

# Barriers to Effective Prescribing in the Elderly: Applying the Theoretical Domains Framework in the Ambulatory Setting

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## Research article

**Keywords:** Barriers to effective prescribing in the elderly, ambulatory, outpatient

**Posted Date:** March 26th, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-19415/v1>

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**Version of Record:** A version of this preprint was published on November 9th, 2020. See the published version at <https://doi.org/10.1186/s12877-020-01766-7>.

# Abstract

**Aims:** As the population ages, potentially inappropriate prescribing (PIP) in the elderly may become increasingly prevalent. This undermines patient safety and creates a potential source of major morbidity and mortality. Understanding the factors that influence prescribing behaviour may allow development of interventions to reduce PIP. The aim of this study is to apply the Theoretical Domains Framework (TDF) to explore barriers to effective prescribing in the elderly in the ambulatory setting.

**Methods:** A scoping review was performed based on the five-stage methodological framework developed by Arksey and O'Malley. Our search strategy included PubMed, CINAHL, EMBASE, the Cochrane Database of Systematic Reviews, and Web of Science. We also searched five electronic journals, Google and Google Scholar to identify additional sources and grey literature. Two reviewers applied eligibility criteria to the title and abstract screening, followed by full text screening, before systematically charting the data.

**Results:** 5,731 articles were screened. 29 studies met the selection criteria for qualitative analysis. Using TDF, 14 domains for barriers to effective prescribing were identified. Significant domains include physician-related factors such as "Knowledge", "Skills", and "Social/Professional Role and Identity"; issues with "Environmental Context and Resources"; and the impact of "Social Influences" and "Emotion" on prescribing behaviour.

**Conclusion:** The TDF elicited multiple domains which both independently and collectively lead to barriers to effective prescribing in elderly patients in the ambulatory setting. Changing the prescribing climate will thus require interventions targeting multiple stakeholders, including physicians, patients and hospital/clinic systems. Moving forward, we will perform a Delphi study to explore individual domains and ultimately develop a physician-pharmacist collaborative care intervention to guide prescribing for the elderly in the ambulatory setting.

## Background

The aging population brings with it an increasing number of older adults (aged 65 years and above) living with chronic disease and taking medications on a regular basis. Compared to younger individuals, the elderly are at increased risk for developing drug-related complications due to a multitude of reasons including frailty, multi-morbidity, altered drug pharmacokinetics and pharmacodynamics, as well as a higher proportion of polypharmacy<sup>1</sup>. This predisposes the elderly to an increased risk of potentially inappropriate prescribing (PIP).

PIP describes the use of medications where the actual or potential harms of therapy outweigh the benefits, and encompasses both potentially inappropriate medications (PIMs) and potential prescribing omission (PPOs)<sup>2</sup>. PIP increases the risk of undesirable clinical consequences including adverse drug events (ADEs), functional decline, falls, cognitive impairment medication non-adherence and mortality<sup>3</sup>. Multiple screening tools have been developed to identify PIMs and PPOs in the elderly, including The

Improving Prescribing in the Elderly Tool, The Medication Appropriate Index, Beers' criteria, and Screening Tool of Older Person's Prescriptions (STOPP) and Screening Tool to Alert doctors to Right Treatment (START)<sup>4</sup>.

Despite these tools, PIP remains a significant problem worldwide, with studies estimating the prevalence of PIP in the elderly between 31-73%<sup>5-8</sup>. Although certain factors (e.g. clinical complexity, conflict between patient and physician's preferences) may be applicable across all settings, we hypothesize that there exists unique barriers to effective prescribing depending on the type of practice (e.g. inpatient vs. outpatient, primary care clinics vs. specialist clinics, rural vs. urban). For this study, we chose to focus on the outpatient or ambulatory care setting, where physicians may experience more time constraints during each individual patient encounter, lack of support from institution-based prescribing algorithms or pharmacist-led medication reviews, and the need to juggle medications from multiple prescribers<sup>9-11</sup>. Obtaining an in-depth understanding of the factors that influence physicians' prescribing behaviour may allow development of interventions to reduce PIP.

