‘Medication reviews in older patients: available tools and practical tips’

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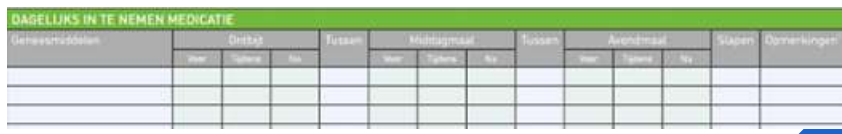
Irene

- 85 years old
- Lives alone in her own house
- Physically very fit, never complains

- Ventricular extrasystoles >30 years (cardiologist every 2y)
- BP: 110/70 mmHg
- eGFR: 52 ml/min
- Weight: 52 kg
- TC 216 mg/dL, TG 169 mg/dL

- Cognitive decline, screening 1y ago: MMSE 19/30 → support (meals, day-center)
- ‘Toilet accidents’

Medication list



Irene

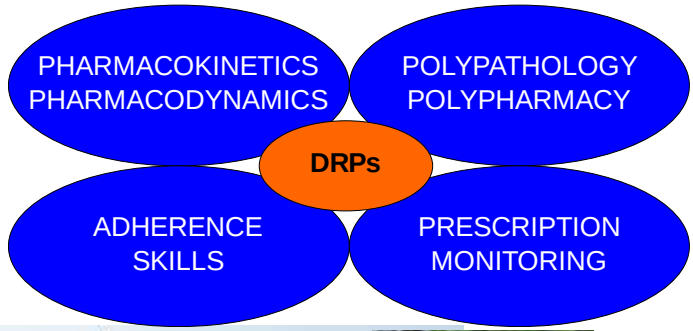
- Hospitalization for severe diverticulitis, temporary stoma for 8 weeks
- Second hospitalization for restore of continuity, 14 days in hospital:
  - Prolonged nausea
  - UTI infection
  - Confusion

Medication list at discharge:

- Calcium / Vitamin D 1g/880IU
- Domperidone 10 mg IN max 3/d
- Paracetamol 325 / tramadol 37,5 mg max 3/d
- Simvastatin 20 mg
- Solifenacine 5 mg
- Zolpidem 10 mg

?

Factors contributing to drug related problems in older persons



Types of DRPs – level of drug process

Prescribing

- 'overprescribing'
- 'misprescribing'
- 'underprescribing'
- 'not taking patients' preferences into account'

Dispensing

- Erroneous prescription validation
- Erroneous dispensing
- Insufficient information

Administration

- Wrong medication, dose, pharmaceutical form,…
- Wrong administration route or technique
- Over- or underadministration of medication

Patient behaviour

- Taking more/less medication (non adherence)
- Erroneous use of medication
- Insufficient communication with HCP

Communication, documentation, follow-up

- Wrong / incomplete medication list
- Insufficient documentation / communication of problems with patient / HCP

Medication review
Assessment of appropriate drug use

A **structured** evaluation of a patient's medicines with the aim of **optimizing** medicines use and improving health **outcomes**. This entails detecting **drug related problems** and recommending **interventions**

Pharmaceutical Care Network Europe (www.pcne.org)

What is the goal?

NOT just:
Reducing polypharmacy

BUT:
Increasing appropriateness of therapy

Prevention of inappropriate prescribing
Prevention of inappropriate use of drugs by the patient
Prevention of ADE due to unsafe drug process

Types of medication review

Type of MR		Information available		
		Medication history	Patient interview	Clinical data
Simple	Type 1	+		
Intermediate	Type 2A	+	+	
	Type 2B	+		+
Advanced	Type 3	+	+	+

Greese-Mannen et al. PCNE definition of medication review: reaching agreement. Int J Clin Pharm 2018

Type of MR	Description
Level 1	Prescription review: addresses issues relating to the prescription or medicines; the patient does not need to be present, nor access to full notes
Level 2	Concordance and compliance review: addresses issues relating to the patient's medicine taking behaviour
Level 3	Clinical medication review: addresses issues relating to the patient's use of medicines in the context of their clinical condition.

NHS Medication Review Guidance June 2021

Clinical Medication review: 4 steps

1. Medication reconciliation
   Drug history + patient interview — Tools
2. Pharmacotherapeutic analysis
   Screening for drug related problems (DRPs) — Tools
3. Pharmacotherapeutic discussion
   Evaluation of DRPs & recommendations — Tools
4. Pharmacotherapeutic plan
   Counseling, implementation & follow-up — Tools

Clinical Medication review: 4 steps

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1. Medication Reconciliation

The process of comparing the medications a patient is taking (and should be taking) with newly ordered medications in order to resolve discrepancies or potential problems

Problems with transfer of information about medicines at transition moments:

Unintended medication discrepancies (UMD):

- drug omitted
- stopped drug added
- wrong drug
- unknown drug
- wrong dose
- unknown dose
- wrong frequency
- unknown frequency

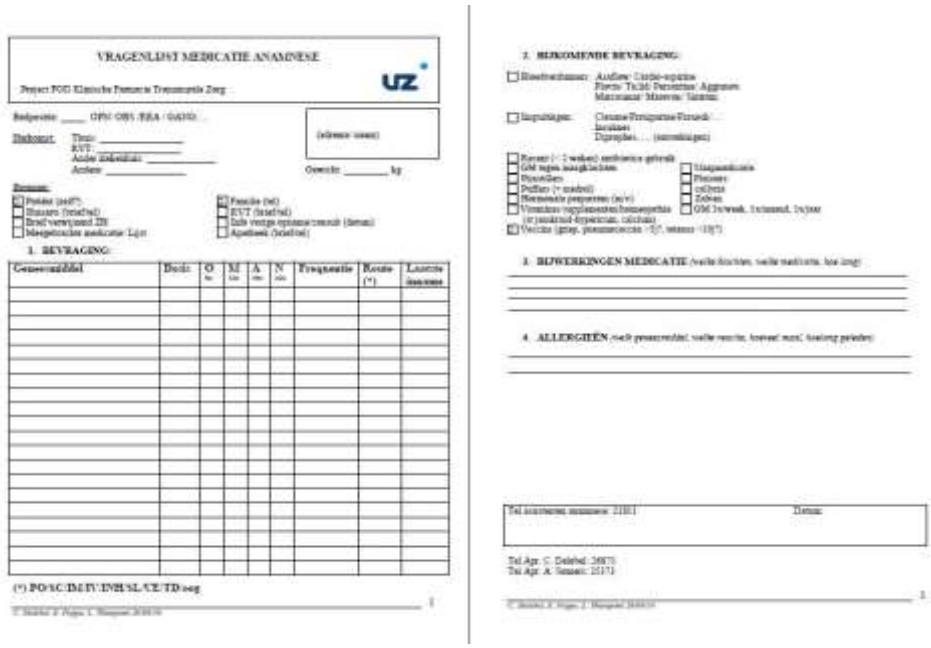
Part 1 = BPMH: Best Possible Medication History

- Use at least 2 sources of information
- Structured approach, 4 steps:
  1. Patient interview, relatives, GP, community pharmacist
  2. Extra questions about drugs that are easily 'forgotten' + high risk medication
  3. Medications stopped because of ADRs / stopped recently
  4. Drug allergies

Drugs that are easily 'forgotten' + high risk medication

- ✓ *Antitrombotic drugs*
- ✓ *Analgesics (chronic / if needed)*
- ✓ *Sleeping pills*
- ✓ *Injectable drugs (e.g. insulin)*
- ✓ *Drugs not taken every day*
- ✓ *Ointments*
- ✓ *Vitamines*
- ✓ *Inhalations*
- ✓ *Plasters*
- ✓ *Eye, ear and nose drops*

- For each drug: 5 fields required
  1. Drug name
  2. Dose
  3. Day frequency
  4. Week frequency
  5. Quantity per administration + unit
- If possible: compare with prescriptions
- Active reporting of relevant discrepancies



VRAGENLIJST MEDICATIE ANAMNESE

1. BEVRAGING:

Geneesmiddel	Dosis	O	M	A	N	Frequentie	Reden (*)	Laatste inname

(*) PO/SC/IM/IV/INH/SL/TC/TD/oog

2. AANBEVOLEN BEVRAGING:

3. BIJWERKINGEN MEDICATIE

4. ALLERGIEËN

‘memory aid’

