The added value of pharmacists in the care of frail older patients

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Use of drugs in older patients: essential but risky

Risk factors
- Comorbidities +++
- PK/PD changes
- Physical/cognitive impairment
- ...

Problems with drugs
- Polymedication
- Inappropriate prescribing
- Poor compliance
- ...

Consequences
- Clinical
  \[ \uparrow \text{ADEs, morbidity, mortality} \]
- Economic
  \[ \uparrow \text{costs} \]
- Humanistic
  \[ \downarrow \text{quality-of-life} \]

- 10-30% of hospital admissions are directly related to drug-related problems
- ADEs are documented in 5-35% of patients in the community
- 32-69% of ADEs are possibly preventable
Approaches for optimisation

- Educational approaches
- Medication reviews
- Multidisciplinary team interventions
- Geriatric evaluation and management teams
- Computerised decision support system
- Regulation
- ...
Objectives of this talk

- To explain the different **models of care** in which pharmacists can be involved
- To review the **evidence** on the **impact** of pharmacists’ involvement in nursing home care, ambulatory care and hospital care
  - Focus: prescribing – recent European studies (RCTs)
- To highlight key **success factors**

Largely inspired from: Spinewine A, Fialova D, Byrne S. The role of the pharmacist in optimizing pharmacotherapy in older people. Drugs Aging 2012;29:495-510
What are we talking about?

- **Pharmaceutical care** (clinical pharmacy)
  - A process by which a pharmacist liaises with a patient and/or HCP to optimize pharmacotherapy
  - By designing, implementing and monitoring therapeutic goals that will produce specific therapeutic outcome for patients
  - Identification, resolution and prevention of drug-related problems
  - **Patient-centered approach**

Hepler C and Strand L., 1990
What are we talking about?

- **Medication review**

  - **Level 0** AD-HOC
    - Unstructured, opportunistic

  - **Level 1** PRESCRIPTION REVIEW
    - Technical review of list of patient’s medicines

  - **Level 2** TREATMENT REVIEW
    - Review of medicines with full patient’s notes

  - **Level 3** CLINICAL MEDICATION REVIEW
    - Face-to-face review of medicines and condition
What are we talking about?

- **Medication review**
  - « A review performed by a HCP,
  - taking into consideration a patient’s health status and medications,
  - with access to full medical and care records,
  - in conjunction with a consultation with the patient and their carer. »
1. Pharmacists in nursing homes

- Models of care
  - Regular medication review; can vary:
    - From: «1-way» approach
    - To: «team approach»
  - Educational role
    - → physicians, nurses, patients
  - Psychoactive medications = frequent focus
    - High rate of prescribing (chemical restraints?) and ADEs
Pharmacist-led medication review

- Zermansky et al., 2006

RCT with 661 residents, 65 NHs, UK

- Medication review + consultations with patient/carer
- Written recommendations forwarded to GP

- Acceptance rate: 76%
- 3.1 vs 2.4 changes in medications (p<.0001)

- ↓ in nb of falls
- No ≠ in drug costs or hospital admission

Table 2. Pharmacist recommendations and outcome by drug

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>225</td>
<td>30.1</td>
</tr>
<tr>
<td>Test required</td>
<td>161</td>
<td>21.6</td>
</tr>
<tr>
<td>Stop medicine</td>
<td>100</td>
<td>13.4</td>
</tr>
<tr>
<td>Alter medicine</td>
<td>91</td>
<td>4.0</td>
</tr>
<tr>
<td>Switch</td>
<td>37</td>
<td>3.5</td>
</tr>
<tr>
<td>Alter dose</td>
<td>40</td>
<td>5.6</td>
</tr>
<tr>
<td>Alter formulation</td>
<td>12</td>
<td>2.6</td>
</tr>
<tr>
<td>Alter timing</td>
<td>2</td>
<td>0.2</td>
</tr>
<tr>
<td>Referred to GP to resolve</td>
<td>10</td>
<td>1.4</td>
</tr>
<tr>
<td>Rectify record mismatch</td>
<td>9</td>
<td>1.2</td>
</tr>
<tr>
<td>Start medicine</td>
<td>75</td>
<td>10.1</td>
</tr>
<tr>
<td>Non-medicine-related intervention</td>
<td>75</td>
<td>10.1</td>
</tr>
<tr>
<td>Total</td>
<td>747</td>
<td>100</td>
</tr>
</tbody>
</table>
Pharmacist-led medication review discussed with the multidisciplinary team

Halvorsen et al., 2010
- Descriptive study
- 142 patients in 3 NHs, Norway
- Medication reviews by pharmacists
  → DRPs discussed during case conferences with medical and nursing staff
- 504 DRPs
- Acceptance rate: 94%

Brulhart and Vermeille, 2011
- Descriptive study
- 329 patients in 10 NHs, Switzerland
- 1225 DRPs
- Acceptance rate: 93%

Pharmacist-led medication review + effective communication with other HCPs → high uptake of recommendations
The Fleetwood model of pharmaceutical care

- American Society of Consultant Pharmacists
- Major components
  - Regular medication review for high risk patients
  - Direct communication with prescriber (multi team)
  - Formalised pharmaceutical care plan documented
- Evidence of improvements in appropriate use of medicines in the US
- Applicability to Europe?
The Fleetwood model of pharmaceutical care

- Applicable to UK?
  - Preliminary study (Patterson SM et al., 2007)
    - Why not... would be good but...
    - Major challenges: access to records, patients, prescribers
    - US model refined
The Fleetwood model of pharmaceutical care

- Main focus: psychoactive agents (anxiolytics, hypnotics, antipsychotics)
- 9 trained pharmacists
- Components:
  - Monthly visits
  - Algorithm to evaluate treatment
  - Liaison with GPs and other HCPs
  - Documentation on pharmaceutical care

Applicable to UK?

