Selecting the right patient for medication reviews

Prof dr Petra Denig, Clinical Pharmacy & Pharmacology, University Medical Center Groningen, the Netherlands
Who is in need of medication review: can you make an educated guess?
Health insurers criteria

- Polymedication check in Switzerland
  - ≥4 prescribed drugs taken over ≥3 months, if patient agrees

- Medication Therapy Management in USA
  - Multiple chronic conditions and multiple chronic drugs prescribed and medication costs that exceed a certain level

- Medicines Use Review in UK
  - Regular users of pharmacy with high risk medicines or recently discharged with medication changes or respiratory disease or cardiovascular disease and ≥4 chronic drugs

- Advanced Medication Reviews in the Netherlands
  - ≥65 year old and ≥5 chronic drugs prescribed (and 1 risk factor: low eGFR, low cognition, low adherence, high fall risk, unplanned hospitalisation, nursing home)
What can you expect

- Medication reviews and drug related problems
- Overview of possible criteria for selecting patients
- Tools developed for selecting patients in need
- Prediction models for identifying patients in need
What is a medication review?

- Medication review is a **structured evaluation of a patient’s medicines** with the aim of **optimising medicines use** and **improving health outcomes**
  - including patient-reported outcomes

- This entails detecting of **drug related problems** (DRP) and **recommending / conducting interventions**
  - DRP: event or circumstance involving drug therapy that **actually or potentially** interferes with desired outcomes
Different Medication Reviews

1. **Simple MR**: based on medication history pharmacy
   - drug interactions, unusual dosages/choices, duplicates, some adherence issues

2A. **Intermediate MR**: based on medication history and patient information
   - drug interactions, unusual dosages, issues, drug-food interactions, effectiveness issues, side effects, problems with OTC, adherence issues, concerns, medication burden

3. **Advanced MR**: based on medication history, patient information and clinical information
   - all above plus: indication without a drug, drugs without indication, dosage/duration issues, suboptimal/inappropriate choices, contraindications => patient’s needs and wants

Adapted from PCNE statement on medication review 2013
Why do we need to select patients?

- Large numbers of (elderly) patients with polypharmacy
- Not all need, want or benefit from medication review
- Different reviews
- Limited resources
Simple MR: select on medication history?

- **Polypharmacy, number of drugs**
- **High risk medication (ADR, hospitalisation, TDM)**
- **PIM/PIP lists**: Beers, EU-7; potentially inappropriate medications for elderly
- **Drug Burden Index (DBI)**: cumulative exposure to anticholinergic/ sedative drugs
- **Medication regimen complexity**
- **STOPP/START criteria**: limited without clinical information
Selection on DBI

- Medication review in ≥65 years, ≥5 chronic drugs including 1 psycholeptic/analeptic and DBI of ≥1
- Advanced reviews did not reduce DBI

- Prevalent use may be difficult to change
- High risk medication may be really needed
- Really inappropriate medication use may be low
- Many patients with low DBI may also need review

- Pilot to use potential rise in DBI (start of new ‘DBI’ drug) as trigger to intervene / prevent
Selection ‘bias’ -> specific intervention

- Medication regimen complexity algorithm
- Key questions for patients
- Optimization actions allocated to each complexity factor
Criteria for selecting patients for medication reviews

- Medication characteristics
  - high risk, high need, inappropriate, complexity, polypharmacy

- Patient characteristics
  - age, literacy, adherence, beliefs, concerns, medication taking issues, (lack of) support, communication issues

- Clinical characteristics
  - frailty, kidney/hepatic function, psychiatric problems, other comorbidity, fall risk, unplanned hospitalisation, impairments (visual, mobility)

High risk?

High need or want?