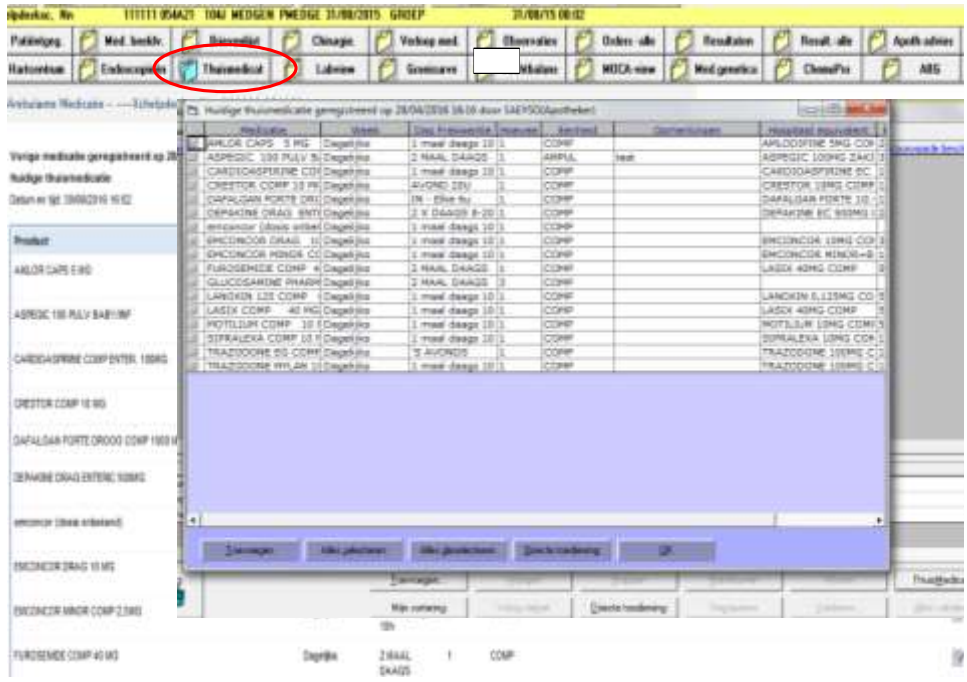
Record for each drug:
- ✓ Starting date (specific date if recently started)
- ✓ Drug name (written out)
- ✓ Dose
- ✓ Quantity per administration time
- ✓ Stopping date if just before admission (a.o. important for anticoagulants)
- ✓ Route of administration
- ✓ Time(s) of administration (hours)

Caution with drugs that are not taken every day (1x/week, 1x/month…):
e.g. methotrexate, biphosphonates, ertyhropoetin…

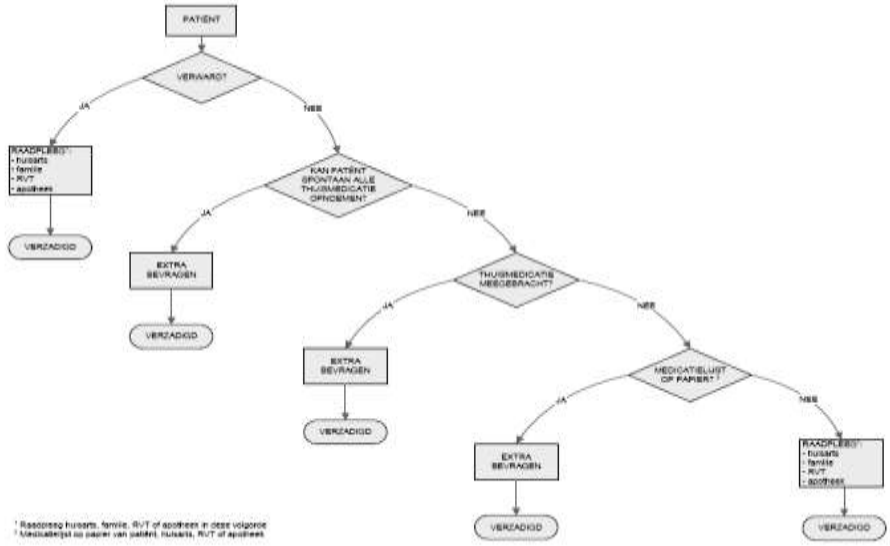
Antitrombotic agents:
- Vitamine K antagonists, DOACs
- LMWH
- Aspirin, clopidogrel, prasugrel,…

Ask specifically for:
- ✓ Antitrombotic drugs
- ✓ Injectable drugs
- ✓ Inhalations
- ✓ Plasters
- ✓ Eye, ear and nose drops
- ✓ Ointments
- ✓ Vitamines
- ✓ Analgesics (chronic / if needed)
- ✓ Sleeping pills

Drug information sources:
1. National drug database
2. Drug information provided by the local health community / institution
3. International drug information sources (e.g. UpToDate)

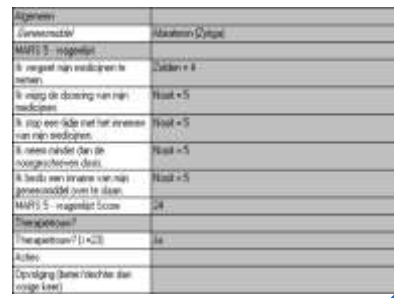


Flowchart: when are we satisfied with the list?



<u>Part 2</u> = Patient interview

- *Who cares for your medicines?*
- *Do you know for what reason you take these medicines?*
- *Do you have other complaints, is the medication effective for you?*
- *Do you experience certain adverse reactions?*
- *Do you have certain difficulties to take the medicines?*
- *Do you sometimes deviate from the scheme, if yes, how often and why?*
- *Do you have questions about your medicines?*



Medication Reconciliation: Recommendations

- Structured approach (BPMH)
- Different sources
- Electronic
- History
- 'Shared' medication scheme
- Medication list + patient interview
- MedRec should be a formal, essential step
  - at every transition
  - at every consultation
- Use tools e.g. structured form, adherence score,…
- Pharmacists' notes: document
- Record who takes care of the medicines
- *Add reasons for changes*

Clinical Medication review: 4 steps

1. Medication reconciliation
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2. Screening for potential DRPs (pDRPs)

PIMs Potentially Inappropriate Medicines

PAMs Potentially Appropriate Medicines

ADRs Adverse Drug Reactions ***Falls!***

HARMs Hospital Admissions Related to Medication

PIP Potentially Inappropriate Prescribing

overuse	misuse	underuse
• Indication not present (anymore) • Combination where monotherapy is sufficient • Duplication	• Inappropriate choice • Inappropriate dosing • Inappropriate duration of therapy • Contra-indication • Drug-drug interaction	• Undertreatment • No preventative therapy

Screening Tools

1) Explicit (criteria): drugs to avoid / drugs to start

- Beers (1991, updates 1997, 2003, 2012, 2015, 2019)
- McLeod (1997)
- IPET: *Improved Prescribing in the Elderly Tool* (2000)
- ACOVE: *Assessing Care of Vulnerable Elders* (2001)
- STOPP/START: *Screening Tool of Older Person's Prescriptions & Screening Tool to Alert Doctors to Right Prescriptions)* (2008, 2014)
- PRISCUS list (2010)
- Australian Prescribing Indicators Tool (2012)
- RASP: *Rationalization of Home Medication by an Adjusted STOPP list in Older Patients* (2014)
- FORTA criteria: *Fit fOR the Aged* (2014)
- EU(7)-PIM list (2015)
- GHEOP^{3}S: *Ghent Older People's Prescriptions community Pharmacy Screening* (2016, 2021)

2) Implicit (judgment): appropriateness

- MAI: Medication Appropriateness Index (1992)
- Lipton's criteria (1993)
- GMA: Geriatric Medication Algorithm (1994)
- AOU: Assessment Of Underuse (2001)
- STRIP: Systematic Tool to Reduce Inappropriate Prescribing (2012)
- A-MAI: Adapted MAI (2012)

Beers List (1991, 1997, 2003, 2012, 2015, 2019)

American Geriatrics Society 2019 Updated Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults

Mark H Beers

1. Potentially Inappropriate Medication Use (PIMs)
2. PIMs due to drug-disease or drug-syndrome interactions that may exacerbate the disease or syndrome
3. PIMs to be used with caution
4. Drug–Drug Interactions that should be avoided in older adults
5. Dosage Reduced with varying levels of kidney function
6. Drugs with strong anticholinergic properties

