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REVIEW

# An Integrative Review of Opioid Stewardship: Optimizing Patient Care and Safety with a Multidisciplinary Approach

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**Abstract:** The opioid crisis in the United States continues to take the lives of tens of thousands of Americans each year. Opioid medications are important components of acute pain management and opioid stewardship is necessary to mitigate opioid misuse while providing adequate pain control for patients with severe medical needs. The definition of opioid stewardship includes the use of evidence-based guidelines, policies, and patient-centered practices to promote appropriate prescribing, use, and deprescribing of opioids to optimize treatment and minimize adverse consequences. There is little concrete guidance about how to achieve these goals or define the role and importance of various healthcare professionals in opioid stewardship programs. An integrative review process was used to evaluate and collate best practices in opioid stewardship from a variety of published papers. The integrative review was chosen to be inclusive of papers outside of quantitative research, allowing for interpretation of qualitative research, position statements, reports, editorials, and opinions. Data extraction included 71 publications that revealed common characteristics that can improve and coalesce opioid stewardship programs. Top characteristics and themes developed include prescribing guidelines, patient and provider education, referral and consultation, prescribing audits, barriers to opioid stewardship, the use of multidisciplinary teams and non-physician healthcare providers, accountability, risk of misuse, access to care, and patient-centeredness. The use of electronic health record tools, decision support tools, patient screening and discharge standards, and opioid tapering were recommended. Open and consistent communication between patients and healthcare providers is deemed essential. Staffing resources were found to be a significant barrier to opioid stewardship. This integrative review of publications related to opioid stewardship seeks to provide a comprehensive list of best practices that can be incorporated into programs to streamline processes and contribute to an organized foundation that can be used in research to illuminate practices that lead to enhanced outcomes.

**Keywords:** opioid, stewardship, multidisciplinary, education, patient-centered, barriers

## Introduction

The opioid crisis in the US continues to take the lives of tens of thousands of Americans each year.[1] According to the National Survey on Drug Use and Health, 8.9 million people aged 12 or older misused opioids in 2022. Of these, 8.5 million people misused prescription pain relievers. Among those diagnosed with a substance use disorder, less than 1% sought treatment owing to either believing that treatment was not needed or a lack of healthcare providers and treatment facilities.[2] Data collated by the National Vital Statistics System counted more than 105,000 drug overdose deaths in the 12-month period ending October 2023 with approximately 70% of these deaths attributable to synthetic opioids.[3] A paradox of these crises is that opioids are still important medications to manage pain, especially acute pain in the inpatient hospital setting.[4] Healthcare professionals find themselves caught between trying to prevent opioid misuse and adequately controlling the pain of patients with severe medical needs. Professionals across disciplines are now called upon to be good stewards of opioids in their management of severe pain.

Stewardship is defined as "the careful and responsible management of something entrusted to one's care".[5] Healthcare professionals are frequently called to be good stewards of resources which are limited in supply and interventions whose misuse can lead to negative consequences. Antimicrobial stewardship, or the judicious use of antibiotics, has been

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promoted since the late 1990s due to the rise in antibiotic resistant bacteria which is directly related to the overuse of antibiotics. Antimicrobial stewardship programs within healthcare settings provide guidance, monitoring, and feedback to prescribers so that they limit their use of antibiotics to only those situations which warrant them.[6]

Similarly, there has been a call for opioid stewardship programs to reduce the use of opioids to minimize the risk of harm from the misuse of opioids past their prescribed period while still managing pain effectively. Shrestha et al[7] proposed a universal definition based on a systematic literature review which included 19 articles that defined opioid stewardship.

> Opioid stewardship programs include evidence-based guidelines, policies, person-centered practices and research to promote rational prescribing, use and deprescribing of opioids for managing pain and specified health conditions. Opioid stewardship programmes should aim to optimise treatment by maximising clinical benefits for the patients and the wider society and minimising adverse consequences, including overuse, misuse, and diversion. Effective patient-provider communications and involving patients and/or their carers in decision-making are key to implementing any opioid stewardship program by considering evidence-based outcomes that matter to patients. Stewardship programmes should also focus on safe procurement, storage, and disposal practices. (Shrestha et al, 2023, p. 391)

Their definition strives to include the patient and shared decision-making to be as important as judicious prescribing practices.

As occurs with many definitions and policy guidance, this definition contains many statements about what stewardship programs should include, with little concrete guidance on how to achieve these goals and the role of different healthcare professionals in such a program. There is a lack of consensus regarding what constitutes opioid stewardship, as well as staffing patterns that do not allow time for opioid stewardship measures. A need exists for a wide-ranging accounting of what opioid stewardship entails to allow for more consistent development and implementation.

Our findings represent a comprehensive list of best practices which can be incorporated into opioid stewardship programs across the globe. This paper aims to provide the results of an integrative review of opioid stewardship practices to inform healthcare providers and institutions and form the basis for consistent and practical development and implementation of opioid stewardship.

## Purpose

As noted, current opioid stewardship programs are often institution-specific and involve internally devised metrics that have not been standardized into clear objectives that constitute "opioid stewardship". Interventions have focused primarily on prescribers and prescribing practices and less on non-prescribing healthcare providers and multidisciplinary teams. Patient assessments and education, as well as medication regimen histories and reviews that can be performed by nurses and pharmacists are less well-studied. To fill this gap, we sought to synthesize the literature promoting concepts of opioid safety and stewardship through the lens of multidisciplinary practice and patient care as defined by the literature. We focused on opioids in general rather than on specific conditions for which opioid may be prescribed, such as cancer or chronic pain, in order to develop broad concepts of opioid stewardship rather than the specific recommendations for prescribing for acute pain, chronic pain, or cancer pain.

## Methods

We chose to conduct an integrative review to address opioid stewardship because this type of review allows for the inclusion of not only qualitative and quantitative research literature but also editorials, professional organization position papers and guidelines, reports, and quality improvement projects.[8] This allows us the broadest view of stewardship practices from a multidisciplinary perspective and the identification of the most common characteristics and themes related to stewardship.

## Literature Search

We began our literature search by asking the question: *How are concepts of opioid stewardship focused on patient care and safety being used by healthcare professionals in their practice-specific roles (pharmacy, nursing, medicine) and in*

*multidisciplinary healthcare teams?* Using this question, we searched the following databases: Web of Science for "opioid stewardship", and CINAHL, Academic All Search Complete, and PubMed for "opioid stewardship AND patient care". We limited our search to the years 2013–2023. Our search approach and terms were developed in partnership with a medical librarian within the Purdue University Library system who influenced our decisions regarding search terms and databases.