Actual risk vs potential risk
Medication error vs suboptimal treatment
Treatment complexity vs patient-perceived burden
### DRPs detected by medication reviews

<table>
<thead>
<tr>
<th>DRP categories</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overtreatment</td>
<td>2915</td>
<td>25.5</td>
</tr>
<tr>
<td>Undertreatment</td>
<td>1814</td>
<td>15.9</td>
</tr>
<tr>
<td>Drug not effective</td>
<td>975</td>
<td>8.5</td>
</tr>
<tr>
<td>Contra-indication</td>
<td>971</td>
<td>8.5</td>
</tr>
<tr>
<td>Side effect</td>
<td>923</td>
<td>8.1</td>
</tr>
<tr>
<td>Difficulty using dosage form</td>
<td>756</td>
<td>6.6</td>
</tr>
<tr>
<td>Interaction</td>
<td>664</td>
<td>5.8</td>
</tr>
<tr>
<td>Non adherence</td>
<td>645</td>
<td>5.6</td>
</tr>
<tr>
<td>Dose too low</td>
<td>622</td>
<td>5.4</td>
</tr>
<tr>
<td>Dose too high</td>
<td>568</td>
<td>5.0</td>
</tr>
<tr>
<td>Inappropriate dosage form</td>
<td>96</td>
<td>0.8</td>
</tr>
<tr>
<td>Miscellaneous problem&lt;sup&gt;a&lt;/sup&gt;</td>
<td>470</td>
<td>4.1</td>
</tr>
<tr>
<td><strong>Total DRPs</strong></td>
<td>11,419</td>
<td>100</td>
</tr>
</tbody>
</table>

<sup>a</sup> Besides drug-related problems, the category ‘miscellaneous problem’ also contained non-drug-related problems, for example, lifestyle advice given such as smoking cessation
# Proposed interventions by pharmacists

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Number</th>
<th>Percentage (%)</th>
<th>Implemented (%)</th>
<th>Other intervention (%)</th>
<th>No intervention (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop drug</td>
<td>2238</td>
<td>19.6</td>
<td>46.6</td>
<td>21.4</td>
<td>32.0</td>
</tr>
<tr>
<td>Provide monitoring</td>
<td>2099</td>
<td>18.4</td>
<td>52.8</td>
<td>23.1</td>
<td>24.1</td>
</tr>
<tr>
<td>Adjust dose</td>
<td>1684</td>
<td>14.7</td>
<td>43.3</td>
<td>25.1</td>
<td>31.6</td>
</tr>
<tr>
<td>Add drug</td>
<td>1601</td>
<td>14.0</td>
<td>36.3</td>
<td>27.4</td>
<td>36.3</td>
</tr>
<tr>
<td>Switch drug</td>
<td>1307</td>
<td>11.5</td>
<td>38.5</td>
<td>26.0</td>
<td>35.5</td>
</tr>
<tr>
<td>Provide education</td>
<td>1225</td>
<td>10.7</td>
<td>67.9</td>
<td>12.3</td>
<td>19.8</td>
</tr>
<tr>
<td>Synchronise medication</td>
<td>304</td>
<td>2.7</td>
<td>82.6</td>
<td>12.5</td>
<td>4.9</td>
</tr>
<tr>
<td>Switch dose form</td>
<td>176</td>
<td>1.5</td>
<td>60.2</td>
<td>24.4</td>
<td>15.4</td>
</tr>
<tr>
<td>Other</td>
<td>766</td>
<td>6.7</td>
<td>15.5</td>
<td>21.5</td>
<td>63.0</td>
</tr>
<tr>
<td>Total</td>
<td>11,419</td>
<td>100.0</td>
<td>46.2</td>
<td>22.4</td>
<td>31.3</td>
</tr>
</tbody>
</table>

*These percentages were calculated based on the known outcomes (11,400) as a proportion of the total interventions (11,419). 0.2% of the interventions (n = 19) was not attributed to a specific category.*
Tools for selecting patients: proposed by pharmacists/experts
Identifying patients in need or at risk

