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Incidence and drivers of medication returns to health facilities by patients in low- and middle-income countries: A scoping review protocol

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Cyril Kutina¹, Gordon Dugle¹, Vitalis Bawontuo¹

¹Simon Diedong Dombo University of Business and Integrated Development Studies



Gordon Dugle

Simon Diedong Dombo University of Business and Integrated De...

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Abstract

Background Medication returns by patients to healthcare facilities are a critical aspect of reverse logistics, intersecting healthcare delivery, patient safety, and environmental sustainability, especially in low- and middle-income countries (LMICs) where systemic inefficiencies and socio-cultural factors may exacerbate the issue. While emerging medication return programs are recognized for their potential to enhance resource efficiency and prevent misuse, they also signal inefficiencies in medical supply chains, prescribing practices, and patient-provider interactions. This scoping review aims to systematically map the incidence and drivers of medication returns to health facilities by patients in LMICs.

Methods This review follows Arksey and O'Malley's scoping review framework and the PRISMA-ScR reporting guidelines. Searches will be conducted in PubMed, Web of Science, CINAHL, and Google Scholar, supplemented by grey literature sources and reference list screening. Eligible studies must address the incidence or drivers of medication returns in LMICs and meet predefined inclusion criteria based on the PCC framework. Data will be extracted using a standardized charting form and analyzed using narrative synthesis, supported by descriptive statistics and thematic analysis.

Discussion The review will provide insights into the patterns of incidence and drivers of medication returns across diverse healthcare settings. By mapping the incidence and drivers of medication returns in LMICs, the review contributes to efforts towards enhancing healthcare efficiency, promoting safe medication practices, and supporting environmental sustainability, aligning with global health and the sustainable development goals. It will inform theoretical advancements in reverse logistics and guide the development of context-specific interventions for medication management in LMICs. Review findings will also highlight critical research gaps and priorities, contributing to sustainable healthcare policies and practices globally.



Guidelines

A scoping review is most suitable for mapping emerging evidence across diverse contexts, populations and methodologies, and for identifying knowledge gaps and priority areas for future research (Arksey and O'Malley 2005; Levac, Colquhoun, and O'Brien 2010). This review will follow the framework developed by Arksey and O'Malley (2005) and the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Extension for Scoping Reviews (PRISMA-ScR) reporting guidelines (Tricco et al. 2018). Specifically, we follow Arksey and O'Malley's five-stage framework for scoping reviews: identifying the research question; searching for relevant studies; selecting studies; charting the data; and collating, summarizing, and reporting the results.

Identifying the research question

- 1 The main question for this review is: What are the incidence and drivers of medication returns to health facilities by patients in LMIC? Specifically, the review addresses the following questions:
 1. What patterns characterize the incidence of medication returns across different healthcare settings in LMICs?
 2. What factors drive medication returns across geographic contexts in LMICs?
- 2 Following recommendations for the adoption of framework analysis for scoping reviews (**Arksey and O'Malley 2005; Levac, Colquhoun, and O'Brien 2010; Tricco et al. 2018**), for this review, incidence refers to the quantifiable occurrence or frequency of medication returns to healthcare facilities within a specified time frame or population. Accordingly, we are interested in measuring:
 1. The proportion of patients returning medications out of the total number of patients accessing healthcare services
 2. The volume of medications such as the number of pills and weight in kilograms returned to a healthcare facility over a specified period
- 3 Additionally, we pre-categorise drivers of medication returns into three main themes:
 1. Patient-related
 2. Prescriber-related
 3. Systemic factors

Note

These operational concepts provide a structured framework for systematic data extraction, synthesis, and interpretation.

Searching for relevant studies

- 4 A three-stage search process will be applied. First, a thorough electronic dataset search will be conducted in Google Scholar, PubMed, Web of Science and CINAHL for peer-reviewed literature. The Google Scholar search will use the broad search term "medication returns by patients" due to its less structured search capabilities. The

searches on PubMed, Web of Science and CINAHL will be based on suitable keyword combinations, boolean operators (AND/OR) and truncation, and Medical Subject Headings (MeSH). The search strings, filters applied and results retrieved for each database will be documented for transparency and reproducibility.

