Systematic review of potentially inappropriate medications in ambulatory seniors

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Background

- Seniors (65 years and older) are the fastest growing population in North America[1,2]
- Potentially Inappropriate Medications (PIMS) are medications that are associated with increased risk of harm to the elderly[3]
- The Beers criteria is a common tool for identifying PIM's in North America
- While a recent meta-analysis reported a pooled PIM rate across primary care settings as 33%, it remains unclear how the prevalence of PIM usage has changed over time[3]

Objectives

1. Summarize the rate of PIMs in seniors using the Beers criteria.
2. Describe how the prevalence of PIM usage has changed over time with different versions of Beers criteria.
3. Describe how the top medication classes have changed over time between different versions of Beers criteria
4. Summarize the risk factors associated with PIM usage and how they have changed over time

Methods

Search: Combined "senior", "BEERS", "Potentially inappropriate medication list", and terms related to primary care.

Databases: Medline, Embase, EBSCOhost, Academic Search premier, Ageline, and The Cumulative Index to Nursing and Allied Health Literature (CINAHL) complete database

Inclusion: Age ≥ 65 years, ambulatory/primary care, BEERs criteria, cross sectional, North American.

Exclusion: Hospitalized/ long term care, specific disease population/medication, review, unclear setting, studies other than cross-sectional, studies outside North America.

Results

Figure 1 – Prisma

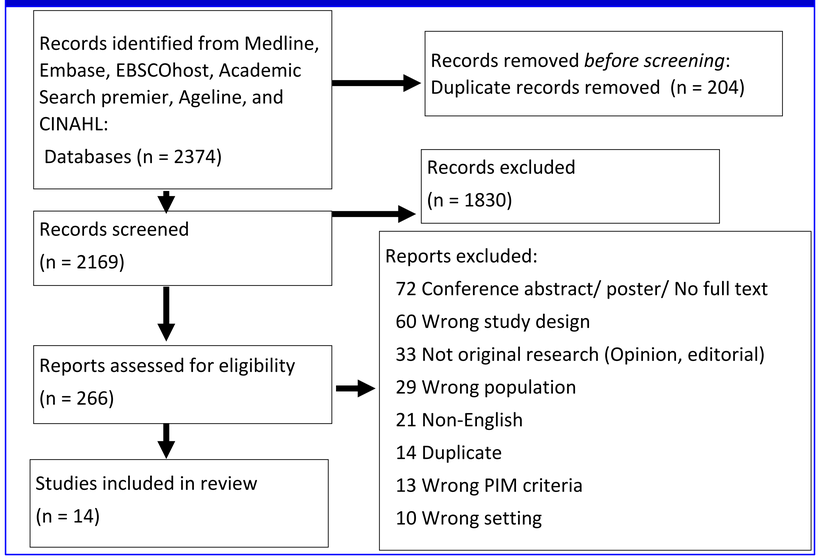


Figure 2 - PIM prevalence median values per version of Beers

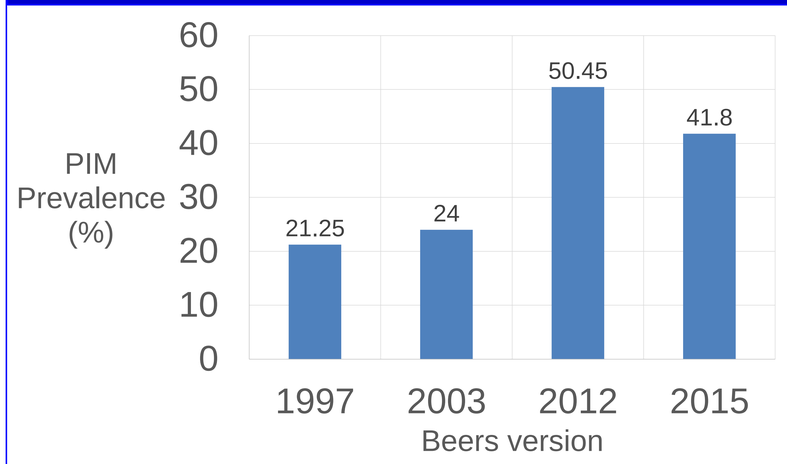
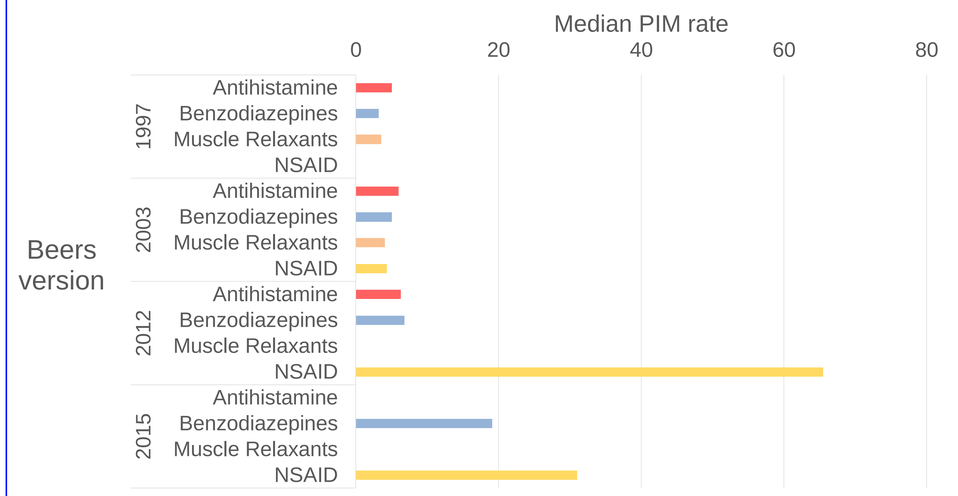