EU(7)-PIM list (2015)

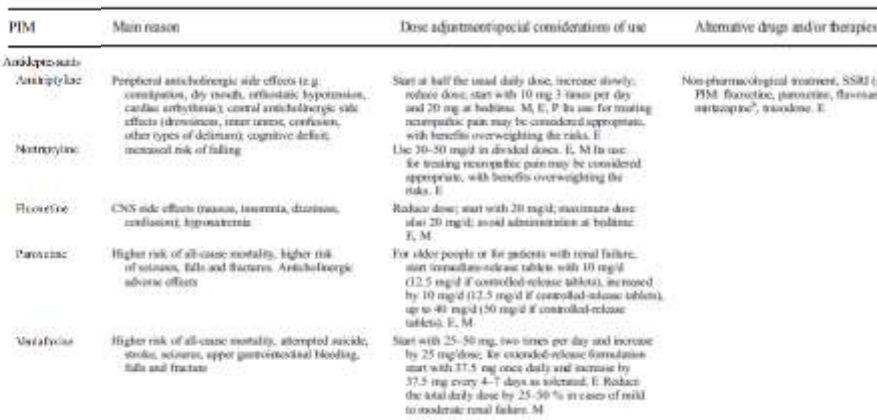
Eur J Clin Pharmacol (2015) 71:861–875
DOI 10.1007/s00228-015-1860-9

PHARMACOEPIDEMIOLOGY AND PRESCRIPTION

The EU(7)-PIM list: a list of potentially inappropriate medications for older people consented by experts from seven European countries

Anna Renom-Guiteras[1,2,4] · Gabriele Meyer[3,4] · Petra A. Thürmann[5,6]

- An expert-consensus list of PIMs covering the drug markets of seven European countries
- First used for people with dementia participating in the RightTimePlaceCare Seventh Framework European project
- Based on German PRISCUS list, PIM lists from Canada, USA and France
- List of 275 drugs + 7 drug classes
- Dose adjustments / special considerations + alternatives



PIM	Main reason	Dose adjustment/special considerations of use	Alternative drugs and/or therapies
Antidepressants			
Amitriptyline	Peripheral anticholinergic side effects (e.g. constipation, dry mouth, orthostatic hypotension, cardiac arrhythmia); central anticholinergic side effects (drowsiness, inner unrest, confusion, other types of delirium); cognitive deficit; increased risk of falling	Start at half the usual daily dose, increase slowly; reduce dose; start with 10 mg 3 times per day and 20 mg at bedtime. M, E, P In use for treating neuropathic pain may be considered appropriate, with benefits overweighting the risks. E	Non-pharmacological treatment, SSRI (except PIM: fluoxetine, paroxetine, fluvoxamine)[a], mirtazapine[b], trazodone. E
Nortriptyline		Use 30–50 mg/d in divided doses. E, M In use for treating neuropathic pain may be considered appropriate, with benefits overweighting the risks. E	
Fluoxetine	CNS side effects (nausea, insomnia, dizziness, confusion); hyponatremia	Reduce dose; start with 20 mg/d; maximum dose also 20 mg/d; avoid administration at bedtime. E, M	
Paroxetine	Higher risk of all-cause mortality, higher risk of seizures, falls and fractures. Anticholinergic adverse effects	For older people or for patients with renal failure, start immediate-release tablets with 10 mg/d (12.5 mg/d if controlled-release tablets), increased by 10 mg/d (12.5 mg/d if controlled-release tablets), up to 40 mg/d (50 mg/d if controlled-release tablets). E, M	
Venlafaxine	Higher risk of all-cause mortality, attempted suicide, stroke, seizures, upper gastrointestinal bleeding, falls and fracture	Start with 25–50 mg, two times per day and increase by 25 mg/dose; for extended-release formulation start with 37.5 mg once daily and increase by 37.5 mg every 4–7 days as tolerated. E Reduce the total daily dose by 25–50 % in cases of mild to moderate renal failure. M	

- Can be considered as a 'European Beers list' (list 1)
- (in)appropriate indications are mostly not mentioned
- Can be used for the analysis of PIP patterns in and across European countries

STOPP/START criteria (2008, update 2014)

Initiative from 'the Irish STOPP/START criteria group' (Cork)
19 experts from 13 European countries: Delphi panel

- Screening Tool of Older Persons' potentially inappropriate Prescriptions (STOPP)
  - 80 STOPP criteria
- Screening Tool to Alert doctors to the Right Treatment (START)
  - 34 START criteria

Requires clinical data: indications, lab values

A. General criteria
B. Cardiovascular system
C. Antitrombotic drugs
D. Central nervous system
E. Decreased renal function
F. Gastro-intestinal system
G. Respiratory system
H. Musculoskeletal system
I. Urogenital system
J. Endocrine ssystem
K. Increased fall risk
L. Pain
M. Anticholinergic agents

O'Mahony et al. Age and Ageing, 2014

STOP

Section B: Cardiovascular System

1. Digoxin for heart failure with normal systolic ventricular function (no clear evidence of benefit).
2. Verapamil or diltiazem with NYHA Class III or IV heart failure (may worsen heart failure).
3. Beta-blocker in combination with verapamil or diltiazem (risk of heart block).
4. Beta blocker with bradycardia (< 50/min), type II heart block or complete heart block (risk of complete heart block, asystole).
5. Amiodarone as first-line antiarrhythmic therapy in supraventricular tachyarrhythmias (higher risk of side-effects than beta-blockers, digoxin, verapamil or diltiazem).

START

Section D: Gastrointestinal System

1. Proton Pump Inhibitor with severe gastro-oesophageal reflux disease or peptic stricture requiring dilatation.
2. Fibre supplements (e.g. bran, ispaghula, methylcellulose, sterculia) for diverticulosis with a history of constipation.

GENERAL

Section A: Indication of medication

1. Any drug prescribed without an evidence-based clinical indication.
2. Any drug prescribed beyond the recommended duration, where treatment duration is well defined.
3. Any duplicate drug class prescription e.g. two concurrent NSAIDs, SSRIs, loop diuretics, ACE inhibitors, anticoagulants (optimisation of monotherapy within a single drug class should be observed prior to considering a new agent).

STOPPFrail (2017, 2020)

Deprescribing in older people approaching end-of-life: development and validation of STOPPFrail version 2

Denis Curtin[1,2], Paul Gallagher[1,2], Denis O'Mahony[1,2] *Age and Ageing* 2020; **50:** 465–471

- Version 2 (2020) includes a method for identifying older people who are likely approaching end-of-life and 25 deprescribing criteria.

Section G: Musculoskeletal system	• Calcium supplements: Unlikely to be of any benefit in short-term unless proven, symptomatic hypocalcaemia. • Vitamin D (ergocalciferol and colecalciferol): Lack of clear evidence to support the use of vitamin D to prevent falls and fractures, cardiovascular events or cancers. • Anti-resorptive/bone anabolic drugs *for osteoporosis* (bisphosphonates, strontium, teriparatide, denosumab) • Long-term oral nonsteroidal anti-inflammatory drugs: Increased risk of side effects (e.g. peptic ulcer disease, bleeding, worsening heart failure) when taken regularly for ≥2 months. • Long-term oral corticosteroids: Increased risk of major side effects (e.g. fragility fractures, proximal myopathy, peptic ulcer disease) when taken regularly for ≥2 months. Consider careful dose reduction and discontinuation.
Section H: Urogenital system	• Drugs for benign prostatic hyperplasia (5-alpha reductase inhibitors and alpha-blockers) in catheterised male patients: No benefit with long-term bladder catheterisation. • Drugs for overactive bladder (muscarinic antagonists and mirabegron): No benefit in patients with persistent, irreversible urinary incontinence unless clear history of painful detrusor hyperactivity.
Section I: Endocrine system	• Anti-diabetic drugs: De-intensify therapy. Avoid HbA1c targets (HbA1C <7.5% [58 mmol/mol] associated with net harm in this population). The goal of care is to minimise symptoms related to hyperglycaemia (e.g. excessive thirst, polyuria).