- 5 A general list of search terms based on the PCC (Population, Concept, Context) framework is presented in **Table 1**. Second, grey literature sources like OpenGrey, ProQuest Dissertations, and websites of relevant health organizations will be searched using general search strings like 'incidence of medication return' and 'drivers of medication return'. Third, the reference lists of studies selected for inclusion in this review will be searched to identify potentially relevant evidence skipped during the database and grey literature searches.

A	B
Population	"Patients" OR "Healthcare consumers" OR "clients"
Concept	Medication returns: "Medication return*" OR "Drug return*" OR "Unused medication*" OR "Unused drug*" OR "Returned pharmaceutical*" OR "Expired medication*" OR "Medication take-back" OR "Drug take-back*" "Incidence: "Incidence" OR "Prevalence" OR "Occurrence" OR "Frequency" "Scale*"" "Drivers: "Driver*" OR "Factor*" OR "Determinant*" OR "Barrier*" OR "Motivation*" OR "Reason*" OR "Facilitator" "
Context	Healthcare setting: "Healthcare facilit*" OR "Health facilit*" OR "Primary care" OR "Secondary care" OR "Tertiary care" OR "Hospital*" OR "Clinic*" "Polyclinic" OR "Health cent*" Geographic context: "Low- and middle-income countr*" OR "LMICs" OR "Less developed countr*" OR "Developing countr*" OR "Resource-limited settings" OR "Resource-constrained settings"

Table 1: General list of search terms

- 6 Search strings and strategies for each electronic database will be documented. Truncation, filters for language (English) and time (past 20 years) will be applied to narrow the search. The search results will be imported into Sysrev (<https://sysrev.com>), a publically accessible and free web-based platform for collaborative and systematic

evidence syntheses. Sysrev's streamlined workflows and automated features like duplicate detection and article clustering significantly help to reduce manual effort and improve efficiency (**Berrang-Ford et al. 2021**).

Study selection

- 7 The selection process will consist of two steps. First, the titles and abstracts of all identified studies will undergo an initial screening based on our predefined inclusion and exclusion criteria based on the PCC framework presented in **Table 2**. Second, the full text of the remaining studies will be screened to ensure they align with the review objectives. Two reviewers will independently conduct both the title/abstract and full-text screening. Disagreements will be resolved by a third reviewer through discussion with the two reviewers. A PRISMA flow diagram will be presented to illustrate the evidence identified, screened, excluded, and included in the review.

A	B	C
Component	Inclusion criteria	Exclusion criteria
Population	Studies must focus on patients who return medications to health facilities. Studies involving healthcare providers that manage or report on medication returns are also considered	Studies focusing on medication returns by entities other than patients, such as wholesalers or distributors, are excluded. Studies describing veterinary medication returns without any focus on human patients are excluded
Concept	The incidence or frequency of medication returns across different health facilities. The drivers or factors contributing to medication returns. Studies reporting on interventions or strategies for mitigating medication returns are also considered eligible.	Studies that do not describe medication returns in terms of incidence, drivers or interventions are excluded. Studies focusing on unused or expired medications without specifying their return to healthcare facilities are excluded.
Context	The contextual scope of the review is health facilities, including primary-level providers (e.g., health posts, health centres, clinics, district hospitals), secondary hospitals, and tertiary hospitals	Studies conducted outside health facility settings, such as at home or in industrial or manufacturing environments, are excluded from the review
Other	Eligible studies include peer-reviewed original articles, reviews, reports, and relevant grey literature, provided they	Editorials, commentaries, conference abstracts, and opinion pieces without substantive data related to the

	A	B	C
		contain sufficient data to address the review research questions. Studies in English with full-text access.	review questions are also excluded. Studies not available in English or lacking full-text access are excluded.