This study thus aims to explore barriers to effective prescribing in the elderly in the ambulatory setting. This review also serves as part of a proof-of-concept study in Phase 1 of an extended 3-phase project to improve prescribing for the elderly at outpatient clinics in public hospitals in Singapore.

## Methods

To capture barriers reported by physicians without placing a limit on the scope or nature of studies, a scoping review was selected over a systematic review. In line with the goals of scoping reviews, quality of evidence and risk of bias were not assessed<sup>12</sup>. We adopted the five-stage methodological framework developed by Arksey and O'Malley<sup>12</sup>, with advancements proposed by Levac, Colquhoun and O'Brien<sup>13</sup> and the Joanna Briggs Institute (JBI)<sup>14</sup>.

### *Stage 1: Identifying the research question*

Our aim is to map barriers experienced by physicians when they are prescribing for older adults with multi-morbidity. As the results will eventually help to inform formulation of an outpatient collaborative care intervention, we focused our search on studies conducted in the ambulatory setting (i.e. hospital outpatient clinics, specialist clinics, and primary care clinics). Hence, our research question was finalized as:

What are the key barriers to appropriate prescribing for older adults receiving ambulatory care?

### *Stage 2: Identifying relevant studies*

JBI's three-step search strategy was adapted<sup>14</sup>, with an initial limited search conducted in PubMed by one of the reviewers (SL). A list of relevant articles was identified and an analysis on the index terms and MeSH terms was performed to identify relevant search terms. In addition, JBI's mnemonic PCC

(population, concept, and context)<sup>14</sup> was utilized to finalize our search strategy, with guidance from a librarian. Table 1 shows a summary of the search terms.

**Table 1: Summary of search terms**

	<b>Keywords (MeSH terms and text word)</b>
<b>Population</b>	Aged, older adult(s), older patient(s), older person(s), older people, elderly, seniors
<b>Concept</b>	Inappropriate prescribing, drug prescriptions, practice patterns (physicians), clinical practice pattern(s), prescribing, deprescribing, deprescription, polypharmacy AND barrier(s), challenge(s) and difficulty/difficulties
<b>Context</b>	Ambulatory care, primary health care, outpatient, clinic(s), primary care

In the second step of the search, our full search strategy was applied across the following databases from 30 Aug 2018 to 5 Sep 2018: PubMed, The Cochrane Database of Systematic Reviews (CDSR), Embase, Web of Science and Cumulative Index to Nursing and Allied Health Literature (CINAHL). The full search strategy for the peer-reviewed databases is provided in Appendix 1.

Grey literature searches were conducted using Google and Google Scholar to capture non peer-reviewed publications on the subject. We reviewed the first 50 titles/websites that were displayed, sorted by relevance and limiting the publication date from 1998 onwards. In addition, we also searched electronic databases of the following five journals relevant to our topic, using limited key words: Age and Aging, Archives of Gerontology and Geriatrics, BMC Geriatrics, Gerontology Series A and Journal of the American Geriatrics Society. In addition, reference lists of the included studies were also searched. This last step was recommended in JBI's three-step search strategy<sup>14</sup>.

### *Stage 3: Study selection*

Two reviewers (SL and DYY) who are practicing clinicians independently completed the first stage title and abstract screening, resulting in a total of 45 eligible studies for the second-stage full text screening. Twenty-nine studies were found to be eligible for inclusion, following full text screening by the same reviewers. Conflicts were resolved through discussion. The two-stage screening process was managed in Covidence<sup>15</sup>, an online systematic review software. Table 2 shows the eligibility criteria used for screening.

**Table 2: Eligibility criteria for scoping review**

	<b>Inclusion</b>	<b>Exclusion</b>
Population	patients 65 and older	children, adolescents and adults younger than 65
Concept	prescribing by physicians, barriers associated with general prescribing	prescribing by pharmacists or nurse practitioners, prescribing restricted to specific diseases or specific medication
Context	outpatient care including primary care	inpatient care, long term care
Others	-	study protocols

#### *Stage 4: Charting the data*

One of the reviewers (SL) performed data extraction, charting the following information: Authors, year, country of origin, aims and purposes of the study, study population, sample size, methods of the studies and key findings on barriers identified by physicians. The second reviewer (DYY) validated the extracted data and made suggestions for changes and additions, with agreement from the first reviewer (SL).