We included publications from or about healthcare settings, opioid dispensing, prescribing, and administering, patient safety or patient care, nursing, pharmacy, and physician activities. We included research publications as well as position statements and guidelines from professional organizations, reports, and editorial or opinion pieces across the globe if published in English. We excluded publications that were outside of healthcare settings including dentistry, non-professional administration of opioids, and papers published before 2013.

Our search returned 286 publications which were uploaded to Covidence for evaluation. Covidence is an online software platform that is used to manage literature reviews by research teams. There were 89 duplicate articles removed identified in multiple searched databases and an additional 76 studies were removed during screening due to the team determining they were irrelevant based on team consensus. Of the 114 full-text manuscripts reviewed, an additional 43 studies were excluded by team consensus, primarily because they reported solely on descriptive studies of opioid prescribing without any inclusion of stewardship practices or interventions. Data extraction was conducted by group consensus on 71 publications. Two reviewers independently reviewed each publication using a template described below. Not all fields applied to all publications reviewed. At each stage of the review process, two reviewers independently reviewed and made an assessment. Covidence indicated if there was a difference in assessment and a third author reviewed with the initial two who completed the review. The publication selection can be seen in the PRISMA flow diagram in Figure 1.

## Data Extraction

A template was created in Covidence to standardize the data extraction process. This template included the title of the paper, country in which the study was conducted, notes from the reviewer, aim of the study, study design, population description, exclusion criteria, total number of participants, population characteristics, population characteristic percentage if applicable, study findings, up to 25 opioid stewardship characteristics, up to five positive themes, and up to five negative themes. This allowed for both quantitative and qualitative data to be extracted from both research publications and other types of literature such as editorials. Themes may have been findings from qualitative studies or conclusions of opinion pieces which did not fit the description of an opioid stewardship characteristic. An example of a positive theme from an opinion piece would be having an organizational focus on opioid stewardship. Data was extracted from each paper by 2 team members independently and then consensus between the extractions was conducted by a third team member. A summary of the papers included in the data extraction is presented in Table 1.

## Data Analysis

The extracted data was exported from Covidence into Microsoft Excel spreadsheets for analysis. In total there were 708 characteristics of stewardship identified and 89 qualitative themes extracted from the 71 papers. To better manage the data, each characteristic was assigned a descriptive code with some characteristics assigned sub-topic. For example, the characteristic "assessing patient risk factors for respiratory depression" was coded as "adverse effects" with sub-topic "respiratory". Similarly, each theme was assigned codes and sub-topics. Coding was validated by the team through consensus.

## Findings

Many of the papers were about systems and research conducted in the United States, followed by Canada and Australia. Most of the papers were opinion pieces, followed by quality improvement and cross-sectional studies. There was only one randomized controlled trial and one non-randomized experimental trial. The characteristics are presented in Table 2.