1. ≥ 5 drugs
2. ≥ 12 doses per day
3. regimen changed ≥ 4 times in past year
4. ≥ 3 concurrent disease states
5. drugs requiring therapeutic drug monitoring
6. history of non-adherence

- Associated with drug-related adverse outcomes
- Adds to healthcare provider ‘subjective’ selection
- Patient survey: patients can reliably answer questions
- Applied to electronic pharmacy / medical records

Koecheler JA e.a. Am J Hosp Pharm 1989
Langford BJ e.a. Pharmacotherapy 2006
Pammett RT e.a. Pharmacotherapy 2015
Isaksen SF e.a. Ann Pharmacother 1999
Makowsky MJ e.a. JMCP 2017
Extended Medication Risk Questionnaires

1. ≥ 5 drugs
2. ≥ 12 doses per day
3. regimen changed ≥ 4 times in past year
4. ≥ 3 medical conditions
5. history of non-adherence
6. drugs requiring therapeutic drug monitoring
7. ≥ 1 target condition (9 were defined)
8. > 1 prescribing physician
9. > 1 pharmacy / location for collecting drugs
10. not collecting drugs themselves
11. not knowing reason for taking particular drug / unanswered questions / worried about drugs

Barenholtz Levy H e.a. Ann Pharmacother 2003
Makowsky MJ e.a. JMCP 2017
## Medication Risk Assessment Questionnaire (MRAQ): detecting high risk patients

A 5-item self-administered MRAQ was used as the gold standard. EMR-based risk fairly predicted ER visit/hospitalisation, with high sensitivities but low specificities. The 10-item self-administered MRAQ fairly detected low medication adherence, with low sensitivity but high specificity.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>EMR-based</th>
<th>Self-Administered</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥3 medical conditions</td>
<td>23.9</td>
<td>51.0</td>
</tr>
<tr>
<td>≥1 target condition</td>
<td>33.3</td>
<td></td>
</tr>
<tr>
<td>≥5 medications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥11 pills per day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥5 medication changes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall MRAQ≥3 criteria met</td>
<td>51.0</td>
<td></td>
</tr>
<tr>
<td>Additional SA-MRAQ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥1 physician prescribing</td>
<td>140</td>
<td>66 (47.1)</td>
</tr>
<tr>
<td>≥1 location</td>
<td>140</td>
<td>29 (20.7)</td>
</tr>
<tr>
<td>≥difficult to take medications</td>
<td>140</td>
<td>5 (3.6)</td>
</tr>
<tr>
<td>Unanswered questions ≥ occasionally</td>
<td>140</td>
<td>5 (3.6)</td>
</tr>
<tr>
<td>Worried about medications ≥ occasionally</td>
<td>141</td>
<td>61 (43.3)</td>
</tr>
<tr>
<td>Overall 10-item SA-MRAQ≥6 criteria met</td>
<td>102</td>
<td>18 (17.6)</td>
</tr>
</tbody>
</table>

| Sensitivity analysis                          |           |                    |
| Overall classic ≥ 3 criteria met              | 46/105 (43.8) | 19/105 (18.1)    |

EMR = emergency medical record; MRAQ = medical record medication risk assessment questionnaire; SA = self-administered.

* 5-item self-administered as gold standard
Risk factors for DRPs: literature review

BMJ Open

Determination of risk factors for drug-related problems: a multidisciplinary triangulation process

Carole P Kaufmann,1,2 Dominik Stämpfli,1 Kurt E Hersberger,1 Markus L Lampert1,2


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ABSTRACT

Introduction and objectives: Drug-related problems (DRPs) constitute a frequent safety issue among hospitalised patients leading to patient harm and increased healthcare costs. Because many DRPs are preventable, the specific risk factors that facilitate their occurrence are of considerable interest. The objective of our study was to assess risk factors for the occurrence of DRPs with the intention to identify patients at risk for DRPs to guide and target preventive measures where they are needed most in patients. Design: Triangulation process using a mixed methods approach. Methods: We conducted an expert panel, using the nominal group technique (NGT) and a qualitative analysis, to gather risk factors for DRPs. The expert panel consisted of two consultant hospital physicians (internal medicine and geriatrics), one emergency physician and independent panel practitioners and healthcare costs. The term DRP embraces...
Risk factors for drug related problems