#### *Stage 5: Collating, summarising and reporting the results*

Barriers identified in the studies were mapped to the Theoretical Domains Framework (TDF) proposed by Michie and colleagues<sup>16</sup>. The TDF synthesizes constructs drawn from 33 psychological theories relating to behaviour and behaviour change, and summarises them into 14 domains that were validated in 2012<sup>17</sup>. The domains broadly capture influences of cognition, emotions, social and environmental factors that impact one's behaviour (Atkins et al, 2017). The flow of the process is reported using the PRISMA flow diagram<sup>19</sup>.

## **Results**

Our search yielded 5,731 abstracts, of which 45 full-text articles were assessed for eligibility, and an eventual 29 articles were included in the qualitative synthesis (Figure 1).

Barriers to effective prescribing in the elderly were mapped to the TDF and categorised into major themes and constructs. These factors were further subdivided based on their respective stakeholders (e.g. patient, physician, healthcare system) where appropriate so as to more effectively target interventions. Table 3 shows a summary of the studies selected, while Table 4 shows the results of our scoping review based on the TDF.

Our scoping review identified three major stakeholders which influence effective prescribing in the elderly – namely the patient, the physician, and the healthcare system at large. Significant barriers in each

stakeholder category can be further summarised to direct appropriate interventions, as shown in Table 5 (see Tables 3-5 in the Supplemental Section).

## Discussion

The TDF elicited multiple domains which both independently and collectively lead to barriers to effective prescribing in the elderly in the ambulatory setting, including significant factors pertaining to Knowledge, Skills, Social/Professional Role and Identity, Social Influences and Environmental Context and Resources. We recognise that the elderly remain a unique population owing to their medical complexity, multimorbidity and frailty, and this can prove challenging for physicians who lack the knowledge and skillsets to effectively manage this group of patients. Patients and their families may exhibit poor healthcare literacy, 'doctor-hop', or express unrealistic expectations including the belief that 'prescribing validates illness', and may thus be reluctant to discontinue medications. Contextual factors such as socioeconomic status and access to healthcare and resources must also be considered when examining reasons for non-compliance or discrepant beliefs.

Beyond usual evidence-based guidelines which may be more easily applicable in younger patient groups, there is a constant need to weigh the risks and benefits of each recommendation based on individual patient context in the elderly, and thus no 'one size fits all' solution. With increased specialisation and fragmentation of care, physicians have also highlighted concerns regarding inter-professional relationships, hesitancy to interfere with recommendations from secondary or tertiary care, and also fears surrounding adverse outcomes or medicolegal consequences. With limited access to prescribing support or pharmacists in the ambulatory setting, it is thus not surprising that this constant need for debate, consultation and individual patient consideration may be time-consuming, resource-intensive, and thus makes it seemingly easier for physicians to skirt around the issue rather than address PIP, and hope that the decision for effective prescribing may be deferred to the next healthcare provider.

Changing the prescribing climate will thus require interventions targeting multiple stakeholders, including patients, physicians, ambulatory clinic systems and healthcare policy makers. At the level of the community, we need to work towards correcting the misconception that 'more medications constitute better treatment', that deprescribing does not equate to 'giving up on the patient', and gently reinforce the importance of medication review. Healthcare and social policies need to target the issue of healthcare financing, provision of adequate subsidies and ensuring equal access to healthcare. For physicians, more training and education in managing elderly patients may be helpful, but beyond the equipment of knowledge and skills alone there is also the need to develop good clinical reasoning, which may come with increased exposure to geriatric medicine, delivery of holistic, patient-centred care, and with increased experience and clinical wisdom. It is a delicate process that cannot be rushed and needs to be guided by good role models, alongside provision of adequate support including access to members of the multidisciplinary team (e.g. pharmacists for medication reviews, specialty care nurses for counselling on non-pharmacological management e.g. in the management of urinary incontinence), allowing seamless updating and retrieval of diagnoses and medication lists across institutions and healthcare settings, and

encouraging open communication among multiple healthcare providers instead of having each one practise in silo.