Drugs Aging (2014) 31:131–140

Consensus Validation of the FORTA (Fit fOR The Aged) List: A Clinical Tool for Increasing the Appropriateness of Pharmacotherapy in the Elderly

Alexandra M. Kuhn-Thiel · Christel Weiß · Martin Wehling · The FORTA authors/expert panel members

- Two-round Delphi procedure with 20 experts (17 geriatric internists + 3 geriatric psychiatrists from Germany and Austria), evaluating the labels assigned to 190 substances or substance groups
- Classification per pharmacological (sub)class, according to indication
- Both over and undertreatment

- *Class A* (A-bsolutely) = indispensable drug, clear-cut benefit in terms of efficacy/safety ratio proven in elderly patients for a given indication
- *Class B* (B-eneficial) = drugs with proven or obvious efficacy in the elderly, but limited extent of effect or safety concerns
- *Class C* (C-areful) = drugs with questionable efficacy/safety profiles in the elderly, to be avoided or omitted in the presence of too many drugs, lack of benefits or emerging side effects; review/find alternatives
- *Class D* (D-on't) = avoid in the elderly, omit first, review/find alternatives

Re-evaluated substance/group (original FORTA rating)	FORTA indication area	No. of raters ($n = 20$) Round 1 Round 2	Consensus coefficient Round 1 (cutoff 0.800)	Expert rating on a numerical scale[a] Round 1 Round 2 mean; mode	Proposed FORTA rating, based on mean value from Round 2
Gingko biloba (C)	Dementia	20 20	0.775	3.5; 3 3.6; 4	D
Haloperidol (D)	BPSD paranoia, hallucinations	19 20	0.632	3.3; 4 3.0; 3	C
Risperidone (D)	BPSD paranoia, hallucinations	20 20	0.500	3.0; 2 2.7; 2	C
Quetiapine (D)	BPSD paranoia, hallucinations	20 20	0.575	3.2; 4 2.9; 3	C
Aripiprazole (D) [2–15 mg/day]	BPSD paranoia, hallucinations	19 17	0.789	3.6; 4 3.4; 4	C
Clozapine (D) [10–50 mg/day]	BPSD paranoia, hallucinations	20 19	0.800	3.6; 4 3.7; 4	D
Risperidone (D)	BPSD restlessness	20 20	0.625	3.3; 4 2.7; 2	C
Melperone (D)	BPSD restlessness	20 20	0.675	3.4; 4 3.4; 4	C
Quetiapine (D) [25–200 mg/day]	BPSD restlessness	19 19	0.763	3.5; 4 3.3; 3	C

TYPE II DIABETES MELLITUS	Suggested FORTA class	France (N=5) FORTA class / Consensus coefficient	Italy (N=7) FORTA class / Consensus coefficient	Nordic countries (N=6) FORTA class / Consensus coefficient	Spain (N=8) FORTA class / Consensus coefficient	Poland (N=8) FORTA class / Consensus coefficient	UK/Ireland (N=9) FORTA class / Consensus coefficient	Germany /Austria (N=21) FORTA class / Consensus coefficient	Mean consensus coefficient	EURO-FORTA Class (original FORTA class in parentheses if different from consensus results)
Substance/group										
DPP4 (Dipeptidylpeptidase) Inhibitors	A	B 0.625 (R2)	A 0.929	B 0.667 (R2)	A 0.857	B 0.643 (R2)	B 0.357 (R2)	A 0.900	0.711	(A) B
Insulin and insulin analogs (if absolutely necessary)	B	A 0.625 (R2)	B 0.857	A 0.667 (R2)	B 0.857	B 0.929	B 0.813	B 0.825	0.796	B
Metformin	B	B 0.875	A 0.585 (R2)	B 0.900	A 0.571 (R2)	B 0.810	B 0.818	B 0.900	0.779	B
GLP1 (Glucagon-Like Peptide-1) analogs	B	B 0.875 (R2)	B 0.833	B 1.000	B 0.929	B 1.000	B 0.929	B 0.916	0.926	B
3rd generation sulfonylureas (for example, glimepiride)	C	C 0.875	C 0.881	C 1.000	C 1.000	B 0.643 (R2)	C 0.818	C 0.875	0.870	C
Glinides (for example, nateglinide)	C	C 0.833	C 0.917	C 1.000	C 1.000	C 1.000	C 1.000	C 0.950	0.957	C
PPAR-γ Ligands (Peroxisomal Proliferator-Activated Receptor gamma)										C
pioglitazone	C	D 0.625 (R2)	C 0.929	C 1.000	C 1.000	C 1.000	C 0.929	C 0.925	0.915	
rosiglitazone	D	D 1.000	D 1.000	D 1.000	D 1.000	D 1.000	D 1.000	D 1.000	1.000	D
Gliflozins	D	D 1.000	D 0.881	D 0.833	D 0.929	D 1.000	C 0.643 (R2)	D 0.975	0.891	D
1st generation sulfonylureas (for example, glibenclamide)	D	D 1.000	D 0.929	D 1.000	D 1.000	D 0.833	D 0.813	D 0.900	0.925	D

RASP: Rationalization of Home Medication by an Adjusted STOPP list in Older Patients

1. Cardiovascular system
1.1. Antiarrhythmic drugs (Vaughan-Williams classification I, III) in patients with chronic (permanent) atrial fibrillation/flutter
1.2. Digoxin in patients with chronic systolic heart failure without optimization of β-blocker therapy (unless contraindications)
1.3. Thiazide or loop diuretics in patients with severe or symptomatic electrolyte disturbances
1.4. Digoxin in suboptimal trough concentrations (optimal range: 0.5–1.0 ng/mL) in patients with systolic heart failure in sinus rhythm
1.5. Loop diuretics as first-line monotherapy for hypertension
1.6. Loop diuretics in patients with peripheral edema without any signs of heart failure
1.7. Non-cardioselective β-blocker in patients with Chronic Obstructive Pulmonary Disease (COPD)
1.8. Spironolactone as first-line therapy without prior use of an angiotensin converting enzyme inhibitor (ACE-I) or an angiotensin receptor blocker (ARB) (exceptions: hypokalemia or ascites)
1.9. Other β-blocker than bisoprolol, carvedilol, metoprolol succinate and nebivolol in patients with systolic heart failure
1.10. Other angiotensin receptor blocker (ARB) than candesartan or valsartan in patients with systolic heart failure
1.11. Nondihydropyridine calcium channel blockers (diltiazem or verapamil) in patients with systolic heart failure (NYHA class III or IV)
1.12. Dipyridamole unless in an extended-release formulation with acetylsalicylic acid for secondary prevention of CVA/TIA
1.13. Aspirin combined with clopidogrel, without any compelling indication
1.14. Vitamin K antagonists for uncomplicated deep venous thrombosis (DVT) for > 3 months ago
1.15. Vitamin K antagonists for uncomplicated pulmonary embolism (PE) for > 6 months
1.16. Acetylcholinesterase inhibitors in patients with clinical and electrocardiographical signs of significant bradyarrhythmias
1.17. Moxonidine in patients with systolic heart failure (NYHA class III or IV)
1.18. Acetylsalicylic acid for primary prevention of cardiac events in persons older than 80 years
1.19. Statins in primary prevention in persons older than 80 years with a significant decrease of life expectancy
1.20. Prolonged use of nitrates/nitrate derivatives if no signs of angina pectoris were present in the last six months

- Acute geriatric care (hospital)
- Focus on cardiovascular drugs
- Clinical data required

Van der Linden L, et al. Development and validation of the RASP list (Rationalization of Home Medication by an Adjusted STOPP list in Older Patients): A novel tool in the management of geriatric polypharmacy. Eur Geriatr Med (2014)

GHEOP³S-tool (2016, 2021)

Ghent Older People's Prescriptions community Pharmacy Screening tool

- 64 items, 5 lists
- Based on existing explicit tools; only drugs on European market
- Use by community pharmacist, without clinical information (indication, lab values)
- Assessment of clinical relevance + feasibility by expert panel
- Manual with rationale + alternative treatment suggestion

List	Inhoud	Voorbeeld
1	Potentially inappropriate medication for older people	Digoxin >125µg
2	Potentially inappropriate medication for older people, dependent on comorbidities	Metoclopramide with Parkinson disease
3	Potentially omitted medication in older people	No folic acid with methotrexate
4	Drug-drug interactions especially relevant in older people	NSAID + VKA
5	Pharmaceutical care-related criteria for older people to be addressed in the community pharmacy	No medication scheme available
Addendum: Medications that should be avoided or used with caution (need for reduction in dose or dosing frequency) in older people with a reduced renal function.		

