Acute care

Optimising medication use in older adults living with frailty during hospitalisation

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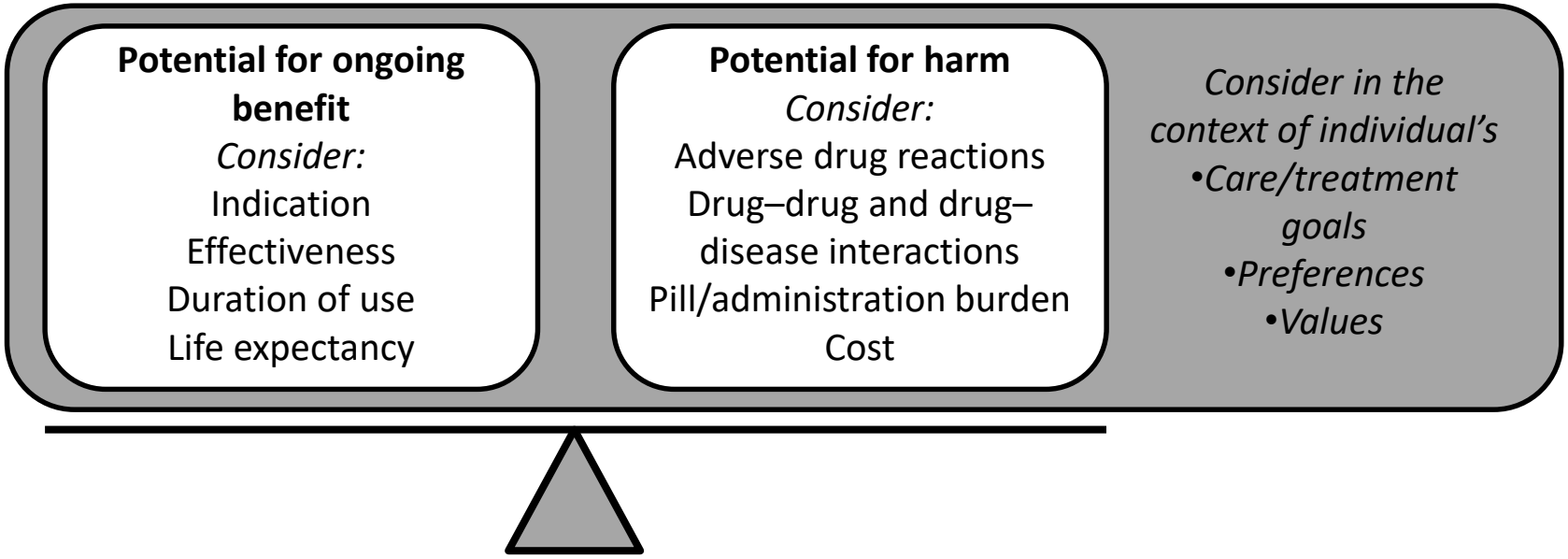
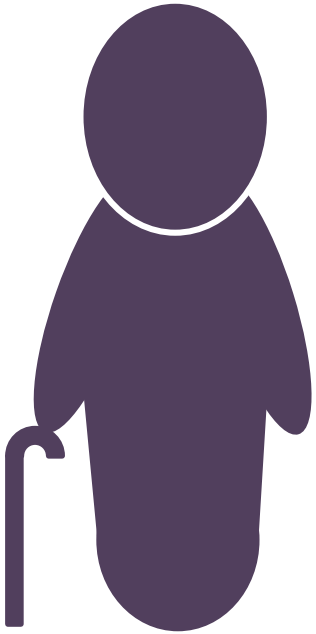
Optimizing medication use

Appropriate use of medications involves both **prescribing** medications which are appropriate and will benefit the individual and **deprescribing** medications where the risks outweigh the benefits



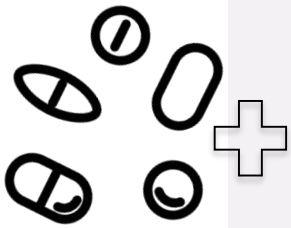
Older adults in hospital



- **Vulnerable group**
  - Acute (or chronic) reason for admission
  - Frailty
  - High risk of prolonged hospital stays, institutionalisation and death
- **Hospitalisation poses risks**
  - High rate of readmission
  - Risk of functional deterioration
  - Medical errors
  - Polypharmacy and PIMs
  - Delirium

Medication use in hospitalized older adults

Prevalence of polypharmacy and potentially inappropriate medication use in older inpatients : a systematic review



Polypharmacy (n=15)

24.0% → 97.1%

Potentially Inappropriate Medications (PIMs) (n=35)

7.0% → 88.5%

Beers, STOPP, + others

Redston MR, et al. *Journal of Alzheimer's Disease* (2018): 1-14.