This scoping review distinguishes itself from existing literature in its focus on elderly patients receiving ambulatory care, which has its own unique set of challenges compared to hospital or residential-based care. It serves as an exploratory piece to better understand the barriers to effective prescribing, and maps out these barriers based on the TDF to provide a comprehensive picture on the ambulatory prescribing climate and allow for more systematic targeting of interventions.

However, because we sought to understand general barriers to prescribing rather than disease-specific or drug-specific considerations, the exclusion of studies that focused on either may have limited the number of studies included in this review. The authors also acknowledge that contextual factors (e.g. access to healthcare) may not be applicable across all healthcare settings, and may need to be interpreted in accordance to each population's unique needs.

In conclusion, there exist multiple barriers to effective prescribing which will require multipronged interventions targeting patients, physicians and the healthcare system at large in order to reduce PIP and improve care in the elderly. Moving forward, the study team will take findings from this scoping review into a modified Delphi study to explore the significance of the identified TDF domains in Singapore's context, and ultimately develop a physician-pharmacist collaborative care intervention to guide effective prescribing for the elderly in the ambulatory setting.

## **Declarations**

### **Ethics approval and consent to participate**

Ethics approval was obtained from the National Healthcare Group Domain Specific Review Board (DSRB).

### **Consent for publication**

Not applicable.

### **Availability of data and materials**

All data generated or analysed during this study are included in this published article and its supplementary information files.

### **Competing interests**

The authors declare that they have no competing interests.

### **Funding**

This work is funded by Geriatric Education and Research Institute, Singapore through the grant award (GERI1622) for the project titled "Appropriate prescribing for older adults with multimorbidity: from barriers to solutions".

### **Authors' contributions**

SL and DYY contributed to study conception and design, as well as data analysis and interpretation. PL contributed to data acquisition, analysis and interpretation. WA and TKT contributed to data interpretation. SL and PL also drafted the manuscript. All authors read and approved the final manuscript.

### **Acknowledgements**

The study team would like to thank Ms Yasmin Munro from the Lee Kong Chian School of Medicine Medical Library for her support given in refining our search terms.

## **References**

1. Mallet L, Spinewine A, Huang A. The challenge of managing drug interactions in elderly people. *Lancet*. 2007 Jul 14;370(9582):185-191.
2. Cahir C, Fahey T, Teeling M, Teljeur C, Feely J, Bennett K. Potentially inappropriate prescribing and cost outcomes for older people: a national population study. *Br J Clin Pharmacol*. 2010 May;69(5):543-52.
3. Hanlon JT, Schmader KE, Koronkowski MJ, Weinberger M, Landsman PB, Samsa GP, Lewis IK. Adverse drug events in high risk older outpatients. *J Am Geriatr Soc*. 1997 Aug;45(8):945-8.
4. Ryan C, O'Mahony D, Kennedy J, Weedle P, Byrne S. Potentially inappropriate prescribing in an Irish elderly population in primary care. *Br J Clin Pharmacol*. 2009 Dec;68(6):936-47.
5. Hansen CR, Byrne S, Cullinan S, O'Mahony D, Sahm LJ, Kearney PM. Longitudinal patterns of potentially inappropriate prescribing in early old-aged people. *Eur J Clin Pharmacol*. 2018 Mar;74(3):307-313.
6. Bahat G, Bay I, Tufan A, Tufan F, Kilic C, Karan MA. Prevalence of potentially inappropriate prescribing among older adults: A comparison of the Beers 2012 and Screening Tool of Older Person's Prescriptions criteria version 2. *Geriatr Gerontol Int*. 2017 Sep;17(9):1245-1251.
7. Bo M, Quaranta V, Fonte G, Falcone Y, Carignano G, Cappa G. Prevalence, predictors and clinical impact of potentially inappropriate prescriptions in hospital-discharged older patients: A prospective study. *Geriatr Gerontol Int*. 2018 Apr;18(4):561-568.
8. Millar A, Hughes C, Ryan C. Evaluating the prevalence of potentially inappropriate prescribing in older adults in intermediate care facilities: a cross-sectional observational study. *Int J Clin Pharm*. 2017 Jun;39(3):527-535.

