. Concern about blame, professional identity,

anticipated judgment, hierarchy, and the wish to preserve competence in the eyes of others can influence whether and how clinicians disclose an error [12]. Ethical preparation must therefore make disclosure obligations usable under the conditions in which errors actually occur, including uncertainty, embarrassment, multiple contributors, and fear of consequences.

Simulation evidence illustrates the gap between endorsing disclosure and performing it. Learners may omit discussion of recurrence prevention or fail to offer an unprompted apology even when they recognize that disclosure is required [13]. Ethical knowledge is thus a necessary substrate for disclosure, but it requires practice in converting duties into observable communicative actions.

The relationship among ethical responsibility, communicative action, post-harm professional response, and support is summarized below without collapsing those domains into one competency.

Table 2. Distinct but intersecting educational tasks across the medication-error disclosure trajectory

Disclosure-related task	What preparation must enable	Evidence most directly available	What remains educationally unresolved
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Recognize a duty to disclose	Identify when transparency to the patient or family is ethically required	Ethics-oriented education and pharmacist attitude evidence	Handling disputed responsibility and uncertain causation
Decide what must be communicated	Distinguish acknowledgment, known facts, uncertainty, apology and prevention plans	Disclosure education and simulation	Consistency across complex medication-use systems
Conduct the disclosure conversation	Communicate clearly, respond to questions and avoid evasive language	Simulation, feedback and patient-experience evidence	Transfer to real pharmacist-patient encounters
Respond professionally after harm	Recognize distress, seek support and continue safe practice	Second-victim studies and learner qualitative evidence	How preparation influences recovery or later disclosure
Activate organizational support	Know when and how to access peer, supervisor and institutional resources	Support reviews and program evidence	Comparative effectiveness of support models
Learn from the event	Connect disclosure with investigation, prevention and follow-through	Communication-and-resolution and patient-safety evidence	Integration into one longitudinal pharmacy curriculum

Communication skills

Communication evidence consistently indicates that disclosure is behaviorally demanding. An interprofessional medication-error simulation demonstrated that pharmacy and other health-profession learners can engage with the communication and teamwork demands created by an error [14]. This is important because medication errors often cross professional boundaries; the pharmacist may need to participate in a disclosure initiated by another professional, clarify the medication-use process, or coordinate communication when responsibility is distributed.

More recent educational studies extend this principle through telehealth disclosure simulation, surveys of learner preparation, and structured feedback on disclosure performance [15–17]. Together, they indicate that communication skills can be rehearsed and assessed and that feedback can improve subsequent simulated performance. The available designs, however, are considerably stronger for immediate educational outcomes than for sustained behavior in real medication-error encounters.

The educational content suggested across these studies is concrete: acknowledge that an error occurred, explain what is known in comprehensible language, apologize appropriately, respond directly to patient questions, describe immediate consequences and care, and explain what will be done to reduce recurrence. Teaching should also prepare learners for situations in which facts are incomplete or multiple professionals are involved. The goal is not a memorized disclosure script; it is reliable

performance of key communicative functions under emotionally difficult and uncertain circumstances.

Responding after harm

Disclosure education often centers the patient conversation, whereas the professional involved in the error may simultaneously be experiencing shock, guilt, shame, fear, self-doubt, or concern about professional consequences. Qualitative evidence from healthcare students and recent graduates shows that learners can experience the characteristics commonly associated with the second-victim phenomenon and may rely on informal coping, reflection, or social support after events [18].

A systematic review of healthcare students similarly found that second-victim experiences occur during training while evidence about structured interventions remains limited [19]. This matters for pharmacy education because exposure to medication errors can occur during experiential learning, simulation, internships, or early practice. A curriculum that teaches disclosure while ignoring the learner's capacity to function after involvement in harm addresses only part of the post-error task.

Multicountry curriculum research further suggests that second-victim concepts and structured preparation for responding to error-related distress are not consistently embedded in professional education [20]. Post-harm preparation should consequently include recognition of distress, routes to confidential support, expectations for immediate patient-safety responsibilities, and guidance about when distress impairs continued safe practice. Such preparation should not pathologize normal

emotional responses or imply that professional support replaces accountability to patients.