Tommelein E. J Public Health (Oxf) 2016;38(2):158-70
Foubert K. Drugs & Aging 2021;38(6):523-33

https://www.ugent.be/fw/nl/onderzoek/bioanalyse/farmzorg/tools/gheop3s-tool-versie-2/gheop3s-tool-update_eng/view

ADRs Adverse Drug Reactions ***Risk factors***

HARMs Hospital Admission Related to Medication

Frequency of and Risk Factors for Preventable Medication-Related Hospital Admissions in the Netherlands
Anne J. Leendertse, PharmD; Antoine C. G. Egberts, PhD; Lennart J. Stoker, PharmD; Patricia M. L. A. van den Bemt, PhD; HARM Study Group
Arch Intern Med. 2008;168(17):1890-1896.

Risk factors:

Patient related:
- impaired cognition (odds ratio [OR], 13.0; 95% CI, 4.6-36.5)
- 4 or more diseases in the patient's medical history (11.3; 4.4-29.0)
- dependent living situation (4.5; 2.4-8.1)
- impaired renal function before hospital admission (2.6; 1.6-4.2)
- nonadherence to the medication regimen

Medication related: polypharmacy (5 or more drugs)

ADRs Adverse Drug Reactions ***Risk score***

Development and validation of a score to assess risk of adverse drug reactions among in-hospital patients 65 years or older: the GerontoNet ADR risk score

Graziano Onder [1], Mirko Petrovic, Balamurugan Tangiisuran, Marieke C Meinardi, Wilnh P Markito-Notenboom, Annemie Somers, Chakravarthi Rajkumar, Roberto Bernabei, Tischa J M van der Cammen

Arch Intern Med. 2010;170(13):1142-1148

Variable	OR (95% CI)	Points
≥4 Comorbid conditions	1.31 (1.04-1.64)	1
Heart failure	1.79 (1.39-2.30)	1
Liver disease	1.36 (1.06-1.74)	1
No. of drugs		
≤5	1 [Reference]	0
5-7	1.90 (1.35-2.68)	1
≥8	4.07 (2.93-5.65)	4
Previous ADR	2.41 (1.79-3.23)	2
Renal failure[b]	1.21 (0.96-1.51)	1

ADRs Adverse Drug Reactions ***Anticholinergic burden***

Drugs & Aging (2021) 38:977–994
https://doi.org/10.1007/s40266-021-00895-z

SYSTEMATIC REVIEW

Quantifying Anticholinergic Burden and Sedative Load in Older Adults with Polypharmacy: A Systematic Review of Risk Scales and Models

Swellem B. Al Rihani[1] · Malavika Deodhar[1] · Lucy I. Darakjian[1] · Pamela Dow[1] · Matt K. Smith[1] · Ravil Bikmetov[1] · Jacques Turgeon[1,2] · Veronique Michaud[1,2]

Anticholinergic Drug Scale (ADS)
Anticholinergic Burden Classification (ABC)
Anticholinergic Effect on Cognition (AEC)
Anticholinergic Risk Scale (ARS)
Anticholinergic Cognitive Burden Scale (ACB)
Modified ACB scale (mACB)
Anticholinergic Activity Scale (AAS)
Anticholinergic Loading Scale (ACL)
Korean Anticholinergic Burden Scale (KABS)
German Anticholinergic Burden Score (German ACB)
Brazilian anticholinergic activity scale

ACB	ADS	AEC	ALS	ARS	Brazilian	German	KABS	mACB
Drugs classified in 7 or more anticholinergic scales								
1	1	0	1		1	1	1	1
2	1	2		2	2	2	2	2
3	3	3	3	3	3	3	3	3
1	0	0	0		1	1	0	1
3	3	3	3	3	3	3	3	3
1	0	0			1	1	1	1
1	1		0		1	1	0	1
2	2	1	0		2	2	1	2

ADR Adverse Drug Reactions

Falls: FRIDs

RESEARCH PAPER

STOPPFall (Screening Tool of Older Persons Prescriptions in older adults with high fall risk): a Delphi study by the EuGMS Task and Finish Group on Fall-Risk-Increasing Drugs

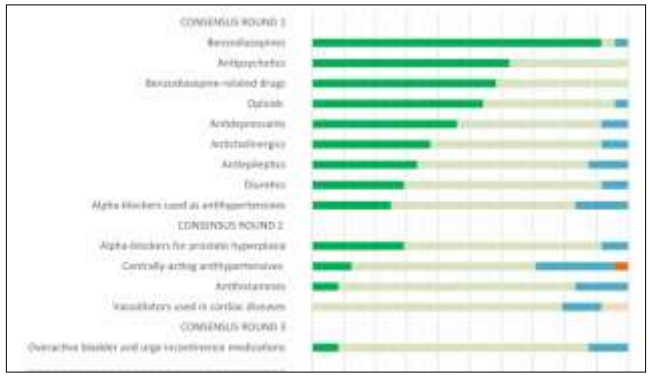


Table 2. Deprescribing guidance for STOPPFall items

	Fall-risk assessment: In which cases to consider withdrawal?[a]	Is stepwise withdrawal needed?[b]	Monitoring after deprescribing[c]
Benzodiazepines (BZD) and BZD-related drugs	-If daytime sedation, cognitive impairment, or psychomotor impairments -In case of both indications: sleep and anxiety disorder	In general needed	-Monitor: anxiety, insomnia, agitation -Consider monitoring: delirium, seizures, confusion
Antipsychotics	-If extrapyramidal or cardiac side effects, sedation, signs of sedation, dizziness, or blurred vision -If given for BPSD or sleep disorder, possibly if given for bipolar disorder	In general needed	-Monitor: recurrence of symptoms (psychosis, aggression, agitation, delusion, hallucination) -Consider monitoring: insomnia
Opioids	-If slow reactions, impaired balance, or sedative symptoms -If given for chronic pain, and possibly if given for acute pain	In general needed	-Monitor: recurrence of pain -Consider monitoring: musculoskeletal symptoms, restlessness, gastrointestinal symptoms, anxiety, insomnia, diaphoresis, anger, chills
Antidepressants	-If hyponatremia, OH, dizziness, sedative symptoms, or tachycardia/arrhythmia -If given for depression but depended on symptom-free time and history of symptoms or given for sleep disorder, and possibly if given for neuropathic pain or anxiety disorder	In general needed	-Monitor: recurrence of depression, anxiety, irritability and insomnia -Consider monitoring: headache, malaise, gastrointestinal symptoms
Antiepileptics	-If ataxia, somnolence, impaired balance, or possibly in case of dizziness -If given for anxiety disorder or neuropathic pain	Consider	-Monitor: recurrence of seizures -Consider monitoring: anxiety, restlessness, insomnia, headache
Diuretics	-If OH, hypotension, or electrolyte disturbance and possibly if urinary incontinence -possibly if given for hypertension	Consider	-Monitor: heart failure, hypertension, signs of fluid retention

ADR Adverse Drug Reactions

Prescribing cascades

Drugs & Aging

ThinkCascades: A Tool for Identifying Clinically Important Prescribing Cascades Affecting Older People

Lisa M. McCarthy[1,2,3] · Rachel Savage[4,5] · Kieran Dalton[6] · Robin Mason[4,7] · Joyce Li[4] · Andrea Lawson[4] · Wei Wu[8] · Shelley A. Sternberg[8] · Stephen Byrne[9] · Mirko Petrovic[9] · Graziano Onder[10] · Antonio Cherubini[11] · Denis O'Mahony[12] · Jerry H. Gurwitz[13] · Francesco Pegreffi[14] · Paula A. Rochon[4,5,15,16]

Accepted: 22 June 2022

Table 3 ThinkCascades: clinically important prescribing cascades affecting older people, by physiologic system