9. Clyne B, Bradley MC, Hughes CM, et al. Addressing potentially inappropriate prescribing in older patients: development and pilot study of an intervention in primary care (the OPTI-SCRIPT study). *BMC Health Services Research*. 2013;13:307.
10. Anthierens S, Tansens A, Petrovic M, Christiaens T. Qualitative insights into general practitioners views on polypharmacy. *BMC Family Practice*. 2010;11:65.
11. Anderson K, Stowasser D, Freeman C, Scott I. Prescriber barriers and enablers to minimising potentially inappropriate medications in adults: a systematic review and thematic synthesis. *BMJ Open*. 2014;4(12):e006544.
12. Hilary Arksey & Lisa O'Malley. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology*, 2005;8:1,19-32.
13. Levac, D, Colquhoun, H & O'Brien, KK 2010, 'Scoping studies: advancing the methodology', *Implement Sci*, ed. 5, vol. 1, pp. 1-9.
14. Peters MDJ, Godfrey CM, McInerney P, Baldini Soares C, Khalil H, Parker D. *Methodology for JBI Scoping Reviews*. The Joanna Briggs Institute Reviewers' Manual 2015. Adelaide, South Australia: The Joanna Briggs Institute; 2015.
15. Covidence systematic review software, Veritas Health Innovation, Melbourne, Australia. Available at [covidence.org](http://covidence.org). Assessed September 2018.
16. Michie S, Johnston M, Abraham C, Lawton R, Parker D, Walker A, on behalf of the 'Psychological Theory' Group. Making psychological theory useful for implementing evidence based practice: a consensus approach. *Qual Saf Health Care* 2005;14:26–33.
17. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implement Sci* 2012;7:37.
18. Atkins L, Francis J, Islam R, O'Connor D, Patey A, Ivers N, et al. A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. *Implementation Sci*. 2017;12:77.
19. Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement, *PLoS Med* 6(7): e1000097.
20. AlRasheed MM, Alhawassi TM, Alanazi A, Aloudah N, Khurshid F, Alsultan M. Knowledge and willingness of physicians about deprescribing among older patients: a qualitative study. *Clinical interventions in aging*. 2018;13:1401–8.
21. Anderson K, Foster M, Freeman C, Luetsch K, Scott I. Negotiating "Unmeasurable Harm and Benefit": Perspectives of General Practitioners and Consultant Pharmacists on Deprescribing in the Primary Care Setting. *Qualitative Health Research*. 2017;27:1936–47.
22. Bokhof B, Junius-Walker U. Reducing Polypharmacy from the Perspectives of General Practitioners and Older Patients: A Synthesis of Qualitative Studies. *Drugs & aging*. 2016;33:249–66.
23. Cadogan CA, Ryan C, Francis JJ, Gormley GJ, Passmore P, Kerse N, et al. Improving appropriate polypharmacy for older people in primary care: selecting components of an evidence-based intervention to target prescribing and dispensing. *Implementation science: IS*. 2015;10:161.