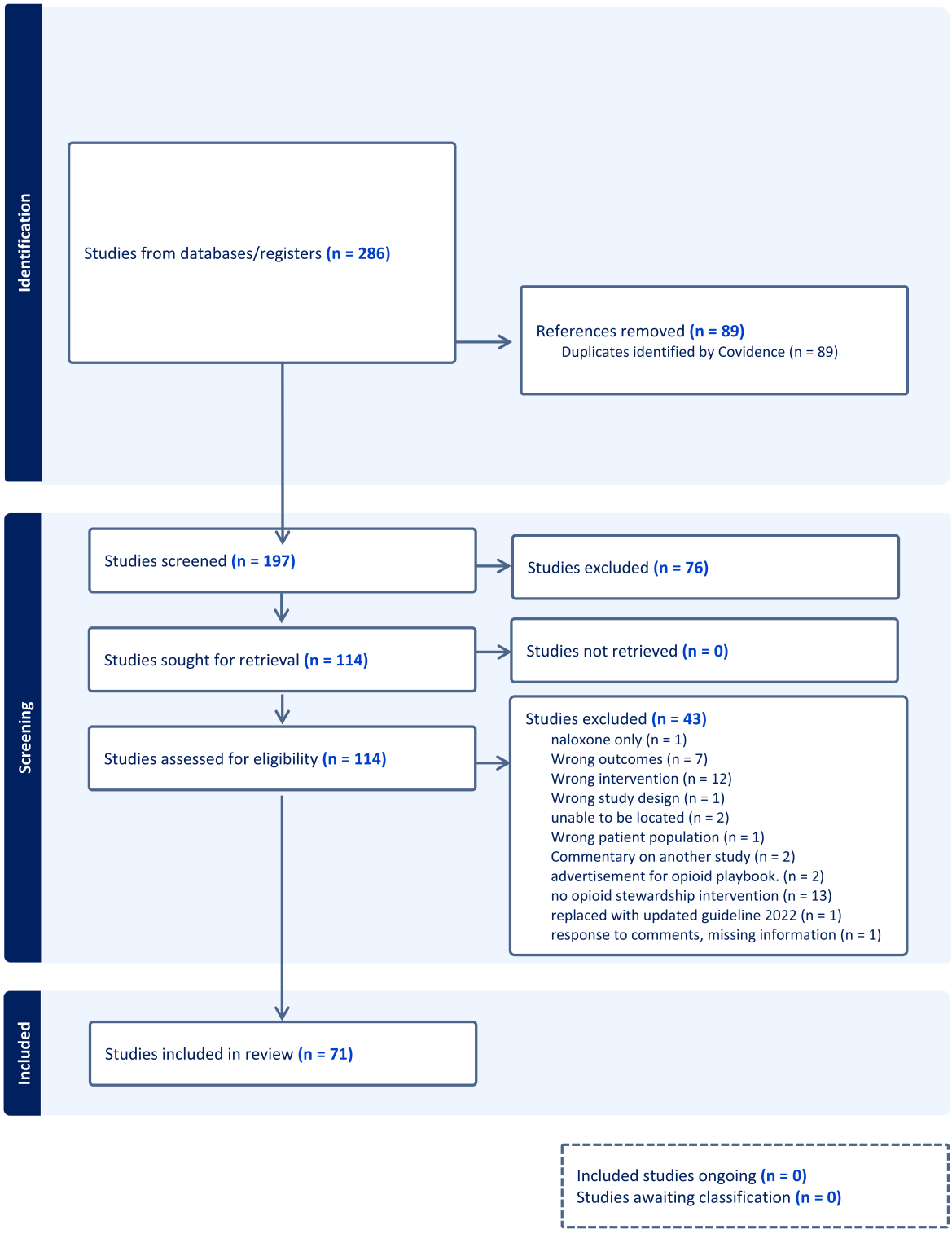


**Figure 1** PRISMA flow diagram for review of characteristics associated with opioid stewardship.

**Table 1** Description of Components of Included Publications

| Title | Country in Which the Study Conducted | Aim of Study | Study Design | Population Description | Exclusion Criteria | Total Number of Participants | Study Findings |
|---|---|---|---|---|---|---|---|
| CDC Clinical Practice Guideline for Prescribing Opioids for Pain - United States, 2022.[9] | United States | Publication of guidelines | Other: practice guidelines | N/A | N/A | N/A | 14 recommendations for prescribing opioids |
| Moving Beyond Misuse and Diversion: The Urgent Need to Consider the Role of Iatrogenic Addiction in the Current Opioid Epidemic.[10] | United States | N/A | Text and opinion | N/A | N/A | N/A | 18 characteristics of opioid stewardship |
| Implementation of a pain medication stewardship program.[11] | United States | Describe pharmacy opioid stewardship program | Case report | N/A | N/A | N/A | 12 components of an opioid stewardship program |
| The Strengths and Weaknesses of Current US Policy to Address Pain.[12] | United States | N/A | Text and opinion | N/A | N/A | N/A | 14 strategies for opioid stewardship |
| Inappropriate opioid prescribing practices: A narrative review.[13] | Canada | Define inappropriate opioid prescribing | Other: narrative review | N/A | N/A | 41 papers | Characteristics of inappropriate prescribing |
| Optimizing opioid prescribing and pain treatment for surgery: Review and conceptual framework.[14] | United States | N/A | Other: Framework development based on literature review | Did not state number of papers included | N/A | N/A | 4 interacting elements drive outcomes |
| When less is more: Opioid use in the emergency department.[15] | United States | N/A | Text and opinion | N/A | N/A | N/A | Presents 9 recommendations for opioid prescribing practices |

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**Table 1** (Continued).

| Title | Country in Which the Study Conducted | Aim of Study | Study Design | Population Description | Exclusion Criteria | Total Number of Participants | Study Findings |
|---|---|---|---|---|---|---|---|
| "Chasing the pain relief, not the high": Experiences managing pain after opioid reductions among patients with HIV and a history of substance use.[16] | United States | Qualitative evaluation of the experience of people living with HIV and history of substance use after reduction or discontinuation of opioid therapy | Qualitative research | HIV-positive history of SUD, long-term opioids for pain | Non-English-speaking, less than 18 years of age, taking opioid therapy less than 3 months, no history of illicit substance use | 18 | Participants who were reduced or discontinued from prescription opioids assess their own pain and had informal pain management plans that included the use of illicit opioids, heroin, and stimulants |
| "If you can't see a dilemma in this situation you should probably regard it as a warning": a metasynthesis and theoretical modelling of general practitioners' opioid prescription experiences in primary care.[17] | UK | Metasynthesis of primary care view on opioid prescribing | Qualitative research | N/A | N/A | 21 papers | 16 characteristics of opioid stewardship, 5 positive themes and 3 negative themes of opioid stewardship. |
| Executive summary of the meeting of the 2018 ASHP Commission on Goals: Focus on Opioids.[18] | United States | Report on strategies for opioid stewardship for pharmacists from a commission | Text and opinion | MD (3), pharmacists (10), MBA (1), PhD (1), RN (1), MA (1) | N/A | 17 | Suggested strategies for pharmacists to support and engage in opioid stewardship activities within health systems |
| Population health management in a small health system: Impact of controlled substance stewardship in a patient-centered medical home.[19] | United States | Quality improvement (QI) improved opioid stewardship | Other: QI | All hospital patients | N/A | N/A | 13 characteristics of opioid stewardship. Presented 2 positive and 1 negative themes of stewardship. |

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| The potential for diversion of prescribed opioids among orthopaedic patients: Results of an anonymous patient survey.[20] | Canada | Determine use of opioid stewardship strategies with orthopedic patients | Cross sectional study | Patients from an outpatient ortho clinic | N/A | 569 | Many patients had left-over opioids, little education on disposal and diversion |
| Consensus Statement for the Prescription of Pain Medication at Discharge after Elective Adult Surgery.[21] c | Canada | Develop a consensus statement for prescribing pain medication at hospital discharge for opioid-naive adults who have had elective surgeries to minimize opioid prescriptions, increase use of nonopioid treatment and pain management options for functional recovery | Text and opinion | N/A | N/A | N/A | Identified 15 characteristics of post-operative pain management. |
| Illicit opioid use following changes in opioids prescribed for chronic non-cancer pain.[22] | United States | Provide evidence that sudden decreases in opioid prescribing increase illicit use of opioids | Cohort study | Publicly insured or uninsured patients in San Francisco who have been prescribe opioids for non-cancer pain for more than 3 months, >18 years old, able to speak English | N/A | 598 | Increase in opioid prescription dose or discontinued prescription resulted in increased odds of more frequent heroin use > 1.5 ORdiscontinued opioid prescription resulted in more frequent use of illicit opioid pain medication 1.75 OR |
| Public policy imperatives to improve medication use.[23] | United States | N/A | Text and opinion | N/A | N/A | N/A | Identified 7 characteristics of prescribing practices. |
| Impact of a pharmacist-directed pain management service on inpatient opioid use, pain control, and patient safety.[24] | United States | Effects of pharmacy directed pain management service | Cross sectional study | N/A | N/A | N/A | Decreased use of overall opioids and high-risk opioid medications |

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**Table 1** (Continued).

| Title | Country in Which the Study Conducted | Aim of Study | Study Design | Population Description | Exclusion Criteria | Total Number of Participants | Study Findings |
|---|---|---|---|---|---|---|---|
| Opioid Misuse: An organizational response while managing cancer-related pain.[25] | United States | Development of opioid stewardship program in oncology | Text and opinion | N/A | N/A | N/A | Identified 6 characteristics of pain management. |
| The opioid epidemic from the acute care hospital front line.[26] | Australia | N/A | Other: Literature Review | N/A | N/A | N/A | Outlines 18 characteristics of opioid stewardship. |
| A scoping review of gaps identified by primary care providers in caring for patients with chronic non-cancer pain.[27] | Canada | Gaps seen by primary care in non-cancer chronic pain | Other: scoping review | N/A | N/A | 31 studies | This review study found consistent themes in the Canadian literature, which are categorized into four broad areas: pain medicine competencies and practices, interprofessional collaboration, attitudes and therapeutic relationships, and strategies to bridge gaps in care |
| Healthcare providers' experiences and perceptions participating in a chronic pain telementoring education program: A qualitative study.[28] | Canada | Evaluation of ECHO PAIN among prescribers | Qualitative research | N/A | N/A | N/A | Describes 2 interventions and 4 positive themes associated with these efforts. |