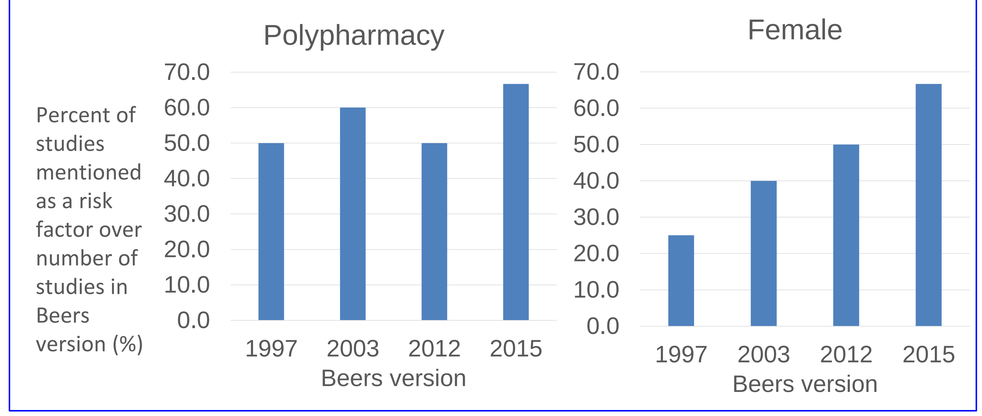
Table 2 – Median, min, and max PIM rate by Beers Version

Version	Median PIM % of patients	Minimum PIM	Maximum PIM	Number of studies	Number of patients
1997	21.25	21	25.8	4	1734797
2003	24	18.3	38	5	742350
2012	50.45	30.9	70	2	16988
2015	41.8	29	48.3	3	1107250
Overall	27.4	18.3	70	14	3601385

Figures 3 - Median PIM rate of medication classes as per Beers criteria version



Figures 4,5 – Percent of studies with risk factor identified by version of Beers



Conclusions

- We found a median PIM rate per patients of 27.4%, with a minimum of 18.3% to a maximum of 70%.
- Potentially inappropriate medication rate with Beers has been trending upwards since 1997 for both median values, max values, and minimum values per version. This may be due to increasing reliance on medications, and additional medications being added to the criteria
- Antihistamine use among the top 5 classes in each study has been declining, meanwhile Benzodiazepine and NSAID use has been increasing.
- Polypharmacy and female gender have consistently been identified as a risk factor for PIM usage across all versions of the Beers criteria.

1. Canadian Institute for Health Information. (2018). Drug Use Among Seniors in Canada, 2016. Ottawa (ON): CIHI. https://doi.org/10.1016/j.jval.2018.04.1003
2. United States Census Bureau, 65 and Older Population Grows Rapidly as Baby Boomers Age, June 25th 2020 3. Liew TM, Lee CS, Goh SKL, et al. The prevalence and impact of potentially inappropriate prescribing among older persons in primary care settings: multilevel meta-analysis. Age Ageing. 2020. doi:10.1093/ageing/afaa057.

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