24. Cadogan CA, Ryan C, Gormley GJ, Passmore P, Francis J, Kerse N, et al. Prescribing appropriate polypharmacy for older people in primary care: A qualitative study of general practitioners' perceptions and experiences. *International Journal of Pharmacy Practice*. 2015;23 Supplement 1:9–10.
25. Carthy P, Harvey I, Brawn R, Watkins C. A study of factors associated with cost and variation in prescribing among GPs. *Family practice*. 2000;17:36–41.
26. Clyne B, Cooper JA, Hughes CM, Fahey T, Smith SM, Team O-SS. 'Potentially inappropriate or specifically appropriate?' Qualitative evaluation of general practitioners views on prescribing, polypharmacy and potentially inappropriate prescribing in older people. *BMC Family Practice*. 2016;17.
27. Cullinan S, O'Mahony D, Fleming A, Byrne S. A meta-synthesis of potentially inappropriate prescribing in older patients. *Drugs & aging*. 2014;31:631–8.
28. Cullinan S, Hansen CR, Byrne S, O'Mahony D, Kearney P, Sahm L. Challenges of deprescribing in the multimorbid patient. *European Journal of Hospital Pharmacy-Science and Practice*. 2017;24:43-U67.
29. Djatche L, Lee S, Singer D, Hegarty SE, Lombardi M, Maio V. How confident are physicians in deprescribing for the elderly and what barriers prevent deprescribing? *Journal of clinical pharmacy and therapeutics*. 2018;43:550–5.
30. Fried TR, Tinetti ME, Iannone L. Primary care clinicians' experiences with treatment decision making for older persons with multiple conditions. *Archives of internal medicine*. 2011;171:75–80.
31. Lee PR, Boyd C, Green A. Clinicians' views on factors influencing prescribing decisions for patients with dementia. *Journal of the American Geriatrics Society*. 2018;66 Supplement 2:S294.
32. Maio V, Jutkowitz E, Herrera K, Abouzaid S, Negri G, Del Canale S. Appropriate medication prescribing in elderly patients: how knowledgeable are primary care physicians? A survey study in Parma, Italy. *Journal of clinical pharmacy and therapeutics*. 2011;36:468–80.
33. Mc Namara KP, Breken BD, Alzubaidi HT, Bell JS, Dunbar JA, Walker C, et al. Health professional perspectives on the management of multimorbidity and polypharmacy for older patients in Australia. *Age and ageing*. 2017;46:291–9.
34. Milos V, Westerlund T, Midlov P, Strandberg EL. Swedish general practitioners' attitudes towards treatment guidelines - a qualitative study. *BMC family practice*. 2014;15:199.
35. Moen J, Norrgard S, Antonov K, Nilsson JL, Ring L. GPs' perceptions of multiple-medicine use in older patients. *Journal of evaluation in clinical practice*. 2010;16:69–75.
36. Newby C, Venditto A. Reducing polypharmacy in the elderly-round and round we go. *Journal of General Internal Medicine*. 2014;29 SUPPL. 1:S424.
37. Pohontsch NJ, Heser K, Loeffler A, Haenisch B, Parker D, Luck T, et al. General practitioners' views on (long-term) prescription and use of problematic and potentially inappropriate medication for oldest-old patients- A qualitative interview study with GPs (CIM- TRIAD study). *BMC Family Practice*. 2017;18.

38. Raae-Hansen C, Byrne S, O'Mahony D, Kearney PM, Sahm LJ, Cullinan S. Challenges of deprescribing in older patients with multimorbidity, from healthcare professionals' perspectives-a narrative review. *Pharmacoepidemiology and Drug Safety*. 2017;26 Supplement 1:16–7.
39. Ramaswamy R, Maio V, Diamond JJ, Talati AR, Hartmann CW, Arenson C, et al. Potentially inappropriate prescribing in elderly: assessing doctor knowledge, confidence and barriers. *Journal of evaluation in clinical practice*. 2011;17:1153–9.
40. Riordan DO, Byrne S, Fleming A, Kearney PM, Galvin R, Sinnott C. GPs' perspectives on prescribing for older people in primary care: a qualitative study. *British journal of clinical pharmacology*. 2017;83:1521–31.
41. Roumie CL, Elasy TA, Wallston KA, Pratt S, Greevy RA, Liu X, et al. Clinical inertia: a common barrier to changing provider prescribing behavior. *Joint Commission journal on quality and patient safety*. 2007;33:277–85. 5.
42. Schuling J, Gebben H, Veehof LJG, Haaiker-Ruskamp FM. Deprescribing medication in very elderly patients with multimorbidity: the view of Dutch GPs. A qualitative study. *BMC Family Practice*. 2012;13.
43. Sellappans R, Lai PS, Ng CJ. Challenges faced by primary care physicians when prescribing for patients with chronic diseases in a teaching hospital in Malaysia: a qualitative study. *BMJ open*. 2015;5:e007817.
44. Sinnige J, Korevaar JC, van Lieshout J, Westert GP, Schellevis FG, Braspenning JC. Medication management strategy for older people with polypharmacy in general practice: a qualitative study on prescribing behaviour in primary care. *The British journal of general practice: the journal of the Royal College of General Practitioners*. 2016;66:e540-51.
45. Sinnott C, Mc Hugh S, Boyce MB, Bradley CP. What to give the patient who has everything? A qualitative study of prescribing for multimorbidity in primary care. *British Journal of General Practice*. 2015;65:e184–91.
46. Wallis KA, Andrews A, Henderson M. Swimming Against the Tide: Primary Care Physicians' Views on Deprescribing in Everyday Practice. *Annals of family medicine*. 2017;15:341–6.