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|---|---|---|---|---|---|---|---|
| Adherence to Opioid Patient Prescriber Agreements at a Safety Net Hospital.[29] | United States | Use and adherence of patient provider agreements in oncology | Cross sectional study | Adult oncology patients | N/A | 905 | Patient prescriber agreements more common in younger, male, White and Black non-Hispanic, with history of prior substance use. Non-adherence associated with male, Black, single with history of substance use, schizophrenia, and criminal activity and risk of non-medical opioid use |
| The opioid crisis should lead pediatric anesthesiologists to a broader vision of opioid stewardship.[30] | United States | To review tools that pediatric anesthesiologists can use to reduce opioid use for pediatric pain control | Text and opinion | N/A | N/A | N/A | Presents 13 characteristics of opioid stewardship around 2 positive themes. |
| Electronic medical record quantity auto-population removal on hospital discharge prescribing patterns: Implications for opioid stewardship.[31] | United States | Effect of removing auto-populated opioid prescription quantities | Other: QI | Patients admitted to inpatient setting and emergency department | N/A | 53608 | Removing the auto-populated values led to increased number of days per prescription in the emergency department and non-operative patients |
| Report of the ASHP Opioid Task Force.[32] | United States | Delineate role of pharmacists in opioid stewardship and recommend areas of engagement. | Text and opinion | Task force: pharmacists (13), MDs (6), MPH (1), patient advisor (1) DNP (1), JD (1) | None | 23 | 69 recommendations made in 9 domains. Five in patient care domain general and five in patient care domain pharmacist's role |
| Extension for Community Healthcare Outcomes (ECHO) chronic pain and opioid stewardship in northwestern Ontario: A thematic analysis of patient cases.[33] | Canada | N/A | Case control study | N/A | N/A | N/A | Presents 6 characteristics of opioid stewardship and 5 positive and one negative theme. |

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**Table 1** (Continued).

| Title | Country in Which the Study Conducted | Aim of Study | Study Design | Population Description | Exclusion Criteria | Total Number of Participants | Study Findings |
|---|---|---|---|---|---|---|---|
| Process, structural, and outcome quality indicators to support perioperative opioid stewardship: a rapid review.[34] | UK | Review of perioperative opioid stewardship literature | Systematic review | Publications of quality indicators of opioid stewardship | N/A | 7 papers | 24 quality indicators of opioid stewardship in five topics |
| Sustainable access to appropriate opioids for palliative care patients in Australia-preventing the need for crisis management.[35] | Australia | Recommendation for opioid stewardship in Australia | Text and opinion | N/A | N/A | N/A | Presents 6 policy related recommendations. |
| The Use of Opioid Analgesia after Surgery: Assessing Postoperative Prescriptions from a Patient and Surgeon Perspective.[36] | United States | Report prescribing practices and patient perspectives | Cross sectional study | Post-operative patients | Patients with follow up care outside of the system or missing documentation | 252 | Most patients regardless of surgery required less than 5 pills |
| The role of pharmacists in opioid stewardship: A scoping review.[37] | Canada | Role of pharmacist in opioid stewardship | Other: scoping review | 82% North America, 78% 2010–2020, 74% hospital, primary care provider, health system, 58% pharmacist led | N/A | 77 articles | Presents 14 characteristics of the pharmacists role in opioid stewardship. |
| Goal-Directed Opioid Stewardship in Acute-on-Chronic Nonmalignant Pain Management.[38] | United States | QI to reduce opioid prescriptions, pre-post education intervention | Other: QI | ≥ 18 years old, acute-on-chronic pain, no active COVID | N/A | 134 | Presents 7 characteristics of opioid stewardship and 2 negative themes related to implementation. |


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| A Quality Improvement Pilot of Pharmacist-Led Identification of an Inpatient Population for Opioid Stewardship and Pain Management.[39] | United States | Pharmacist-led project to identify patients for pain management and opioid stewardship | Other: QI | All patients admitted to hospital | <18 years old | N/A | Presents 11 recommendations for opioid stewardship and pain management around 2 positive themes. |
| Opioid Use in Long-Term Care: Guidelines and Policy Recommendations.[40] | United States | Guidelines for pain management in long term care | Other: guideline review | N/A | N/A | N/A | 13 recommendations for policy development for opioids. Presents 4 positive themes in their conclusion. |
| Acute Pain Management Pearls: A Focused Review for the Hospital Clinician.[41] | United States | N/A | Text and opinion | N/A | N/A | N/A | Presents 22 recommendations for pain management. |
| Perianesthesia Patient Education for the Promotion of Opioid Stewardship.[42] | United States | N/A | Other: CE narrative review | N/A | N/A | N/A | 8 characteristics of opioid stewardship. |
| Opioid Stewardship and the Surgeon.[43] | United States | Commentary on OS and surgeons | Text and opinion | N/A | N/A | N/A | REDUCE acronym: Recognize risk; Educate patients; Discuss patient expectations and the proposed plan; Use multi-modal therapy; Controlled prescribing; Early referral to pain specialists |
| Survey of Opioid Stewardship Practices in American Society of Health-System Pharmacists (ASHP) Post-Graduate Year 2 (PGY2) Pain Management and Palliative Care (PMPC) Pharmacy Residency Programs.[44] | United States | N/A | Cross sectional study | N/A | N/A | N/A | Provides 5 characteristics of opioid stewardship programs, one negative theme related to implementation. |

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**Table 1** (Continued).

| Title | Country in Which the Study Conducted | Aim of Study | Study Design | Population Description | Exclusion Criteria | Total Number of Participants | Study Findings |
|---|---|---|---|---|---|---|---|
| Opioid Stewardship.[45] | United States | Opinion | Case control study | N/A | N/A | N/A | Presents 16 characteristics of opioid stewardship. |
| Opioid Management in CKD.[46] | United States | Describe opioid prescribing best practice for CKD | Text and opinion | N/A | N/A | N/A | Makes 16 recommendations for pain management. |
| AAA stewardship: managing high risk medications with dedicated antimicrobial, anticoagulation and analgesic stewardship programs[47] | Australia | To describe adapting an antimicrobial stewardship framework to anticoagulation and analgesic stewardship | Text and opinion | N/A | N/A | N/A | Presents 16 recommendations for medication stewardship. |
| Impact of an Asynchronous Spaced Education Learning Intervention on Emergency Medicine Clinician Opioid Prescribing[48] | United States | Impact of education on prescribing | Non-randomized experimental study | Emergency room clinicians in one hospital | N/A | 45 | Overall reduction of opioid prescribing, greater reduction in education group |
| Opioid Stewardship in Urology: Quality Improvement Summit 2018[49] | United States | Report on the AUA Quality Improvement Summit findings related to appropriate use of opioids in urology and programs to reduce opioid prescribing | Text and opinion | Clinicians, researchers, policy makers | N/A | N/A | Reduction of perioperative opioids in pain management in the community requires engagement of stakeholders |
| Current state of opioid stewardship[50] | United States | Assess current status of hospital opioid stewardship practices for adults and children | Cross sectional study | Hospitals in the US, Canada, and Saudi Arabia | Health systems who do not have staff members represented on the targeted listservs | 133 | Opioid stewardship and prospective patient screening processes for opioid risk factors were uncommon in the surveyed hospitals |