Drug A	Side effect	Drug B
Cardiovascular System (n=2)		
Calcium Channel Blocker	Peripheral edema	Diuretic
Diuretic	Urinary incontinence	Overactive bladder medication
Central Nervous System (n=4)		
Antipsychotic	Extrapyramidal symptoms	Antiparkinsonian agent
Benzodiazepine	Cognitive impairment	Cholinesterase inhibitor or memantine
Benzodiazepine	Paradoxical agitation or agitation secondary to withdrawal	Antipsychotic
Selective Serotonin Reuptake Inhibitor (SSRI) / Serotonin-norepinephrine Reuptake Inhibitor (SNRI)	Insomnia	Sleep agent (e.g., Benzodiazepines, Benzodiazepine Receptor Agonists, Sedating antidepressant, Melatonin)
Musculoskeletal System (n=1)		
NSAID	Hypertension	Antihypertensive
Urogenital System (n=2)		
Urinary Anticholinergics	Cognitive impairment	Cholinesterase inhibitor or memantine
Alpha-1 Receptor Blocker	Orthostatic hypotension, dizziness	Vestibular sedative (e.g., betahistine, Antihistamines, Benzodiazepines)

NSAIDs: non-steroidal anti-inflammatory drugs

PIP Potentially Inappropriate Prescribing

Critera of assessment for each drug
Clinical information available
Patient centered approach

- **Indication**
- **Contra-indication** (drug-disease interaction)
- **Drug choice**
- **Dose**
- **Modalities** (frequency, times / mode of administration)
- **Interactions** (drug-drug, drug-food)
- **Duration of therapy**
- **Adverse reactions**

In addition: underuse?

Adapted MAI (aMAI) (2012)

Nr	Question	Weight
1	Indication	3
2	Drug-disease interactions (contra-indications)	2
3	***Right choice***	3
4	Dose	2
5	**Directions** (route / time of administration, frequency, adm. technique)	1
6	***Adverse drug reactions***	2
7	Drug-drug interactions	2
8	Duration of therapy	1

Calculation of scores: appropriate = weight x 0
marginally appropriate = weight x 0.5
inappropriate = weight x 1
total score per drug [0 – 16]

+ additional question: undertreatment?

Implicit approach: Appropriateness of therapy

	Drug list		Indication	Contra-indication	Right choice	Dose	Correct modalities	Inter-actions	Duration	Adverse reactions	Tot
			3	2	3	2	1	2	1	2	Tot
1	Perindopril 5mg q24h	HF, AHT	0	0	0	2	0	0	0	1	3
2	Fenofibrate 145 mg q24h	?	0	0	3	2	0	0	0	0	5
3	Clonazepam 0,6mg q 24h	Menière	1,5	0	3	0	0	0	1	1	6,5
4	Sotalol 80 mg q12h	AF	0	0	1,5	1	0	0	0	0	2,5
5	Paracetamol 375 mg q24h	OA	0	0	0	2	1	0	0	0	3
6	Tramadol 37,5mg q24h	OA	0	0	1,5	1	0	0	0,5	0	3
										Totale score	23

Case 1 – explicit approach

Patient 1	Woman, 82 years
Reason of admission	Falls day -4 & day -1
Medical history	Bilateral total hip prosthesis, osteoporosis, reflux oesophagitis grade C, arterial hypertension 2014: fall, humerus fracture, spinal stenosis with paresthesia 2016: fall, acetabulum fracture – diagnosis osteoporosis
Medical problem(s)	Pain, balance problems
Social / cognitive status	Lives alone, walks with walking aid (rollator)
Relevant lab values	K+ 5.25 mmol/l, Na+ 137 mmol/l, eGFR 42 ml/min/1,73m², 25OH vit D <3.0 ng/ml, BP 155/110, weight 59 kg
Drugs	**Problems – recommendations**
1 Alendronate 70 mg 7h 1x/week	Caldium / vit D?
2 Cinnarizine 75 mg 8h-12h-18h	
3 Duloxetine 60 mg 8h	
4 Lormetazepam 2 mg 20h	
5 Omeprazole 40 mg 7h	
6 Oxycodone 10 mg IN	Laxative?
7 Pravastatine 20 mg 8h	
8 Ramipril 5 mg 8h	

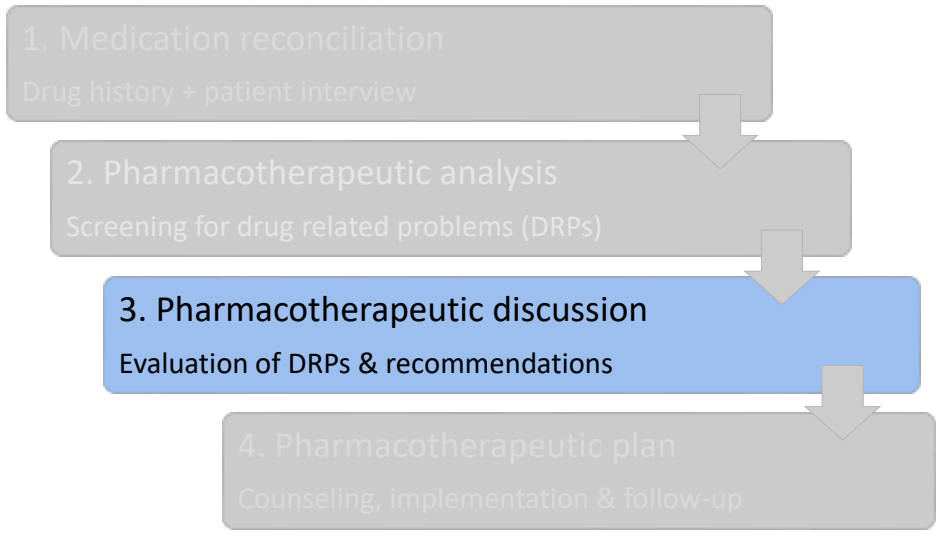
Case 1 – implicit approach

Patient 1	Woman, 82 years
Reason of admission	Falls day -4 & day -1
Medical history	Bilateral total hip prosthesis, reflux oesophagitis grade C, arterial hypertension 2014: fall, humerus fracture, spinal stenosis with paresthesia 2016: fall, acetabulum fracture – diagnosis osteoporosis
Medical problem(s)	Pain, balance problems
Social / cognitive status	Lives alone, walks with rollator
Relevant lab values	K+ 5.25 mmol/l, Na+ 137 mmol/l, eGFR 42 ml/min/1,73m², 25OH vit D <3.0 ng/ml, BP 155/110, weight 59 kg

			Indication	Contra-indication	Right choice	Dose	Modalities	Inter-actions	Duration	Adverse effects			
Drugs		**Indic**	3	2	3	2	1	2	1	2	**Tot**	**Problem(s)**	**Recommendation(s)**
1	Alendronate 70 mg 7h 1x/w												
2	Cinnarizine 75 mg 8h-12h-18h												
3	Duloxetine 60 mg 8h												
4	Lormetazepam 2 mg 20h												
5	Omeprazole 40 mg 7h												
6	Oxycodone 10 mg IN												
7	Pravastatine 20 mg 8h												
8	Ramipril 5 mg 8h												
	appropriate: weight x 0 marginally appropriate: weight x 0.5 inappropriate: weight x 1									*Underuse?* 3		Caldium / vit D?	
										Total score		Laxative?	

	Medicatie	Overuse	Contra-indication	Incorect choice	Incorrect dose	Incorrect modalities	Interactions	Duration of therapy	Adverse Reactions
1	Apixaban 5 mg 2/d				x?		x		
2	Bisoprolol 2,5 mg 1/d								
3	Flupentixol 10 mg 1/d	x		x			x	x	x
4	Macrogol 1/d			x					
5	Naproxen 550 mg 2/d		x	x			x	x	x
6	Melitracen 0,5 mg 1/d	x		x			x	x	x
7	Omeprazole 40 mg 1/d				x				
8	Perindopril 5 mg 1/d				x				x
9	Simvastatine 20 mg 1/d	x?						x?	
10	Tramadol 100 mg 1/d			x	x	x	x	x?	x
11	Trazolan 100 mg 1/d	x		x	x		x	x	x
12	Zolpidem 10 mg 1/d	x					x	x	x
	Undertreatment?	1. Paracetamol							
		2. Calcium/vit D							

Clinical Medication review: 4 steps



3. Pharmacotherapeutic discussion

Part 1 = Preparation: evaluation of DRPs

- Clinical relevance: patient specific
- Benefit / risk ratio of PIMs
  - Risk of falls?
  - Frailty?
  - Cognitive function?
  - Life expectancy?
- Formulate recommendation for every DRP
- Deprescribing strategies
- Prioritisation of DRPs
  - Drugs with high risk of adverse events
  - Drugs with several DRPs (several criteria)
  - Types of DRPs e.g. 'no indication', 'contra-indication', 'underuse' (?)