• Literature review & expert panel
  – excluding risk factors mentioned in only 1 publication, with low-ranking in expert panel, related to care system
  – eliminating synonyms/duplicates

• 42 risk factors
  – **Patient characteristics**: cognition, medication-related understanding/education, non-adherence, impaired manual skills, impaired vision, age, living alone, need for caregiver, language issues
  – **Medical issues**: morbidity (cardiac, respiratory, diabetes, dementia, renal impairment, hepatic impairment), motion issues/fall risk, recent hospitalisation, experience of ADR
  – **Medication**: polypharmacy, 21 specific drugs/ drug groups/ drug combi’s, difficult to handle medication

Kaufmann CP e.a. BMJ Open 2015
# 27 risk factors with high ratings

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Delphi</th>
<th>IQR</th>
<th>NGT Ranking list</th>
<th>Qualitative analysis</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dementia, cognitive situation, low IQ, confused patient</td>
<td>4</td>
<td>4.00–4.00</td>
<td>Yes</td>
<td>Yes</td>
<td>10, 17, 18, 19, 20</td>
</tr>
<tr>
<td>Polypharmacy (number of drugs &gt;5)</td>
<td>4</td>
<td>4.00–4.00</td>
<td>Yes</td>
<td>Yes</td>
<td>10, 17, 18, 21, 22, 5</td>
</tr>
<tr>
<td>Antiepileptics</td>
<td>4</td>
<td>4.00–4.00</td>
<td>Yes</td>
<td>Yes</td>
<td>23, 24, 20, 25</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>4</td>
<td>4.00–4.00</td>
<td>Yes</td>
<td>Yes</td>
<td>10, 21, 23, 26, 5</td>
</tr>
<tr>
<td>Combinations of NSAID and oral anticoagulants</td>
<td>4</td>
<td>4.00–4.00</td>
<td>Yes</td>
<td>Yes</td>
<td>20</td>
</tr>
<tr>
<td>Insulin</td>
<td>4</td>
<td>4.00–4.00</td>
<td>Yes</td>
<td>Yes</td>
<td>10, 23, 24</td>
</tr>
<tr>
<td>Missing information, half-knowledge of the patient, the patient does not understand the goal of the therapy</td>
<td>4</td>
<td>4.00–3.25</td>
<td>Yes</td>
<td>Yes</td>
<td>11</td>
</tr>
<tr>
<td>Medication with a narrow therapeutic window</td>
<td>4</td>
<td>4.00–3.25</td>
<td>Yes</td>
<td>Yes</td>
<td>5</td>
</tr>
<tr>
<td>Non-adherence</td>
<td>4</td>
<td>4.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td>10</td>
</tr>
<tr>
<td>Polymorbidity</td>
<td>3.5</td>
<td>4.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td>10, 22</td>
</tr>
<tr>
<td>Digoxin</td>
<td>3</td>
<td>4.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td>24, 20, 27</td>
</tr>
<tr>
<td>Renal impairment (eGFR &lt;30 mL/min)</td>
<td>3</td>
<td>4.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td>10, 22, 20</td>
</tr>
<tr>
<td>NSAIDs</td>
<td>3</td>
<td>4.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td>5, 10, 21, 23, 24, 25</td>
</tr>
<tr>
<td>Experience of ADR</td>
<td>3</td>
<td>3.75–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td>22</td>
</tr>
<tr>
<td>Medication that is difficult to handle</td>
<td>3</td>
<td>3.75–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Language issues (ie, non-native speakers)</td>
<td>3</td>
<td>3.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td>5, 10, 19, 23, 24, 26, 25</td>
</tr>
<tr>
<td>Diuretics</td>
<td>3</td>
<td>3.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td>21, 20</td>
</tr>
<tr>
<td>Tricyclic antidepressants</td>
<td>3</td>
<td>3.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td>22, 20</td>
</tr>
<tr>
<td>Hepatic impairment</td>
<td>3</td>
<td>3.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Self-medication with non-prescribed medicines</td>
<td>3</td>
<td>3.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Impaired manual skills (causing handling difficulties)</td>
<td>3</td>
<td>3.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Visual impairment</td>
<td>3</td>
<td>3.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td>17</td>
</tr>
<tr>
<td>Anticholinergic drugs</td>
<td>3</td>
<td>3.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td>23</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>3</td>
<td>3.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td>21, 20, 28, 25, 29</td>
</tr>
<tr>
<td>Opiates/opioids</td>
<td>3</td>
<td>3.00–3.00</td>
<td>Yes</td>
<td>Yes</td>
<td>10, 23, 26, 20, 25</td>
</tr>
<tr>
<td>Corticosteroids</td>
<td>3</td>
<td>3.00–2.00</td>
<td>Yes</td>
<td>Yes</td>
<td>10, 23, 24</td>
</tr>
<tr>
<td>Oral antidiabetics</td>
<td>3</td>
<td>3.00–2.00</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Source: Kaufmann CP e.a. BMJ Open 2015