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|---|---|---|---|---|---|---|---|
| Post-surgical opioid stewardship programs across Australia and New Zealand: Current situation and future directions[51] | Other: Australia and New Zealand | To investigate the current state of opioid stewardship measures among anesthesiologists in Australia and New Zealand to inform health services research | Other: Survey | Practicing anesthetists | Anesthetists not associated with a clinical trials network | 45 | Opioid stewardship interventions are present in health systems but are not comprehensive or communicated to providers. Barriers to opioid stewardship programs should be addressed prior to broad implementation |
| Improving opioid stewardship programs through shared decision-making[52] | Canada | Commentary on opioid stewardship | Text and opinion | N/A | N/A | N/A | Identifies 9 strategies for opioid stewardship. |
| Designing a Pharmacist Opioid Safety and Intervention Tool[53] | Canada | Creating and implementing a tool for opioid stewardship | Other: QI | N/A | N/A | N/A | Presents 4 characteristics of opioid stewardship. |
| A Health System-Wide Initiative to Decrease Opioid-Related Morbidity and Mortality[54] | United States | Framework for opioid stewardship | Other: QI | N/A | N/A | N/A | Identifies 15 strategies for opioid stewardship. |
| Opioid stewardship: implementing a proactive, pharmacist-led intervention for patients coprescribed opioids and benzodiazepines at an urban academic primary care centre[55] | Canada | Develop the role of the pharmacist in opioid stewardship | Other: QI | Patients co-prescribed opioids and benzos | N/A | 55 | Increased number of opioid tapers |
| Considerations for perioperative opioid analgesic stewardship in Australia: a focus on tapentadol[56] | Australia | Report on best practices using tapentadol | Text and opinion | N/A | N/A | N/A | 14 recommendations for opioid stewardship. |

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**Table 1** (Continued).

| Title | Country in Which the Study Conducted | Aim of Study | Study Design | Population Description | Exclusion Criteria | Total Number of Participants | Study Findings |
|---|---|---|---|---|---|---|---|
| The Effect of Opioid Stewardship Interventions on Key Outcomes: A Systematic Review[57] | United States | N/A | Systematic review | Studies on opioid stewardship strategies | Observational studies, qualitative studies without test of significance, sample of less than 50 patients | 14 studies | Presents 21 recommendations for opioid stewardship. |
| Considerations for neonatal and pediatric pain management[58] | United States | Pain management best practices in neonates | Other: narrative review | N/A | N/A | N/A | Makes 7 recommendations for pain management strategies. |
| Real-World Observational Evaluation of Common Interventions to Reduce Emergency Department ePrescribing of Opioid Medications[59] | United States | Effects of opioid stewardship on prescribing in the ED | Other: QI pre-post intervention | ED visits | N/A | 775,692 | Significant reduction in opioid prescribing |
| Opioid Prescribing and Opioid Risk Mitigation Strategies in the Veterans Health Administration[60] | United States | Description of opioid prescribing in the VHA system | Text and opinion | N/A | N/A | N/A | Describes 4 strategies for opioid stewardship. |
| The Time for Opioid Stewardship Is Now[61] | United States | N/A | Other: Report | N/A | N/A | N/A | How to support opioid stewardship in organizations |
| Optimization of Opioid Discharge Prescriptions Following Thyroid and Parathyroid Surgery[62] | United States | Assess efficacy of thyroid surgery bundle including opioid prescribing | Other: QI pre-post intervention study | Patients who had thyroid surgery | Hospital encounters > 2 days, non-index thyroid surgery | 240 (160 pre and 80 post) | Significant decreases in prescriptions and morphine milliequivalents per prescription, and number of days of prescriptions |

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| Development, Validation, and Assessment of Clinical Impact of Real-time Alerts to Detect Inpatient As-Needed Opioid Orders With Duplicate Indications: Prospective Study[63] | United States | Efficacy of electronic health record alerts to remove duplicate prn orders | Other: QI | N/A | N/A | N/A | Identified strategies for improving opioid stewardship. |
| Moving Away From a "One Size Fits All" Model: Ensuring Opioid Stewardship Includes People Who Use Drugs[64] | Canada | N/A | Text and opinion | N/A | N/A | N/A | Identified 5 strategies for opioid stewardship. Found 1 positive and 1 negative overarching theme to opioid stewardship. |
| ASHP national survey of pharmacy practice in hospital settings: Prescribing and transcribing 2019[65] | United States | N/A | Other: report | N/A | N/A | N/A | Recommended 14 strategies for opioid stewardship. |
| Developing a framework for implementing opioid stewardship programmes in Australian hospital settings[66] | Australia | Report of panel to develop stewardship guidelines | Text and opinion | N/A | N/A | 29-member multidisciplinary panel | 26 of 27 items reached consensus as important, 19 items reached consensus for feasibility. |
| Developing and piloting an adaptable oxycodone quality improvement strategy: steps towards opioid stewardship[67] | Australia | Effect of prescriber led QI to reduce opioid prescribing in a hospital | Other: | Patients who had received an opioid prescription | N/A | N/A | Significant increases in tailored oxycodone prescribing and reduction in patients receiving oxycodone |
| Intraoperative opioids: Reduce but not refuse![68] | Other: Belgium | N/A | Text and opinion | N/A | N/A | N/A | Provides 8 strategies for opioid stewardship. |
| Reducing post-operative opioids in children undergoing outpatient urologic surgery: A quality improvement initiative[69] | United States | Efficacy of opioid stewardship intervention | Other: QI pre-post intervention | N/A | N/A | 6684 | Makes 8 recommendations for opioid stewardship. |

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**Table 1** (Continued).