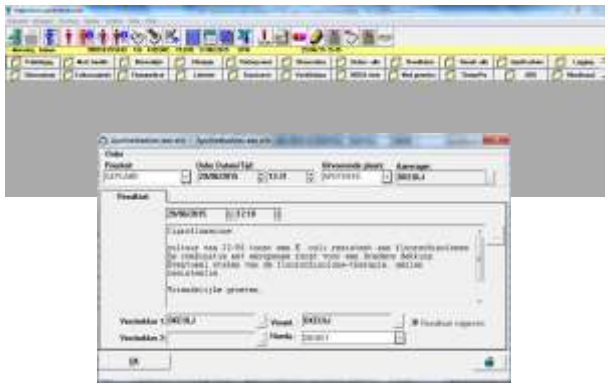
Patient 1	Woman, 82 years
Reason of admission	Falls day -4 & day -1
Medical history	Bilateral total hip prosthesis, osteoporosis, reflux oesophagitis grade C, arterial hypertension
Medical problem(s)	Pain, balance problems
Social/cognitive status	Lives alone, walks with rollator
Relevant lab values	K+ 5.25 mmol/l, Na+ 137 mmol/l, eGFR 42 ml/min/1,73m², 25OH vit D <3.0 ng/ml, BP 155/110, weight 59 kg

	Drugs	Indication	Indicatio n	Contra-indicatio n	Right choice	Dose	Modalitie s	Inter-actions	Duration	Adverse effects	Tot	Underlying problem(s)	Recommendation(s)
			3	2	3	2	1	2	1	2			
1	Alendronate 70 mg 7h 1x/week	osteoporosis		1			1		1		3	Start date? If > 5 years: stop. Still reflux problems? Should be taken before breakfast.	Consider to stop. Take at least 30 min before breakfast, correct modalities, withold when active
2	Cinnarizine 75 mg 8h-12h-18h	?	1,5		3			2	0,5	2	9	PAD. Risk of ADRs: sedation, drowsiness, obstipation, dry mouth	Stop, in case of PAD: aspirin
3	Duloxetine 60 mg 8h	neuropath pain?			1,5	1	0,5	2	0,5	2	7,5	falls, take in the evening. Still needed?	neuropathic pain? Alternative drug? Lower dose?
4	Lormetazepam 2 mg 20h	sleeping problems?				2		2	0,5	2	6,5	High dose, still needed? Risk of falls. Interactions.	Lower dose, try to stop with tapering scheme
5	Omeprazole 40 mg 7h	reflux oesophagitis				1			0,5		1,5	High dose, still needed?	Lower dose, check vitB12, Mg
6	Oxycodone 10 mg IN	pain	1,5		1,5			2		1	6	strange choice (no step 1 of pain ladder)	Evaluation of pain treatment
7	Pravastatine 20 mg 8h	?	1,5		1,5		1					Cholesterol levels? Wrong time of administr.	Stop, in case of PAD: increase dose to 40 mg, at 20h
8	Ramipril 5 mg 8h	arterial hypertension				1				2	3	adverse reaction (K+), dose too high	Lower dose to 2,5mg; possibly combine with thiazide
	appropriate: weight x 0											undercure for fall prevention	start calcium + vitamin D (1g/800IE)
	marginally appropriate: weight x								*Undercure?*	3	9	undercure of step 1 pain ladder	start paracetamol (3 or 4 gr/day)
	inappropriate: weight x 1											undercure of laxative	start laxative (e.g. macrogol)
									Total score		45,5		

3. Pharmacotherapeutic discussion

Part 2 = Discussion of DRPs and solutions

- Communication with the physician
  - Ask for treatment goals
  - Discuss DRPs + recommendations, prioritized



3. Pharmacotherapeutic discussion

Part 2 = Discussion of DRPs and solutions

- Communication with the patient
  - Ask for treatment goals
    - → *Outcome Prioritization Tool*
    - → *Goal Attainment Scale*

- Explain which changes are proposed and why
- Apply "Motivational conversation" technique
- Taking into account patient preferences
- Deprescribing psychotropic drugs might be the most challenging

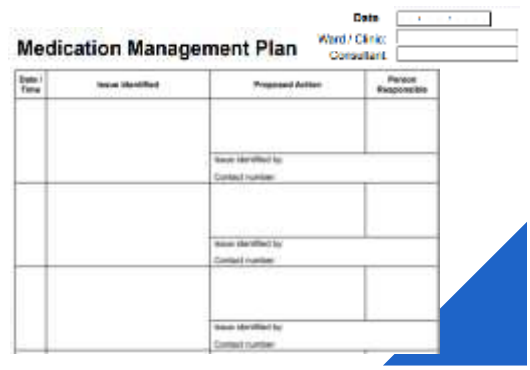
Clinical Medication review: 4 steps

1. Medication reconciliation
   Drug history + patient interview
2. Pharmacotherapeutic analysis
   Screening for drug related problems (DRPs)
3. Pharmacotherapeutic discussion
   Evaluation of DRPs & solutions (physician, patient)
4. Pharmacotherapeutic plan
   Counseling, implementation & follow-up

4. Pharmacotherapeutic plan

Plan:

- Documents:
  - New medicines list
  - Overview of all changes + reasons
  - Medication management plan (follow-up)
    - What?
    - Who?
    - How?
    - When and how often?



- Patient counseling
- Communication to HCPs

www.deprescribing.org

For elderly adults (>65 y) who use BZRAs, we recommend the following:
- Taper the BZRA dose slowly (strong recommendation, low-quality evidence)

www.medstopper.com

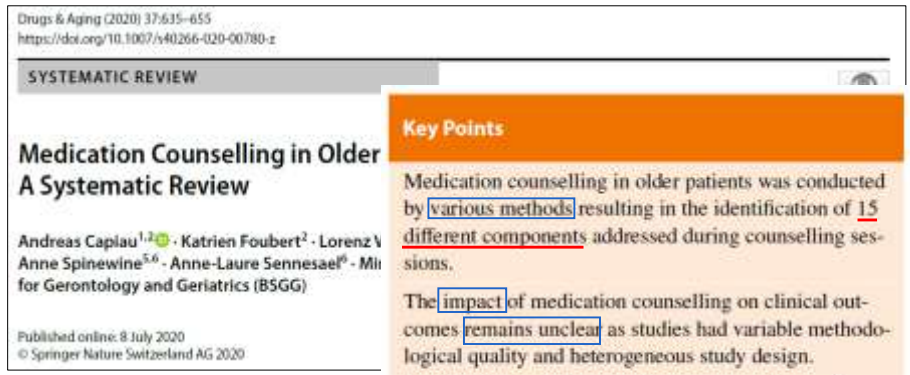
Original Investigation

Reduction of Inappropriate Benzodiazepine Prescriptions Among Older Adults Through Direct Patient Education
The EMPOWER Cluster Randomized Trial

Cara Tannenbaum, MD, MSc; Philippe Martin, MSc; Robyn Tamblyn, PhD; Andrea Benedetti, PhD; Sara Ahmed, PhD

Afbouwschema Lormetazepam 2mg

Stap 1	Van..... Tot	Lormetazepam 1,5mg gedurende 3 weken	= 1 + ½ comp Lormetazepam 1mg
Stap 2	Van..... Tot	Lormetazepam 1mg gedurende 3 weken	= 1 comp Lormetazepam 1mg
Stap 3	Van..... Tot	Lormetazepam 0,5mg gedurende 3 weken	= ½ comp Lormetazepam 1mg
Stap 4	Van..... Tot	Lormetazepam 0,5mg om de andere dag gedurende 3 weken	= ½ comp Lormetazepam 1mg
Stopdatum	.....		