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Drug Associated Risk Tool (DART)

- Self-assessment tool may save time and resources of caregivers
- Can reveal more issues
- Allows better patient involvement

Kaufmann CP e.a. BMJ Open 2018
University Medical Center Groningen
DART validation

- Poor regarding kidney/liver problems
- Poor regarding the use of some specific drugs

- Item reduction: >5 medicines, missing doses, concerns about dependency, diabetes, heart failure
- Tested in hospitalised patients without cognitive impairments

Kaufmann CP e.a. BMJ Open 2018

University of Groningen
University Medical Center Groningen
Risk factors for need for intervention in hospital setting: literature review
<table>
<thead>
<tr>
<th></th>
<th>MRAQ</th>
<th>DART</th>
<th>Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Polypharmacy / number of drugs</strong></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Elderly patients</td>
<td>n.a.</td>
<td>-</td>
<td>x</td>
</tr>
<tr>
<td>Female gender</td>
<td>n.a.</td>
<td>n.a.</td>
<td>x</td>
</tr>
<tr>
<td>Poor renal function</td>
<td>n.a.</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Poor liver function</td>
<td>n.a.</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><strong>Polymorbidities</strong></td>
<td>xx</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>History allergy / ADR</td>
<td>n.a.</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><strong>Compliance / reconciliation</strong></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><strong>High risk drugs</strong></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Trigger drugs</td>
<td>n.a.</td>
<td>x</td>
<td>n.a.</td>
</tr>
<tr>
<td>Concerns / questions</td>
<td>xx</td>
<td>x</td>
<td>n.a.</td>
</tr>
<tr>
<td>Medication complexity</td>
<td>x</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Many regimen changes</td>
<td>x</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>&gt;1 prescriber/pharmacy</td>
<td>xx</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Length hospital stay/recent hosp</td>
<td>n.a.</td>
<td>-</td>
<td>x</td>
</tr>
</tbody>
</table>

Sources:
- Makowsky MJ e.a. JMCP 2017
- Kaufmann CP e.a. BMJ Open 2015
- Suggett E e.a. Drugs- RWO 2016
Selection criteria based on prediction models

- Predicting medication-related preventable hospital admissions
- Predicting relevant medication-related improvements after medication review
- Predicting need for medication review
Which outcome is relevant?