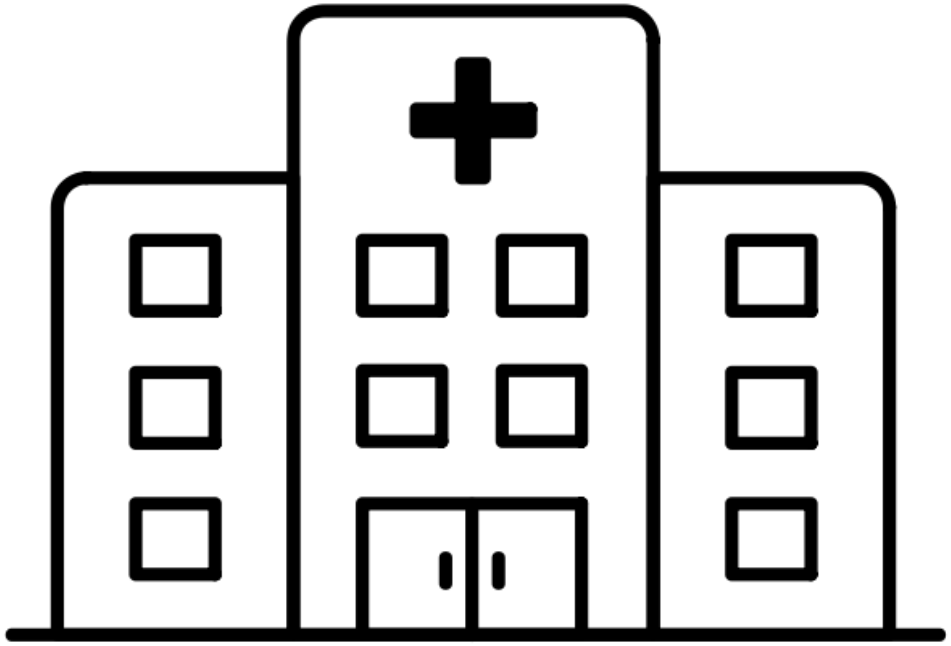
Changes in medication use during hospitalization

On admission

7.1 regular medications

23.8% taking ≥10 medications

54.8% taking ≥1 PIMs



On discharge

7.6 regular medications

28.3% taking ≥10 medications

60.8% taking ≥1 PIMs

During hospitalization

0.6% medications deprescribed

84.1% reactive and **15.9%** proactive

Hubbard R et al MJA. 2015;202:373-377, Scott S et al Int J Clin Pharm 2018;20 June; Ni Chronin et al Australasian J Ageing. 2016;35:262-265

What happens after discharge to deprescribed medications?

- **22%** of medications that were intentionally ceased during hospital admission were restarted in the 5 months following discharge
- **27%** of medications that were ceased in hospital due to an ADR were restarted in the following 6 months
- Intervention study (comprehensive geriatric assessment) - **25%** of medications that had been ceased were restarted within 1 year

Viktil et al BMJ Open 2012;2;e001461; van der Linden et al Br J Clin Pharmacol 2012;29:957-962; Lampela et al Drugs Aging 2010;27:507-521

Barriers to optimising medication use in hospital

- Presentation of an acute problem
- The culture is to prescribe more medications (which may be enhanced in acute illness), with stopping a lower priority
- Inertia in work practice, and reluctance to question a colleague's prescribing decisions, may lead to prescribing medications taken prior to admission without review
- Fragmented care
  - difficulties accessing complete medical histories
- Admission may be too short to implement changes and monitor
  - Lack of formal follow-up/support procedures

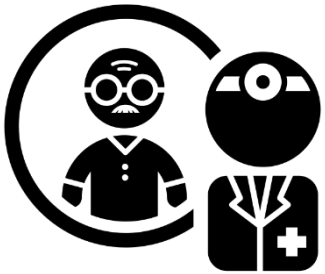
Opportunities to deprescribe in hospital

- Medication history is routinely undertaken
- Time available for discussions with patients/family
  - 89% of older ***inpatients were willing to stop*** one or more of their regular medications
- Opportunity for close short term monitoring
  - Physiological parameters are routinely monitored
- Complex decisions routinely occur
  - Collection of full history and investigations, routine discussion and consideration of factors such as life expectancy and exploration of individual goals of care
  - The multidisciplinary team, consultations from specialists
- Established methods of communication with primary care physicians

What do health care professionals feel about deprescribing in hospital

› Over 90% of hospital pharmacists agreed that they had an important role in managing statin therapy in older inpatients (95% CI: 90.5–98.8%) *Wu A, JPPR 2017*

› Junior doctors (who usually chart prescriptions) may have limited confidence in their knowledge of geriatric pharmacology and ability to review medications, or may not feel that medication review is their role. *Cullinan S, et al. Br J Clin Pharmacol 2014*