## Tables

Due to technical limitations, tables 3-5 are only available as a download in the supplemental files section.

## Figures

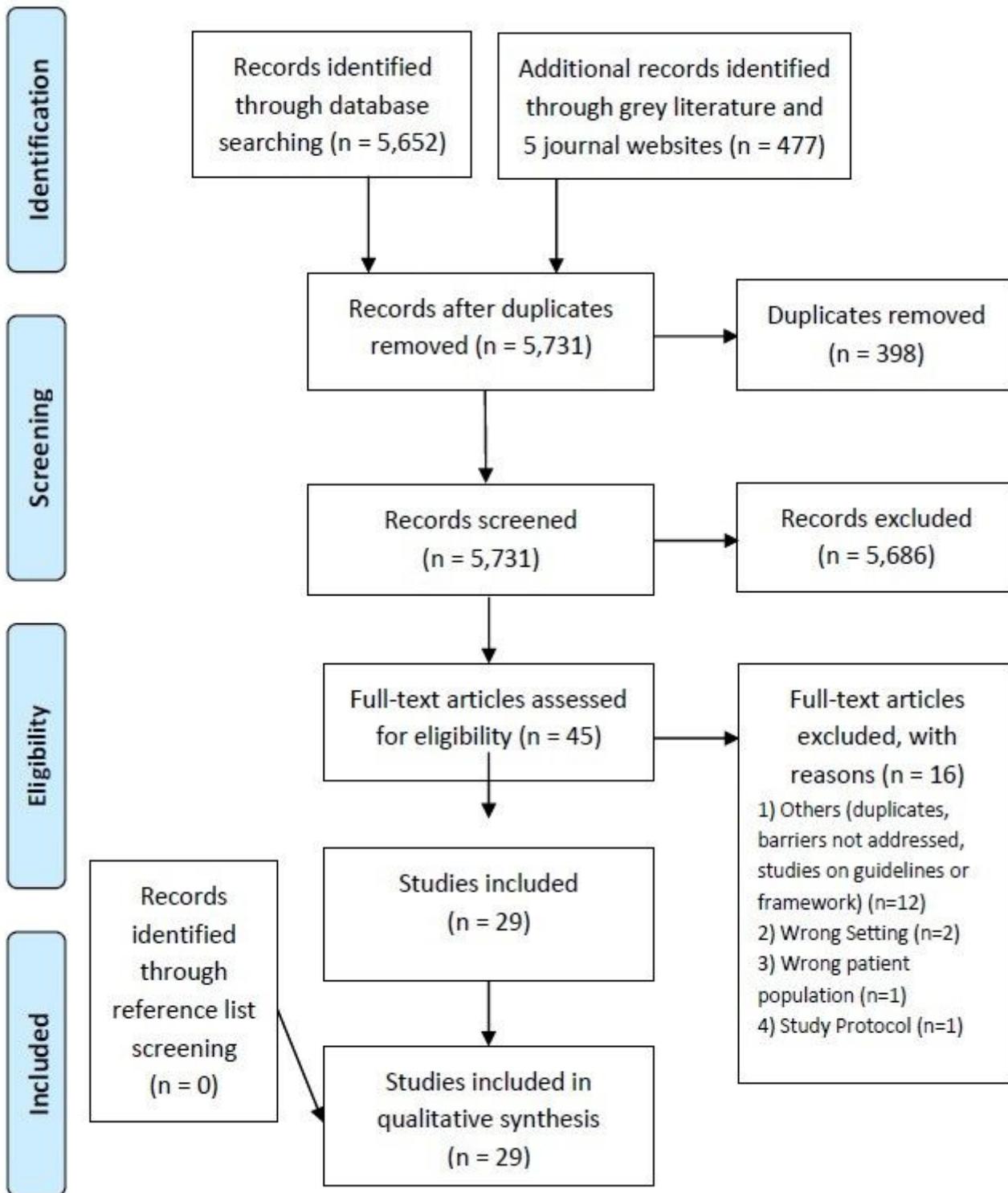


Figure 1

PRISMA 2009 Flow Diagram(19)

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Tables35.pdf](#)