Professional/institutional support

The organizational environment shapes what follows an error. Communication-and-resolution programs illustrate an institutional approach in which disclosure, patient response, investigation, and resolution are treated as coordinated activities rather than isolated conversations [21]. Implementation research indicates that such programs require organizational commitment, operational processes, and reliable communication practices; policy endorsement alone does not ensure consistent execution [22].

Pharmacy-specific evidence shows why institutional support is relevant. Consensus work with community pharmacists identified psychological and professional effects associated with medication-error involvement and emphasized peer support among preferred responses [23]. Measurement research in pharmacy professionals has also supported structured assessment of second-victim experience, making visible dimensions of distress and perceived organizational support that may otherwise remain informal [24]. Qualitative work with community pharmacists indicates perceived value in education addressing risk, stress, communication and support, although perceived usefulness cannot be interpreted as evidence that a particular educational package improves patient or practitioner outcomes [25].

Across healthcare more broadly, the instruments used to assess second-victim experience are themselves heterogeneous. A scoping review of the Second Victim Experience and Support Tool literature found generally supportive psychometric evidence while also identifying variation across versions, settings, and uses [26]. Measurement can help institutions identify patterns of distress and support, but scores should not be treated as a complete account of recovery or professional functioning.

Review evidence describes support as a multilevel activity extending from prevention and immediate colleague response to structured peer assistance and specialized professional support [27]. Evidence from intensive-care environments demonstrates that the burden and recovery trajectory can vary substantially and may be amplified in high-intensity clinical contexts [28]. Such findings are informative for pharmacy but should not be transferred as if workplace exposure and professional roles were identical.

A systematic review of healthcare staff support after patient-safety incidents found a recurring mismatch between the support staff want, the support they receive, and the evidence available regarding effectiveness [29]. This distinguishes the presence of a support program from the accessibility, acceptability, timeliness, and utility of that support.

More formal institutional approaches are emerging. The RESCUE framework translates second-victim support into organizational standards covering intervention and staff preparation, providing a structured basis for implementation across healthcare institutions [30]. Pharmacy education reviews, meanwhile, indicate that disclosure and management of medication errors can appear within broader patient-safety curricula but remain inconsistently organized across programs [31]. Peer-support initiatives such as the Healing Emotional Lives of Peers program demonstrate that healthcare organizations can operationalize rapid peer support at scale, while their results remain linked to the institutional contexts in which they were implemented [32].

Open-disclosure research among general practitioners further shows that disclosure behavior and clinicians' own post-incident experiences are connected in practice [33]. Taken together, the evidence suggests that education should prepare pharmacists not only to offer disclosure but also to recognize and use the systems surrounding disclosure: incident reporting, supervision, peer support, escalation, follow-up, and organizational learning.

Integrated educational gaps

The strongest gap is fragmentation. Pharmacy-inclusive disclosure simulation demonstrates that learners can practise post-error communication, yet the evidence rarely follows learners into real medication-error disclosure encounters [34]. Pharmacy education also increasingly develops clinical reasoning for detecting and resolving medication errors, but competence in identifying an error does not itself establish competence in explaining that error to a harmed patient [35]. Likewise, simulation of nontechnical skills can strengthen communication-related performance while leaving the specific ethical and emotional demands of disclosure incompletely tested [36].

Four further gaps emerge from the integrated evidence. First, educational studies tend to emphasize immediate learner outcomes, especially confidence, attitudes, knowledge, or simulated behavior; patient-centered

outcomes and sustained practice are uncommon. Second, ethical preparation and communication assessment are seldom linked prospectively to post-harm coping and support use. Third, pharmacy-specific evidence remains smaller than the broader healthcare literature, requiring cautious transfer from medicine, nursing, and multidisciplinary settings. Fourth, institutional support is commonly studied as an employee or organizational concern rather than as something learners must understand before independent practice.