› Geriatricians report they are more likely to deprescribe medications for patients with polypharmacy and underlying cognitive impairment or limited life expectancy. *Ni Chroinin D, et al Age Ageing 2015*

Findings

- 9 RCTs (n=2522 subjects)
  - Pharmacist led (n=4), physician led (n=4), multidisciplinary team led (n=1)
  - 4 used a specific tool to identify PIMs as part of the intervention – 1 of these used a computer support system

Findings

Medication outcomes:

› 7/9 studies reported a statistically significant reduction in PIMs in the intervention group, and no study showed an increase in PIMs

→ possible to improve quality of medication use in hospital

Clinical outcomes:

› ADRs (+,0), QOL (+,0), mortality (0), hospitalisation (0), falls (+,0), function (+,0)

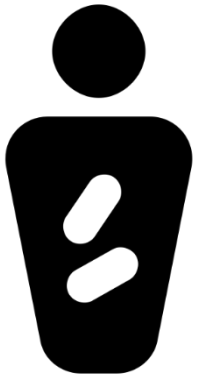
→ mixed results on impact on clinical outcomes

Anticholinergic and sedative medications

- Intended effect (effect central to therapeutic action)
  - Anticholinergics: e.g. allergic rhinitis, urinary incontinence, nausea/vomiting
  - Sedatives: e.g. insomnia

- Unintended effect (effect not central to therapeutic use)
  - Anticholinergics: e.g. anti-depressants, antipsychotics
  - Sedatives: e.g. opioids, anti-convulsants

- **Concerns about**
  - Reduced/limited efficacy in older adults with frailty
  - Increased risk of harms in older adults with frailty
  - Negative effects of combinations



Drug Burden Index (DBI)

Total Drug Burden = $B_{AC} + B_S$

$$\frac{E}{\alpha} = \sum \frac{D}{D + DR_{50}}$$

E = pharmacological effect

α = proportionality constant

D = daily dose

DR_{50} = daily dose required to achieve 50% of maximal contributory effect at steady state (estimated as the minimum recommended daily dose)

Drug Burden Index (DBI)

Table 1 Example of mathematical calculation of the Drug Burden Index (using clinical scenario)

Medications in clinical scenario	Daily dose (D)	Minimum recommended daily dose (δ)	Individual DBI
Irbesartan 300 mg, daily	300 mg	75 mg (no anticholinergic or sedative effects)	0
Darifenacin 15 mg, daily	15 mg	7.5 mg (anticholinergic effects)	0.67
Temazepam 7.5 mg, at night	7.5 mg	7.5 mg (sedative effects)	0.50
Acetaminophen 300 mg, 2 tablets tds	1,800 mg	300 mg (no anticholinergic or sedative effects)	0
Codeine 15 mg, 2 tablets tds	90 mg	120 mg (sedative effects)	0.43
Total DBI calculation			
$DBI = \sum \frac{D}{D+\delta}$			1.60

Kouladjian O'Donnell et al (2014) Clinical Interventions in Ageing; p 1503

Drug Burden Index (DBI)

DBI

Countries

Australia

Canada

Finland

The Netherlands

New Zealand

UK

USA

Associated Outcomes

↓ physical function

↓ balance and falls

Frailty

Hospitalisation

↑ GP visits

↓ cognition and memory (+/-)

Mortality (+/-)

Longitudinal studies: ↓ physical function over 5 years, ↓ memory performance, ↑ physician visits and mortality

Limitations

Definitions of anticholinergic or sedative medications

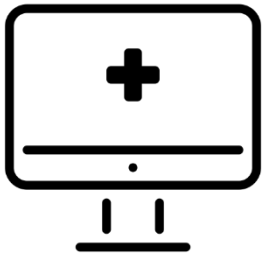
Pharmacokinetic and pharmacodynamic parameters

Estimation of the minimum effective dose

Observational and pilot RCT studies

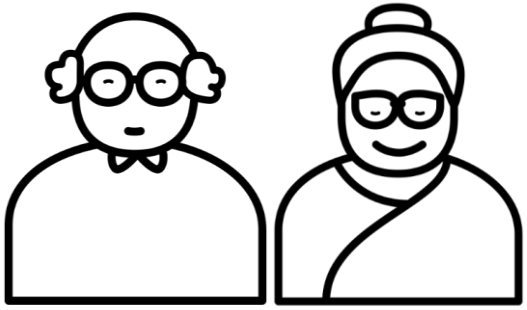
Kouladjian O'Donnell et al (2014) Clinical Interventions in Ageing; p 1503

Pharmacist led intervention to improve medication use in older in-patients living with frailty: the Drug Burden Index



Highlight drugs which may be suitable for deprescribing

Act as a communication tool



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