Table 2: Inclusion and exclusion criteria based on PCC framework

- 8 To be included in the review, studies need to meet the following eligibility criteria rooted in our review questions and PCC framework. First, studies must focus on patients who return medications to health facilities. Studies involving healthcare providers that manage or report on medication returns are also considered, as these populations are critical in shaping the processes and outcomes of such returns. Studies focusing on medication returns by entities other than patients, such as wholesalers or distributors, are excluded. Additionally, studies describing veterinary medication returns without any focus on human patients are excluded.
- 9 Second, eligible studies must describe:
 1. The incidence or frequency of medication returns across different health facilities
 2. The drivers or factors contributing to such returns
- 10 Studies reporting on interventions or strategies for mitigating medication returns are considered eligible only if they align with the scope of our research questions, specifically focusing on understanding the incidence and drivers of medication returns. If these interventions or strategies are discussed in the context of these factors, they contribute to identifying potential solutions. However, studies that focus on interventions without describing medication returns in terms of their incidence or drivers are excluded. Additionally, studies focusing on unused or expired medications without specifying their return to healthcare facilities are excluded.
- 11 Third, the contextual scope of the review is health facilities, defined here as any formally recognized facility that provides health care, including primary-level providers (e.g., health posts, health centres, clinics, district hospitals), secondary hospitals, and tertiary hospitals (**Dixon et al. 2023**). Studies conducted outside health facility settings, such as at home or in industrial or manufacturing environments, are excluded from the review.
- 12 Fourth, eligible studies include peer-reviewed original articles, reviews, reports, and relevant grey literature, provided they contain sufficient data to address the review

research questions. Articles not available in English or lacking full-text access are excluded. Editorials, commentaries, conference abstracts, and opinion pieces without substantive data related to the review questions are also excluded.

Data charting

- 13 A standardized data charting form designed for this review will be used for data extraction (**see Supplementary File 1**). Data that will be extracted from included studies will consist of author(s), year of publication, title, aim/objective, operational definition of medication return if provided, facility type, study design, the incidence of medication return, drivers of medication return, interventions/strategies for addressing medication returns (if reported), and knowledge gaps and further research directions.
- 14 The data charting form will be piloted using 10 included studies independently by two team members to test the form's adaptability and applicability across different types of data (**Levac, Colquhoun, and O'Brien 2010**). Each reviewer will independently extract data using the initial version of the form, focusing on key variables such as study characteristics, incidence metrics, and drivers of medication returns. The two reviewers will document challenges encountered during the process, such as unclear definitions, overlapping categories, or evidence that is difficult to capture.
- 15 The entire review team will then meet to discuss identified challenges or shortcomings of the form. The team will agree on revisions, including redefining variables or adding new fields where necessary. This rigorous piloting process will ensure the charting form used for the substantive review is robust and capable of systematically addressing the review questions.

Collating, summarizing, and reporting the results

- 16 The reporting of results will be guided by PRISMA-ScR reporting guidelines (**Tricco et al. 2018**). To present a comprehensive view of study characteristics, our analysis will categorize studies included in this review into study design (quantitative, qualitative or mixed-methods), health facility type (i.e., primary, secondary or tertiary care hospitals), and geographic contexts (e.g., sub-Saharan Africa, South-East Asia).
- 17 Given the inherent diversity of study designs and outcomes, narrative synthesis will be the primary method for summarizing findings. We will describe commonalities and differences in study characteristics and identify overarching themes, such as common incidences and drivers, and contextual factors underlying them across different institutional and geographic settings.



- 18 Quantitative data, such as the incidence or frequency of medication returns, will be summarized using descriptive statistics (e.g., means, medians, ranges) and tabulated for comparison across studies. Incidence trends will be visualized across geographic regions or healthcare settings to highlight patterns. Qualitative narratives describing trends in medication returns will be presented to complement the quantitative data.