These gaps point toward longitudinal preparation rather than a single disclosure exercise. Learners need opportunities to recognize disclosure obligations, practise conversations, receive feedback, manage uncertainty, understand the emotional consequences of error involvement, and learn how organizational support and follow-up operate. The evidence supports each component to different degrees; it does not yet demonstrate that a fully integrated curriculum produces superior patient, professional, or organizational outcomes.

Table 3. Educational discontinuities revealed across pharmacist preparation for medication-error disclosure

Evidence-supported gap	What current evidence commonly addresses	What remains weak or untested	Priority for educational integration
Ethical-to-behavior gap	Recognition that errors should be disclosed	Translation of ethical obligation into reliable real-world disclosure	Couple ethics teaching with observed disclosure performance
Simulation-to-practice gap	Confidence, attitudes and simulated communication	Sustained behavior during actual medication-error events	Assess transfer during experiential education and early practice
Detection-to-disclosure gap	Medication-error recognition and clinical reasoning	Communication after the error has been recognized	Extend medication-safety teaching beyond detection and correction
Disclosure-to-recovery gap	Patient-facing conversation	Learner/professional functioning after harm	Teach disclosure alongside post-incident self-recognition and support seeking
Individual-to-system gap	Personal communication skills	Navigation of reporting, supervision, peer support and follow-up	Make institutional response part of professional preparation
Support-availability gap	Description of preferred or existing support	Comparative evidence on accessibility and effectiveness	Evaluate support use and outcomes, not program existence alone
Pharmacy-transfer gap	Broader healthcare evidence	Pharmacy-specific patient, learner and practice outcomes	Test mechanisms directly in pharmacy settings
Outcome gap	Short-term educational outcomes	Patient experience, recurrence, professional recovery and long-term practice	Use longitudinal, multi-perspective outcome designs

The integrated evidence therefore defines a post-error educational problem with several connected but non-substitutable competencies. Ethical reasoning establishes why disclosure is owed; communication training develops how that obligation is enacted; post-harm preparation addresses the professional's ability to respond safely after involvement in harm; and institutional literacy connects individual action with the systems responsible for support, investigation and follow-through. The extent to which these elements should be combined pedagogically is examined in the remaining sections.

This review indicates that preparing pharmacists for medication-error disclosure is best understood as a sequence of related professional capabilities rather than a narrowly defined communication exercise. The

literature supports ethical preparation, disclosure rehearsal, post-harm support, and organizational follow-through, but these elements have largely developed in separate evidence streams. Patient and family research gives particular weight to openness, responsiveness, and the quality of communication after an adverse event [3]. Pharmacy-specific evidence shows that pharmacists generally endorse disclosure while differing in views about responsibility, content, and management of patient emotions [11]. These findings make the educational challenge more specific than teaching that disclosure is ethically desirable.

The communication literature provides the clearest evidence that performance can be taught and assessed. Simulation studies identify concrete behaviors that learners may omit despite recognizing the need to

disclose, including apology and discussion of recurrence prevention [13]. Structured feedback can improve subsequent simulated disclosure performance [17], and pharmacy-inclusive interprofessional simulation has produced improvements in disclosure-related knowledge and attitudes [34]. These outcomes support deliberate practice, but they do not establish durable transfer to real encounters involving harmed patients, uncertain causation, organizational scrutiny, and continuing therapeutic relationships.

The post-harm literature adds a second educational problem. Healthcare learners and professionals may experience guilt, anxiety, diminished confidence, intrusive recollection, or work-related consequences after involvement in a patient-safety incident [19]. Pharmacy-specific studies confirm that these concerns are relevant to pharmacists rather than merely transferable from medicine or nursing [23]. Preparation that ends when the patient conversation ends may consequently leave learners without a workable understanding of how to seek help, participate in investigation, maintain safe professional functioning, and learn from the event.