- Problems that require a pharmacist intervention
  - DRPs, ADEs, ADRs, medication errors
  - Patient concerns, worries, difficulties, adherence
  - Medication burden, treatment complexity, need for deprescribing

- Not all are reflected in preventable medication related hospitalisations
Predicting medication improvement

- **Outcome**: relevant improvement in medication appropriateness (MAI) after medication review
- **Included**: ≥65 year old and ≥5 drugs and ≥3 chronic diseases from ≥2 organ systems including 1 cardiovascular
- **Potential predictors**:
  - age, gender, number of GP visits
  - eGFR, number of diagnoses, illness score, number of healthcare providers
  - number of drugs, number of differences between prescribed and used drugs
- **Final predictors**: number of drugs, number of differences between prescribed and used drugs

Rose O e.a. PlosOne 2016
Tool to select for simple or advanced MR

Screening algorithm for patients ≥65 years with ≥5 chronic medications

- Simple MR for patients with low complexity
- Advanced MR for patients with high complexity
Development of the algorithm

- Two expert panels of general practitioners and community pharmacists assessed complexity/need
- 80 cases of elderly patients
  - Medication & medical history, diagnostic assessments, background information (e.g. mobility, cognition, recent falls, hospital admissions)
- Modified Delphi method
  - Cases judged on their complexity on a 9 point Likert scale

<table>
<thead>
<tr>
<th>Simple case</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

- Backward stepwise regression analyses to develop the algorithm predicting the expert ratings

Crutzen S e.a. Frontiers in Pharmacology, accepted 2019

University Medical Center Groningen
Results

‘number of drugs’×1 + ‘number of prescribers’×3 + ‘recent fall incident’×7 + ‘does not collect own medication’×4

Figure 1: Regression model of the complexity rating of the expert panel vs the algorithm

Adj. R-squared=0.726
Small pilot to study feasibility

- Implemented in 4 pharmacies, using a short patient questionnaire to collect data

**Question 1.**
Do you collect your own medication at the pharmacy?  
Yes ☐  
No ☐

**Question 2.**
Do you use medication which is prescribed by a different physician than your general practitioner? For instance, a pulmonologist or a cardiologist from the hospital or a psychiatrist.  
Yes ☐  
No ☐

*In case of a yes:* How many different physicians besides your general practitioner prescribe your medication? ......

**Question 3.**
In the last 12 months, have you had a fall so severe that you needed help from other people? For instance, you needed to go to the general practitioner or the emergency room because of this fall. Or you needed extra help in or around the house because of this fall.  
Yes ☐  
No ☐

- Mixed opinions about feasibility and validity
  - Sending questionnaires to all eligible patients was feasible
  - Doubts about getting reliable information on fall incidents
  - Information on Q1/2 may be derived from pharmacy records
  - Agreement with selections was moderate
Where does this bring us?

- There is not yet an optimal algorithm to select patients for different levels of medication review
- Possible screening criteria
  - number of chronic medicines (not using a cut-off level)
  - signals: falls, dizziness, pain, specific drugs/combi’s, ..
  - adherence issues: missing doses, concerns, discrepancies
- Separate programs for specific subgroups
  - patients not visiting the pharmacy
  - poor communication skills, poor health literacy
- Combine electronic algorithms with some key patient questions in a hybrid or dynamic model
Dynamic model for patient selection

- ≥65 years & ≥5 drugs
- Signal from HCP or caregiver or algorithm to detect: recent falls, need for multidose, multiple prescribers, drug changes
- Request from patient

Quick scan (drugs & background)

Full scan, collect (some) additional patient information from GP and/or patient

No action (only feedback)

Intermediate review

Advanced review

Patient questions: do you
- want a talk with pharmacist
- want less drugs / intakes
- have questions about drugs
- experience side effects
- think your drugs don’t work
- have difficulties taking
- sometimes not sure
- sometimes do not take
- forget (how often)

Health complaints
- pain, mobility, dyspnoe, dizziness, fatigue, dry mouth, diarrhoea, itching, ...

Verdoorn S e.a. DREAMeR study

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