Protocol references

1. Abbas, Haidar, and Jamal A Farooque. 2013. 'Return and disposal of unused medicines: a customer perspective of reverse logistics', *International Journal of Business and Management Invention*, 2: 59-66.
2. Abruquah, Akua Afriyie, Jacqueline Annabelle Drewry, and FT Ampratwum. 2014. 'What happens to unused, expired and unwanted medications? A survey of a community-based medication disposal practices', *International Journal of Development and Sustainability*, 3: 2175-85.
3. Agrawal, Saurabh, Rajesh K Singh, and Qasim Murtaza. 2015. 'A literature review and perspectives in reverse logistics', *Resources, Conservation and Recycling*, 97: 76-92.
4. Alhamad, Hamza, Nilesh Patel, and Parastou Donyai. 2020. 'Towards medicines reuse: a narrative review of the different therapeutic classes and dosage forms of medication waste in different countries', *Pharmacy*, 8: 230.
5. Ali, A ALSHEHRI, A ISHAQUI Azfar, A Hamad, and K Abdul. 2019. 'Evaluation of medicine return from wards to inpatient pharmacy in tertiary care hospital', *Lat Am J Pharm*, 38: 712-8.
6. AlSamanhodi, Hamza, Meshary Almeshary, Kwame Amoh, Saleh Aldekhael, Abdulmalik Alkatheri, Shmeylan Alharbi, Maha Alammari, Salah AbuRuz, and Abdulkareem Albekairy. 2017. 'Evaluation of the causes and cost impact of returned intravenous medications at a tertiary care hospital in Riyadh, Saudi Arabia', *Tropical Journal of Pharmaceutical Research*, 16: 231-37.
7. Amoabeng, Ivy Anima, Bernice Araba Otoo, Godfred Darko, and Lawrence Sheringham Borquaye. 2022. 'Disposal of Unused and Expired Medicines within the Sunyani Municipality of Ghana: A Cross-Sectional Survey', *Journal of Environmental and Public Health*, 2022: 6113346.
8. Ampadu, Isaac, Robert Morones, Andrea Tsatoke, Lacie Ampadu, Martin Stephens, William C Crump, and David Bales. 2021. 'Community-based medication disposal pilot initiative in southwest tribal communities', *Injury epidemiology*, 8: 1-7.
9. Arksey, Hilary, and Lisa O'Malley. 2005. 'Scoping studies: towards a methodological framework', *International Journal of Social Research Methodology*, 8: 19-32.
10. Ayvaz, Berk, Bersam Bolat, and Nezir Aydin. 2015. 'Stochastic reverse logistics network design for waste of electrical and electronic equipment', *Resources, Conservation and Recycling*, 104: 391-404.
11. Berrang-Ford, Lea, AR Siders, Alexandra Lesnikowski, Alexandra Paige Fischer, Max W Callaghan, Neal R Haddaway, Katharine J Mach, Malcolm Araos, Mohammad Aminur Rahman Shah, and Mia Wannewitz. 2021. 'A systematic global stocktake of evidence on human adaptation to climate change', *Nature Climate Change*, 11: 989-1000.
12. Chong, Kah Mun, Kingston Rajiah, David Chong, and Mari Kannan Maharajan. 2022. 'Management of medicines wastage, returned medicines and safe disposal in Malaysian community pharmacies: A qualitative study', *Frontiers in Medicine*, 9: 884482.
13. Coma, Anna, Pilar Modamio, Cecilia F Lastra, Marcel L Bouvy, and Eduardo L Mariño. 2008. 'Returned medicines in community pharmacies of Barcelona, Spain', *Pharmacy World & Science*, 30: 272-77.
14. Dixon, Brian E, Scott Teesdale, Rita Sembajwe, Martin Osumba, and Eyasu Ashebier. 2023. 'Facility registries: metadata for where care is delivered.' in, *Health Information Exchange* (Elsevier).
15. Fleischmann, Moritz, Jacqueline M Bloemhof-Ruwaard, Rommert Dekker, Erwin Van der Laan, Jo AEE Van Nunen, and Luk N Van Wassenhove. 1997. 'Quantitative models for reverse logistics: A review', *European Journal of Operational Research*, 103: 1-17.
16. Geremew, Sefefe, Wondim Ayenew, Dawit Teshome Gebregeorgise, and Bruck Messele Habte. 2024. 'Prevalence of unused medications and determinants among the general public in Addis Ababa, Ethiopia', *BMC*

Public Health, 24: 3131.