Support cannot be reduced to individual resilience. Systematic review evidence identifies discrepancies between the support healthcare staff want and what is available after safety incidents [29]. More structured organizational initiatives demonstrate that peer support, escalation pathways, and institutional standards can be operationalized [30]. The educational implication is that pharmacists should enter practice knowing how such systems function and how to access them. The evidence does not establish one universally superior support model, and institutional resources vary considerably across settings.

An additional finding concerns the boundary between medication-safety competence and disclosure competence. Pharmacy curricula already address patient safety, error recognition, management, and, in some programs, disclosure [31]. Clinical reasoning studies likewise show that pharmacy learners can develop skills for detecting and resolving medication errors [35]. Those abilities are foundational but address a different question from explaining an error to a patient, acknowledging harm, communicating what is known and uncertain, and participating in post-event follow-through. Future educational evaluation should preserve this distinction when selecting outcomes.

The review therefore supports a conditional conclusion. An integrated educational approach is warranted because the professional tasks surrounding medication-error disclosure interact in practice. Evidence is much less developed for the effectiveness of a fully integrated curriculum. The strongest current basis is component-level: disclosure behaviors can be practised; pharmacists demonstrate identifiable attitudes and support needs; patients value open and responsive communication; and institutions can organize post-incident support. The next research step is to test how these components function together across experiential education and early professional practice.

Proposed educational integration

Educational integration should begin before an error occurs. Learners need explicit preparation for the ethical responsibility to disclose, including situations involving shared responsibility, incomplete information, or uncertainty about causation. Educational programs that make disclosure expectations explicit provide one foundation for this preparation [10]. Ethical instruction should then be connected to observed performance so that recognition of responsibility becomes communicative action.

A second component is repeated disclosure practice. Simulation should expose learners to more than a cooperative standardized patient encounter. Scenarios can vary patient emotion, degree of harm, certainty about facts, number of professionals involved, and whether the pharmacist caused, detected, or inherited the error. Existing disclosure simulations demonstrate the feasibility of rehearsing these encounters [15]. Feedback should focus on acknowledgment, explanation, apology, patient questions, immediate care, and prevention plans while avoiding rigid scripting.

A third component should prepare learners for their own response following harm. Pharmacy professionals have identified education and support needs related to stress and the consequences of medication errors [25]. Learners should know how to recognize when distress is affecting safe practice, where confidential support can be obtained, and how professional accountability can coexist with receiving support.

Finally, education should make organizational follow-through visible. Pharmacists should understand incident reporting, escalation, multidisciplinary investigation, communication-and-resolution processes, peer support, and the need for continued contact with patients where

appropriate. These topics connect individual competence with institutional responsibility without making learners responsible for systems they do not control.

The resulting educational integration is illustrated in **Figure 2**. Solid connections represent relationships

directly supported by the reviewed evidence; dashed connections identify educational relationships proposed through integrative synthesis and requiring prospective evaluation.

From preparation to safer practice

An integrated framework for pharmacist medication-error disclosure and post-harm support