| Title | Country in Which the Study Conducted | Aim of Study | Study Design | Population Description | Exclusion Criteria | Total Number of Participants | Study Findings |
|---|---|---|---|---|---|---|---|
| Affecting emergency department oxycodone discharge prescribing: An educational intervention[70] | Australia | Quality improvement - pre-post education intervention | Other: QI | Emergency department patients receiving an oxycodone prescription | N/A | 1438 prescriptions | Decrease in prescriptions, number of tabs per prescription, and increase in communication to primary care |
| A pharmacist-led intervention to improve the management of opioids in a general practice: a qualitative evaluation of participant interviews[71] | Australia | Practitioner view of pharmacist led opioid management intervention | Qualitative research | Primary care physicians, nurses, and office managers | N/A | 13 | Found 13 strategies related to prescribing and 5 positive themes for opioid stewardship. |
| Educating junior doctors and pharmacists to reduce discharge prescribing of opioids for surgical patients: a cluster randomised controlled trial[72] | Australia | Educational intervention to reduce prescribing | Randomized controlled trial | Surgical patients | Pre-admission use of opioids, transfer to another facility, missing discharge documentation | N/A | Presents 7 characteristics of opioid stewardship. |
| Race, pain, and opioids among patients with chronic pain in a safety-net health system[73] | United States | Racial disparities in prescribing and stewardship | Cohort study | Patients with non-cancer chronic pain and history of illicit drug use | N/A | 236 | Black patients received lower doses of opioids and had worse pain, lower education. White patients were more likely to have injected drugs in the last year. No differences in overall substance use, opioid stewardship interventions, reduced or discontinued opioids, yellow flag events |
| Transformation of Hospital Pharmacist Opioid Stewardship[74] | United States | Describe development of opioid stewardship and the role of pharmacists | Case report | N/A | N/A | N/A | Identified 20 strategies for opioid stewardship. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| System-level policies on appropriate opioid use, a multi-stakeholder consensus[75] | Other: Europe | Publish practice guidelines | Other: practice guidelines | European experts for Delphi panel | N/A | 23 | Presents 13 strategies for opioid stewardship. |
| Identifying Residents Who May Benefit from an Analgesic Review: Applying Analgesic Indicators in Residential Aged Care Services[76] | Australia | Applying AMDA pain management guidelines to analgesic review | Cross sectional study | Long term care residents | End of life, medically unstable, non-English proficient | 550 | Identified 7 characteristics of opioid stewardship. |
| Society of Pain and Palliative Care Pharmacists White Paper on the Role of Opioid Stewardship Pharmacists[77] | United States | Description of creating an opioid stewardship program | Case report | N/A | N/A | N/A | Presents 21 strategies for opioid stewardship and 5 positive themes associated with opioid stewardship. |
| Assessment of an Opioid Stewardship Program on Perioperative Opioid Prescribing in a Safety-Net Health System[78] | United States | Assessment of the effect of an opioid stewardship program | Text and opinion | Surgical patients at 6 facilities | Patients with hospital stays of greater than 7 days | 11,833 | Inpatient opioid use decreased, hydrocodone prescribing decreased, acetaminophen, ibuprofen, and oxycodone prescribing increased, Morphine milliequivalents remained the same. Emergency department visits post-operatively decreased |
| Evaluating a Pharmacist-Led Opioid Stewardship Initiative at an Urban Teaching Hospital[79] | Canada | Description of patients who received opioid stewardship with Medication and Risk Factor Review, Optimize, Refer at Risk Patients, Educate and Plan (MORE) tool and pharmacist assessment | Cross sectional study | Medical/ surgical patients over 4 months in one hospital | Age < 19, duration of opioid treatment less than 3 days, opioid treatment only methadone or buprenorphine-naloxone, not assessed using the MORE tool | 50 | 62 interventions recommended by pharmacists |


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**Table 2** World Geographic Region and Publication Classification

| **Location of Study** | **Count** |
|---|---|
| United States | 44 |
| Canada | 12 |
| Australia | 11 |
| UK | 2 |
| Belgium | 1 |
| Europe | 1 |
| **Publication Classification** | **Count** |
| Text and opinion | 22 |
| Quality Improvement | 13 |
| Cross sectional study | 9 |
| Review Articles | 9 |
| Case study | 5 |
| Qualitative research | 4 |
| Cohort study | 2 |
| Practice guidelines | 2 |
| Report | 2 |
| Non-randomized experimental study | 1 |
| Framework development based on literature review | 1 |
| Randomized controlled trial | 1 |

**Abbreviations**: QI, quality improvement; UK, United Kingdom.

There were a total of 58 characteristic codes and 70 sub-topics assigned to the characteristics. Table 3 illustrates each of the characteristics and the sub-topics within each characteristic. The top five characteristics were prescribing guidelines (103 manuscripts), patient education (71 manuscripts), refer/consult (45 manuscripts), audit of prescribing (42 manuscripts), and provider education (42 manuscripts). There were 34 characteristics that were mentioned in five or fewer manuscripts. To get another view of the data, the sub-topics were used as headings to assess their frequency. Table 4 shows the distribution of sub-topics and characteristics associated with each with frequency. The most common sub-topic was care plan and goals (32 manuscripts), followed by pain management (27 manuscripts), assessment (20 manuscripts), and prescribing (18 manuscripts). The most common characteristic associated with care plan and goals was patient education (23 manuscripts).

There were a total of 98 themes extracted from the literature. There was a broad variety in the themes which could only be reduced to 39 theme codes and 22 sub-topics. The top seven codes had 4 or more themes assigned to them and can be seen in Table 5 with their sub-topics. The most common theme was barriers identified that inhibited opioid stewardship (12 manuscripts), followed by team (8 manuscripts), education (5 manuscripts), accountability (4 manuscripts), patient-centered (4 manuscripts), risk and access (4 manuscripts). The most common sub-topic for barriers to opioid stewardship was a lack of staff followed by insurance.

**Table 3** Opioid Stewardship Characteristic Codes and Sub-Topics

| Characteristics | Count |
|---|---|
| **Prescribing Guideline** | **103** |
| Limits | 30 |
| Prescribing guideline | 23 |
| Titrate | 14 |
| Other CNS depressants | 11 |
| Tapers | 7 |
| Non-opioids | 4 |
| Interactions, minimize, short term, naltrexone, risk, national, reduce, MOUD, provider education, low dose, pharmacists, combination, partial fill, pain management | 1 each |
| **Patient Education** | **71** |
| Care plan and goals | 23 |
| Patient education | 19 |
| Disposal | 11 |
| Contracts | 7 |
| Risk/benefit | 5 |
| Non-opioids | 2 |
| Care plan, documentation, tapers, storage | 1 each |
| **Refer/Consult** | **45** |
| Pain management | 18 |
| Team | 10 |
| SUD | 7 |
| Behavioral health | 5 |
| Specialists | 2 |
| Peds, tapers, pain | 1 each |
| **Audit of Prescribing** | **42** |
| Audit prescribing | 25 |
| Communication | 8 |
| Medication review | 4 |
| Refills | 2 |
| Errors, pharmacists, Narcan inpatient | 1 each |
| **Provider Education** | **42** |
| Provider education | 23 |
| Pain management | 7 |
| Prescribing | 5 |
| OS, ongoing, nursing, non-opioids, SUD, by pharmacist, pain | 1 each |