Drugs & Aging (2020) 37:635–655
https://doi.org/10.1007/s40266-020-00780-z

SYSTEMATIC REVIEW

Medication Counselling in Older
A Systematic Review

Andreas Capiau[1,2] · Katrien Foubert[2] · Lorenz V
Anne Spinewine[5,6] · Anne-Laure Sennesael[6] · Mi
for Gerontology and Geriatrics (BSGG)

Published online: 8 July 2020
© Springer Nature Switzerland AG 2020

Key Points

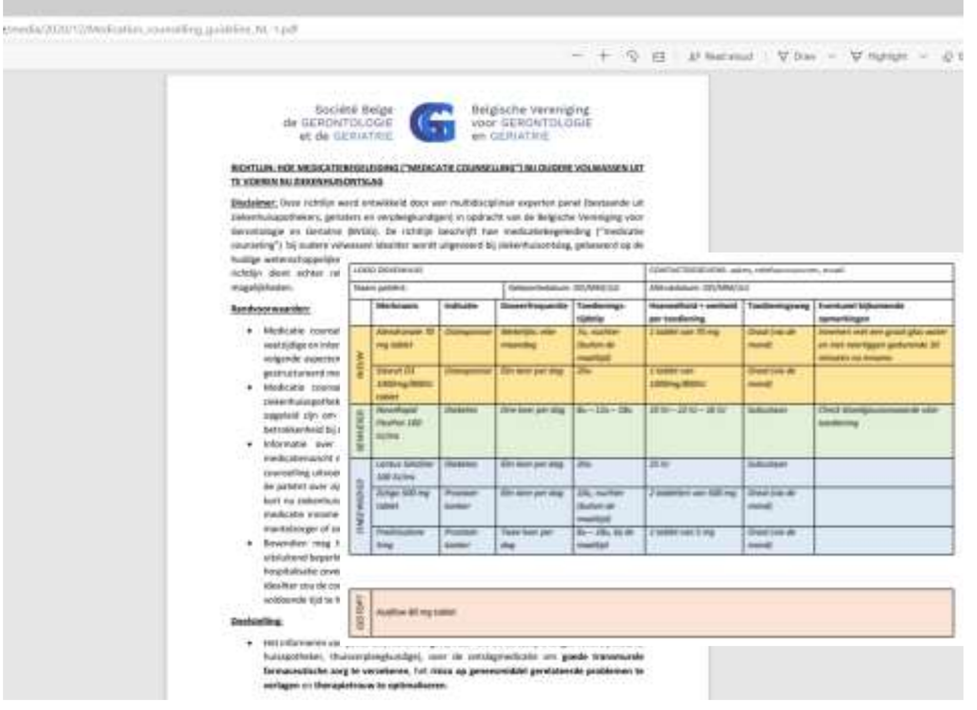
Medication counselling in older patients was conducted by various methods resulting in the identification of 15 different components addressed during counselling sessions.

The impact of medication counselling on clinical outcomes remains unclear as studies had variable methodological quality and heterogeneous study design.

Statistically significant results were more frequently observed when counselling was provided as part of a comprehensive intervention before discharge. This may suggest that medication counselling should preferably be integrated into a holistic approach to ensure appropriate medication use in older patients after hospital discharge.

High-quality trials with a proper description of the counselling intervention and long-term follow-up are needed to provide definitive evidence for the effect of medication counselling in this population.

www.geriatrie.be



Drugs Aging (2018) 35:43–60

Tools for Assessment of the Appropriateness of Prescribing and Association with Patient-Related Outcomes: A Systematic Review

Nashwa Masnoon[1,2] · Sepehr Shakib[3,4] · Lisa Kalisch-Ellett[1] · Gillian E. Caughey[1,3,4]

Key Points

While there is a range of tools for the assessment of the appropriateness of prescribing in the literature, the results of this systematic review highlight the need for evidence-based tools that combine the various aspects of medication management in order to optimise health outcomes.

Less than 50% of available tools have been externally validated, limiting their use in clinical practice. It is important to develop tools that are proven to improve common patient-related outcomes such as falls and hospitalisation.

Table 1 Summary of characteristics of various prescribing appropriateness assessment tools and criteria

Characteristic	Percentage of tools (n = 42)
Scoring system	21.4
Delphi method/expert panel	76.2
Stopping inappropriate medications	78.6
Starting appropriate medications	28.6
Suggesting alternatives	26.2
Dosing:	64.3
Mentions dosing only	61.9
Based predominantly on dosing	2.4
Impact of renal function on drug clearance	45.2
Focusing on specific drug class(es)	9.5
Drug-drug OR drug-disease interactions	66.7
Explicit (criteria based)	61.9

Table 3 Proportion of studies showing positive association between externally validated prescribing appropriateness assessment tools and patient-related outcomes

Tool (n = 14, 33.3%)	Hospitalisation	Mortality	Falls	Cognitive decline	Functional decline	ADR	Quality of life	Discharge home post-hospitalisation	Renal failure
Tools with a scoring system									
DBI [19]	2/3[a]	3/4	2/3	1/2	7/8	*	*	*	*
ARS [20]	1/3	2/3	1/1	2/3	3/4	2/2	*	*	*
ADS [21]	*	0/1	1/1	0/2	0/1	1/1	*	*	*
ACBS [61]	*	1/2	*	2/2	1/1	*	*	*	*
Sedative Load [60]	*	0/1	*	0/1	1/2	*	*	*	*
MRCI [59]	1/1	*	*	*	*	*	*	1/1	*
MAI [58]	1/1	*	*	*	*	1/2	1/1	*	*
CPS [62]	1/1	2/3	*	*	*	*	*	*	*
Tools without a scoring system									
Beers (1991, 1997, 2003 & 2012) [22]	2/6	1/3	2/2	1/2	1/2	1/4	*	*	*
STOPP START [23]	2/3	1/1	1/1	*	1/2	2/2	1/2	*	*
HEDIS [50]	1/2	1/1	*	*	*	0/1	*	*	*
PRISCUS [56]	1/1	*	*	*	*	*	*	*	*
FORTA [55]	*	*	*	*	1/1	1/1	*	*	1/1
Zhan et al. 2001 [30]	0/1	*	*	*	*	0/1	*	*	*

Research

JAMA Internal Medicine | Original Investigation

Effect of an In-Hospital Multifaceted Clinical Pharmacist Intervention on the Risk of Readmission

A Randomized Clinical Trial

Lene Vestergaard Ravn-Nielsen, MSc(Pharm); Marie-Louise Duckert, MSc(Pharm); Mia Lolk Lund, MSc(Pharm); Jolene Pilegaard Henriksen, MSc(Pharm); Michelle Lyndgaard Nielsen, MSc(Pharm); Christina Skovsende Eriksen, MSc(Pharm); Thomas Croft Buck, MSc(Pharm); Anton Pottegård, MSc(Pharm), PhD; Morten Rix Hansen, MD; Jesper Hallas, MD, DMSc

JAMA Intern Med. 2018;178(3):375-382. doi:10.1001/jamainternmed.2017.8274
Published online January 29, 2018.

OPTIMIST trial: Odense Pharmacist Trial Investigating Medication Interventions at Sector Transfer

RCT:
1) Structured patient centered medication review
2) 1 + MedRec at discharge + motivational interview + contact with GP/CP + telephone calls (2x)

CONCLUSIONS AND RELEVANCE A multifaceted clinical pharmacist intervention may reduce the number of ED visits and hospital readmissions.

Conclusions

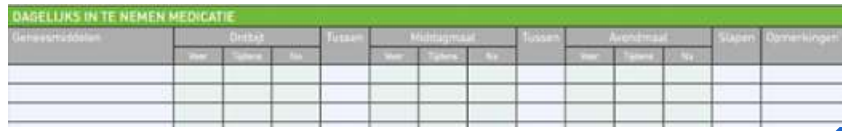
- Use a structured approach
- Use tools in the different steps of medication review (not only for screening DRPs)
- Select the tools that are feasible in your setting
- Combine tools e.g. explicit + implicit
- Work patient centered
- Document pDRPs, recommendations, changes, treatment goals, patient preferences,…
- Communicate plans and medication lists
- Don’t forget to follow-up

Irene

Medication list at discharge:

- Calcium / Vitamin D 1g/880IU
- Domperidone 10 mg IN max 3/d
- Paracetamol 325 / tramadol 37,5 mg max 3/d
- Simvastatin 20 mg
- Solifenacine 5 mg
- Zolpidem 10 mg

?



Thank you for your attention!

Questions?