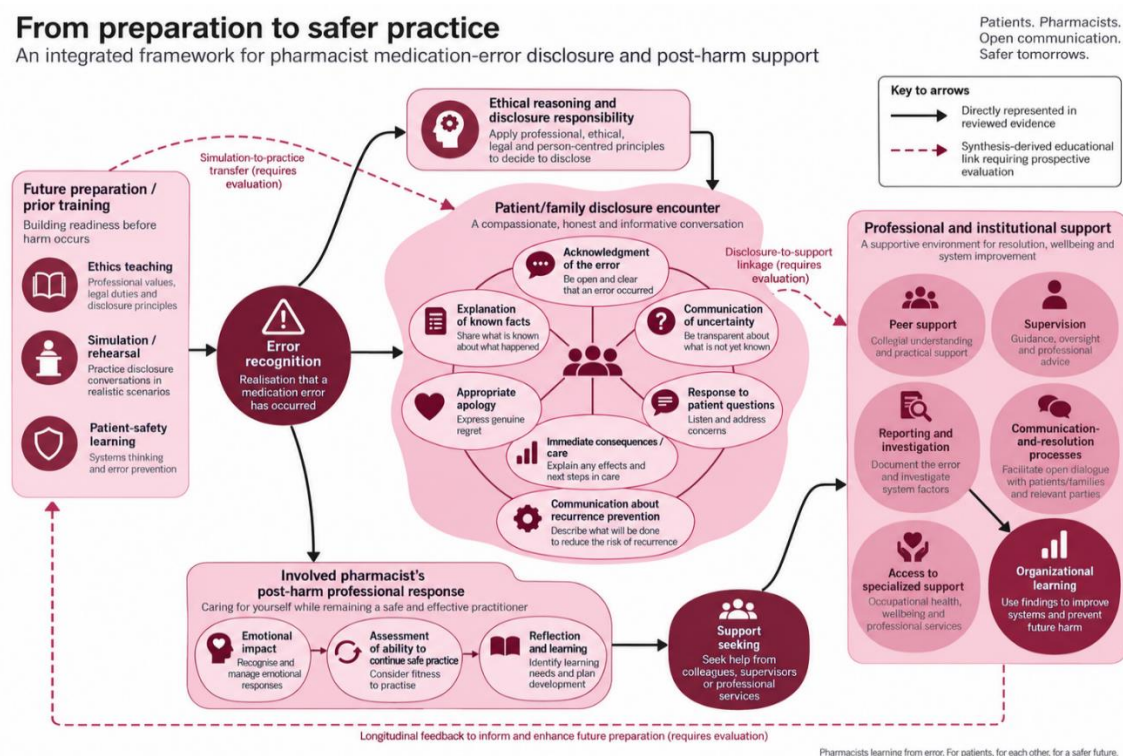


Figure 2. From disclosure obligation to supported follow-through: evidence-informed integration of pharmacist preparation after medication error

Strengths and limitations

A principal strength of this review is the integration of evidence that is often considered separately. Pharmacy disclosure attitudes, disclosure education, patient experience, second-victim research, and organizational support were examined as different sources of knowledge about the same post-error professional trajectory. Maintaining design distinctions also reduced the risk of treating simulated educational improvement, practitioner attitudes, patient experience, and organizational implementation as interchangeable evidence.

Several limitations constrain interpretation. Direct pharmacy research was smaller than the broader healthcare literature, making some educational implications dependent on transfer from medical, nursing, interprofessional, or general healthcare settings. Many educational studies relied on short-term outcomes

and simulated encounters, while observational studies were susceptible to self-report, selection, and setting effects. Support studies were heterogeneous in constructs, interventions, and outcome measurement. A further methodological limitation is that the retained search record did not permit defensible reconstruction of complete source-by-source retrieval, deduplication, screening, and full-text exclusion arithmetic. No numerical selection values were retrospectively manufactured to fill that gap. This limits reproducibility of the review-flow component and should be corrected through a prospectively preserved database export and screening log before this manuscript is treated as a definitive systematic account of the evidence base. The review also did not establish comparative effectiveness among disclosure curricula or support systems. Proposed connections among ethical preparation, communication practice, post-harm

response, and institutional support should therefore be understood as an evidence-informed educational integration requiring prospective evaluation.

Conclusion

Preparing pharmacists to disclose medication errors requires more than teaching error recognition or a disclosure script. The available evidence supports four distinguishable areas of preparation: ethical responsibility, patient-facing communication, professional response after harm, and knowledge of the support systems surrounding the event. Pharmacy-specific evidence exists in each broader area, but it remains fragmented and is supplemented substantially by evidence from other health professions and healthcare organizations.

Educational programs can reasonably connect these areas while preserving their different purposes. Learners should be able to recognize when disclosure is owed, communicate openly under difficult conditions, respond safely to their own involvement in harm, and access institutional support and learning processes. What remains uncertain is whether integrating these elements into a longitudinal pharmacy curriculum improves real disclosure behavior, patient experience, professional recovery, or organizational learning. Those outcomes define the next stage of research.

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