(*Continued*)

**Table 3** (Continued).

| Characteristics | Count |
|---|---|
| **Patient Screening for Misuse** | **41** |
| Risk | 17 |
| Patient screening for misuse | 7 |
| OUD | 7 |
| SUD | 4 |
| Pre-op risk | 3 |
| Mental health | 2 |
| Chronic pain | 1 |
| **Good Pain Control** | **39** |
| Assessment | 13 |
| Treat pain | 13 |
| Pain management | 11 |
| Order set | 2 |
| **Non-opioid Analgesics** | **30** |
| Non-opioid analgesics | 28 |
| Alert and prescribing | 1 each |
| **Support and Infrastructure** | **27** |
| Support and infrastructure | 25 |
| Prescribing and tapers | 1 each |
| **Pharmacist Role** | **25** |
| Care plan and goals | 8 |
| Stewardship | 6 |
| Pharmacist role, nurse role, education, patient review | 2 each |
| Medication review, formulary, pain management | 1 each |
| **Communication** | **21** |
| **Committee** | **20** |
| Committee | 17 |
| Prescribing, audit, tapers | 1 each |
| **Non-Pharmacological Pain Management** | **19** |
| **Tool** | **17** |
| EHR | 6 |
| PDMP | 6 |
| Prescribing | 2 |
| Alert | 2 |

(*Continued*)

**Table 3** (Continued).

| Characteristics | Count |
|---|---|
| **Discharge** | **15** |
| Prescribing | 8 |
| Discharge | 4 |
| Patient education | 2 |
| Non-opioids | 1 |
| **Know the Patient** | **14** |
| Assessment | 7 |
| Know the patient | 5 |
| Care plan and goals and risk/benefit | 1 each |
| **Narcan** | **14** |
| Narcan | 13 |
| Alert | 1 |
| **Adverse Effects** | **13** |
| Respiratory | 4 |
| Adverse effects | 3 |
| Monitoring | 2 |
| Interactions, comorbidity, reporting, report | 1 each |
| **Tapers** | **11** |
| **MME** | **9** |
| Tracking | 4 |
| MME | 3 |
| Alert and restrict | 1 each |
| **Disposal** | **7** |
| Storage | 2 |
| Take back | 2 |
| Disposal | 3 |
| **Drug Screening** | **7** |
| **Nurse Role** | **5** |
| Nurse role | 4 |
| Education | 1 |
| **QI** | **5** |
| **OUD medication** | **4** |

(*Continued*)

**Table 3** (Continued).

| Characteristics | Count |
|---|---|
| **Follow-up** | **4** |
| Follow-up | 3 |
| Refill | 1 |
| **Emergency Department** | **4** |
| **Team** | **4** |
| **Bowel Regimen** | **3** |
| Bowel regimen | 2 |
| Alert | 1 |
| Age of patient, resources, telehealth, Diversion, MOUD, community, electronic prescribing | 3 each |
| Medication formulation, monitor patients, stigma, documentation, illicit use | 2 each |
| Research, rapid response, short term use, Recovery, renal considerations, storage, health test, dispensing authority, addiction vs pseudo-addiction, patient monitoring, prescription verification, mental health, burden of opioids on patients, harm reduction, med administration, other, dependence vs OUD, address risk before RX | 1 each |

**Abbreviations**: HER, electronic health record; MME, morphine milliequivalents; MOUD, medications for opioid use disorder; OUD, opioid use disorder; PDMP, prescription drug monitoring program; SUD, substance use disorder.

**Table 4** Opioid Stewardship Characteristic Coding and Sub-Topics

| Sub-Topic | Count |
|---|---|
| **Care Plan and Goals** | **32** |
| Know the patient | 1 |
| Patient education | 23 |
| Pharmacist role | 8 |
| **Pain Management** | **27** |
| Pharmacist role | 1 |
| Prescribing guideline | 1 |
| Provider education | 7 |
| Refer/consult | 18 |
| **Assessment** | **20** |
| Good pain control | 13 |
| Know the patient | 7 |
| **Prescribing** | **18** |
| Committee | 1 |
| Discharge | 8 |
| Non-opioid analgesics | 1 |

(*Continued*)

**Table 4** (Continued).

| Sub-Topic | Count |
|---|---|
| Provider education | 5 |
| Support and infrastructure | 1 |
| Tool | 2 |
| **Risk** | **18** |
| Patient screening for misuse | 17 |
| Prescribing guideline | 1 |
| **Tapers** | **12** |
| Committee | 1 |
| Patient education | 1 |
| Prescribing guideline | 7 |
| Prescribing guideline | 1 |
| Refer/consult | 1 |
| Support and infrastructure | 1 |
| **SUD** | **12** |
| Patient screening for misuse | 4 |
| Provider education | 1 |
| Refer/consult | 7 |

**Abbreviation**: SUD, substance use disorder.

**Table 5** Most Common Themes in Opioid Stewardship

| Theme | Count |
|---|---|
| **Barriers** | **12** |
| Burden of stewardship | 1 |
| Cannot change prescribing of others | 1 |
| Insurance | 3 |
| Lack data | 1 |
| Lack of screening | 1 |
| Lack of staff | 4 |
| Resources lacking | 1 |
| **Team** | **8** |
| **Education** | **7** |
| Patients | 2 |
| Providers | 4 |

(*Continued*)

**Table 5** (Continued).

| Theme | Count |
|---|---|
| **Barriers** | **12** |
| Other | 1 |
| **Accountability** | **5** |
| Leadership | 3 |
| Providers | 1 |
| Other | 1 |
| **Patient-Centered** | **4** |
| **Risk** | **4** |
| Pain | 1 |
| Reduce | 2 |
| Screenings | 1 |
| **Access** | **4** |
| Non-pharmacological interventions | 1 |
| Specialists | 3 |

## Discussion

By far, the most common characteristic of opioid stewardship was related to prescribing guidelines, with the most common sub-topic of setting limits on prescribing. Also, common was titrating opioid doses to establish the lowest dose needed for effective pain management. This intervention is primarily targeted towards physicians and other advanced practice providers who order medications and write prescriptions. The next most common feature of opioid stewardship is patient education, and the most common sub-topics are related to care planning and goal setting, general patient education, and disposal of opioids. However, we also see education as a sub-topic of both the pharmacist and nurse role and a multidisciplinary approach begins to appear. The next six most common characteristics all similarly relate to the prescriber. Not until the 7$^{th}$ most common characteristic do we see a multidisciplinary approach that includes the role of the pharmacist as a significant characteristic of opioid stewardship. We found many position papers and guidelines created by professional pharmacy practice organizations. Pharmacists have a unique role in healthcare as guardians and gatekeepers of medications, so it is logical that they would lead opioid stewardship initiatives. Their advanced knowledge of medications makes them ideal to provide education to providers and patients alike. There is also mention of their interaction with nurses and patients as part of care planning. Further down the list of characteristics, non-pharmacological pain management appears as the 13$^{th}$ most commonly mentioned. This is a pain management strategy that can be delivered by a wide variety of healthcare workers[80] and has long been part of nursing practice.[81] As providers continue to reduce their use of opioid medications, nurses will need to augment analgesics with non-pharmacological pain management techniques.