17. Gerrans, James, Parastou Donyai, Katherine Finlay, and R Simon Sherratt. 2023. 'An efficient smart pharmaceutical packaging technology framework to assess the quality of returned medication through non-intrusively recording storage conditions after dispensation', *Technologies*, 11: 75.
18. Jankie, Satish, Naveeta Barsatee, Vicky Dookhan, Kadita Sookdeo, Sasha Hernandez, and Arlene Villarroel Stuart. 2022. 'Patients' knowledge, attitudes and concerns regarding the disposal of expired/unused medication', *International Journal of Pharmacy Practice*, 30: 247-52.
19. Jesson, Jill, Rob Pocock, and Keith Wilson. 2005. 'Reducing medicines waste in the community', *Primary Health Care Research & Development*, 6: 117-24.
20. John, Sajan T, R Sridharan, PN Ram Kumar, and M Krishnamoorthy. 2018. 'Multi-period reverse logistics network design for used refrigerators', *Applied Mathematical Modelling*, 54: 311-31.
21. Kassahun, Haile, and Dugessa Tesfaye. 2020. 'Disposal practices of unused medications among patients in public health centers of Dessie town, northeast Ethiopia: a cross-sectional study', *Current Drug Safety*, 15: 105-10.
22. Langley, Chris, John Marriott, Adam Mackridge, and Richard Daniszewski. 2005. 'An analysis of returned medicines in primary care', *Pharmacy world and science*, 27: 296-99.
23. Levac, Danielle, Heather Colquhoun, and Kelly K O'Brien. 2010. 'Scoping studies: advancing the methodology', *Implementation Science*, 5: 69.
24. Lim, Ming Tsuey. 2016. 'Disposal Practices of Unused and Unwanted Medications among Patients in a Tertiary Hospital', *Education in Medicine Journal*, 8.
25. Mackridge, Adam J, and John F Marriott. 2007. 'Returned medicines: waste or a wasted opportunity?', *Journal of Public Health*, 29: 258-62.
26. Mahlaba, Kesentseng Jackson, Elvera Anna Helberg, Brian Godman, Amanj Kurdi, and Johanna Catharina Meyer. 2022. 'Patients' knowledge and practice on disposal of medicines kept in households in South Africa: Findings and implications', *Journal of Research in Pharmacy Practice*, 11: 13-18.
27. Makaleng, Mpho Sharon Makgedi, and Keith Lambert. 2022. 'Evaluation of reverse logistics in challenges within the manufacturing pharmaceutical companies'.
28. Makki, Mutaseim, Asrul Akmal Shafie, Ahmed Awaisu, Rabia Hussain, Moza Al Hail, Walid Mohammed ElMotasim, Mohamed Yousif Mohamed Ali Taha, Einas Abdoun, Noriya Mohd J Al-Khuzaei, and Gamila Salama. 2024. 'Patients' knowledge, attitude, and practices toward unused medications in Qatar: a cross-sectional survey', *Heliyon*.
29. Rajagopal, Premkumar, Veera Pandiyan Kaliani Sundram, and Babudass Maniam Naidu. 2015. 'Future directions of reverse logistics in gaining competitive advantages: A review of literature', *International journal of supply chain management*, 4: 39-48.
30. Shealy, Kayce M, Megan S Ritter, Anna S Wyatt, and David H Eagerton. 2019. 'Trends in potentially abused medications returned during medication take-back days', *Journal of the American Pharmacists Association*, 59: 575-78.
31. Shin, Jinhee, and Kennedy Diema Konlan. 2023. 'Prevalence and determinants of medication adherence among patients taking antihypertensive medications in Africa: A systematic review and meta-analysis 2010-2021', *Nursing Open*, 10: 3506-18.
32. Sorato, Mende Mensa, Majid Davari, and Abbas Kebriaeezadeh. 2024. 'Improving access to medicines to reduce marketing and use of substandard and falsified medicines in Africa: Scoping review', *The Journal of Medicine Access*, 8: 27550834241236598.



33. Tricco, Andrea C, Erin Lillie, Wasifa Zarin, Kelly K O'Brien, Heather Colquhoun, Danielle Levac, David Moher, Micah DJ Peters, Tanya Horsley, and Laura Weeks. 2018. 'PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation', *Annals of internal medicine*, 169: 467-73.
34. United Nations. 2015. "Transforming our world: the 2030 Agenda for Sustainable Development " In. New York, United States: United Nations.
35. White, Katherine Gwenda. 2010. 'UK interventions to control medicines wastage: a critical review', *International Journal of Pharmacy Practice*, 18: 131-40.
36. Yang, Christina HJ, Mitesh Doshi, and Nancy A Mason. 2015. 'Analysis of medications returned during a medication take-back event', *Pharmacy*, 3: 79-88.
37. Yang, Su Lan, Sze Ling Tan, Qing Liang Goh, and Siow Yen Liau. 2018. 'Utilization of ministry of health medication return programme, knowledge and disposal practice of unused medication in Malaysia', *J Pharm Pract Community Med*, 4: 7-11.