Knowing the patient and providing appropriate patient education about expectations for treatment with opioid prescriptions has been noted to be a common feature of opioid stewardship. Recommendations for patient education included broad pain management for which opioid medications may be a part, a limited number of opioid doses per prescription, and expectations for refills. Pain contracts and care plan goals were also sub-topics in patient education. Disposal of unused opioid medications is also a part of patient education. Further sub-topics related to disposal include safe storage and the use of medication take-back programs.

Provider education about pain management treatment guidelines and the auditing of prescribing practices were common characteristics found in opioid stewardship programs. Published papers that studied the impact of provider education on opioid prescribing generally found that audits of prescribing practices led to decreases in opioid prescriptions and the number of morphine milliequivalents (MMEs) per prescription for a short duration but did not often produce longer-lasting results indicating that routine audits and continuing education are likely needed.

Patient screening for a history of or current substance misuse was a consistently recommended characteristic of opioid stewardship. Mental health assessment and treatment were strategies mentioned to provide optimal patient-centered care and pain management. Chronic pain should be addressed as a part of patient assessment and patient education. The role of pharmacists and nurses in patient and provider education, as well as patient screening, was highlighted.

Other top strategies include the need for open and consistent communication between patients and healthcare providers, committees to oversee stewardship, electronic tools to assist in decision support, patient discharge standards, the use of naloxone (Narcan), awareness of adverse effects, tapering opioids, awareness of morphine equivalents, and drug screening. There were only four mentions of teams or interprofessional collaboration presented as a characteristic of opioid stewardship. This is notable because in the assessment of qualitative themes, teams were the second most frequently mentioned concept, following barriers to successful implementation of stewardship programs in importance. Having adequate resources, including staff, appears to be the biggest barrier to successful opioid stewardship.

There is a key role for healthcare administration and clinical leadership to ensure the development of a culture of opioid stewardship amongst all members of the care team and stronger cross-discipline collaboration and teamwork in patient care. Team-based care is an important aspect as healthcare transfers into its new era of accountability through stewardship of prescribing opioids but also antibiotics and other medications.

Developing and implementing an opioid stewardship program can be challenging when faced with a myriad of possible metrics, a lack of staffing and resources, limited availability of substance use disorder treatment programs and healthcare provider bias related to substance use disorder. Funding streams for employee positions can be evaluated to allocate toward a healthcare provider who is specifically tasked with creating and leading a multidisciplinary team for opioid stewardship. In many institutions, this position is held by a nurse or pharmacist. A member of administration can champion this position and provide support and oversight. Educational objectives for healthcare providers of all disciplines should include modules on bias and stigma in addition to evidence-based opioid prescribing and monitoring practices.

## Limitations

There are limitations to this review. This review may not include every publication related to opioid stewardship; however, we did see repetition in characteristics and themes suggesting data saturation. The inclusion of additional manuscripts is unlikely to alter our findings and recommendations. We chose to focus on general opioid stewardship rather than disease-specific opioid management strategies and therefore did not contrast the use of opioids for acute pain to those used for cancer or chronic pain. By design, the integrative review includes a broad variety of literature, and the quality of the literature was not assessed or used as a limitation to inclusion and it allowed us to include 22 opinion or editorial pieces, 2 guidelines, and 2 reports which appear in searches but are not peer-reviewed. We did not conduct a meta-analysis of the quantitative studies, which may have found that different characteristics of stewardship are more effective in the management and appropriate use of opioids than those that are most commonly listed. We took a quasi-qualitative approach to data analysis and although we attempted to improve rigor through consensus and independent reviews, individual bias may have affected our coding and results. Related to the content of the reviewed literature, the primary focus of current literature is on prescribers and prescribing practices with less study of the role and impact of non-prescribing healthcare professionals in opioid stewardship. Patient education about the risks of opioid misuse and expectations of opioid drug therapy, as well as screening for a history of substance misuse, is discussed but more research is needed in this area to further elevate the unique expertise of nurses and pharmacists in these areas. Exploration into the contribution of other providers, including social workers and peer recovery support specialists, is lacking and would benefit from enquiry. Research into the creation of true multidisciplinary teams that include prescribers, pharmacists, nurses, social workers, and case managers with delineation of roles and evaluation of patient outcome metrics can contribute to the evidence base. The most effective content of educational programming for prescribers and other healthcare providers is not well-studied. Findings of this review suggest that education specific to prescribing

practices is helpful to apply evidence-based practices for a period of time but adherence wanes. Supplementary education that delves into personal bias, patient experiences of substance use disorder and needs in treatment, and the effectiveness of alternative forms of pain management is absent. Research into the development and delivery, as well as effectiveness of this type of education would be beneficial. This integrative review is intended to be broad in nature and discuss the current state of opioid stewardship metrics, as such, it is generalizable to wide range of institutions and healthcare providers. Editorials and opinion pieces were included in this review which may impact the applicability of the findings to specific institutions.

## Conclusion

Although the concept of multidisciplinary patient care is broadly accepted, we found that the literature identifying opioid stewardship practices is heavily weighted towards the role of the prescriber. Current intervention development to improve opioid stewardship which should focus on prescribers is needed. The role of the pharmacists, nurses, and other allied health professionals must be incorporated into opioid stewardship programs as we focus on addressing opioid misuse. We believe additional research into the role of non-prescribing healthcare workers in effective pain management and opioid stewardship programs is still needed to establish true best practices. Further review of non-prescribing allied health professionals in a multi-disciplinary approach is needed as well as potential intervention design in training and practice to increase their holistic involvement in opioid stewardship.

Patient-centered care is a theme of opioid stewardship that was consistently noted throughout this review. Provider education that encompasses patient communication related to patient expectations and comfort with pain management was an important feature of opioid stewardship but outcomes of this standard as a best practice are not found in current literature. We believe this research would be an important addition to our current knowledge.

## Disclosure

The authors report no conflicts of interest in this work.

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