Patterson et al., 2010 & 2011

Cluster RCT, 334 residents, 22 NHs (11 matched pairs), Northern Ireland

- "Applicable to UK?"

- Components:
  - Psychiatric indication?
  - On admission to nursing home:
    - Resident drug history unknown and medication prescribed less than 6 months ago
  - Quantitatively documented?
    - Objective documentation?
      - Yes
      - No
  - Behavioral indication?
    - Yes
    - No
  - Psychiatric indication?
    - Yes
    - No
  - Psychoactive medication prescribed?
    - Indication documented?
      - Yes
      - No
Nursing home care

Primary outcome measure: change in proportion of residents receiving inappropriate psychoactive drugs

No ≠ in falls rate
The Fleetwood model of pharmaceutical care

- Pharmacoeconomic analysis

Figure 1. Cost-effectiveness plane for residents alive at 12 months. The scatter graph shows the mean difference in costs and in the proportion of nursing home residents receiving one or more inappropriately prescribed psychoactive medications.
2. Pharmacists in ambulatory care

- Pharmaceutical care specifically mandated or encouraged in several countries
  - US, UK, Australia, Netherlands,...

**National Service Framework for Older People**

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 2002</td>
<td>All people over 75 years should normally have their medicines reviewed at least annually and those taking four or more medicines should have a review 6 monthly.</td>
</tr>
<tr>
<td>April 2004</td>
<td>Every PCG or PCT will have schemes in place so that older people get more help from pharmacists in using their medicines.</td>
</tr>
</tbody>
</table>
2. Pharmacists in ambulatory care

- Models of care
  - Pharmaceutical care provided by community pharmacists
  - Home-based medication reviews
  - Pharmaceutical care within a primary care team
Community pharmacy setting

PEER study (Bernsten et al., 2001)

- RCT, 2454 patients, ≥65y, ≥5meds
- 190 pharmacies, 7 European countries

Pharmaceutical care by community pharmacists
Education, compliance, medication review, follow-up

- No ≠ in knowledge, compliance, nb meds, changes
- Heterogeneity across countries

- No ≠ in hospital admissions, cost, variable effect on HRQOL

Challenges and limitations!

- Access to patient data, contact with GPs,...
  → Pharmacists too detached from other HCPs
- Training of pharmacists (too) limited
Community pharmacy setting

Denneboom et al., 2007

- Cluster RCT, 738 patients, ≥75y, ≥5meds
- 28 pharmacies, 77 GPs, the Netherlands
- Treatment review using pharmacy record and computerised screening tools
- Recommendations to GPs via written report
- Recommendations discussed during case conferences
- More medication changes accepted by GP at baseline / 6 mo when case conferences (p.02)
- Higher costs covered by slightly greater savings
Ambulatory care

**Home-based medication review (HMR)**

**HOMER trial** (Holland et al., 2005)

- RCT, 872 patients, ≥80y, discharged from hospital, ≥2meds, UK

Home-based medication review at wk 2 and 8
Adherence, education, ADR report to GP,...

- ↑ rate of hospital admission (HR 1.30, 95%CI 1.07-1.58)
- No ≠ in QOL or death

**What this study adds**

- Home based medication review by pharmacists may increase hospital admissions
- More effective forms of medication review need to be established, considering patients’ quality of life and effects on both hospital and general practice, as well as prescribing outcomes

- Increased help-seeking behavior?
- Better and dangerous adherence in intervention group?

- No access to full patient data!
- No face-to-face contact with GP
  → Pharmacists too detached from other HCPs
Clinic-based medication review

Zermansky et al., 2001

RCT, 1188 patients, ≥65y, taking ≥1 repeat med, 4 general practices, UK

Clinical medication review
Specifically trained pharmacist
Close collaboration with GPs
Clinic-based medication review

Zermansky et al., 2001

- RCT, 1188 patients, ≥65y, taking ≥1 repeat med, 4 general practices, UK
- Clinical medication review
  Specifically trained pharmacist
  Close collaboration with GPs
- More changes in drug regimen (p=.02)
- Reduction in net cost of drugs per patient per 28 days
- No ≠ in hospital admissions, mortality, outpatient consultations

What this study adds

Consultations with a clinical pharmacist are an effective method of reviewing the drug treatment of older patients

Review by a pharmacist results in more drug changes and lower prescribing costs than normal care plus a much higher review rate

Use of healthcare services by patients is not increased
3. Pharmacists in acute care

- Model of care
  - Medication history on admission
  - Medication review and individualised patient counselling during hospital stay
  - Discharge information/education for patients /HCPs
  - (follow-up telephone calls)
<table>
<thead>
<tr>
<th>Study</th>
<th>Setting</th>
<th>Patients</th>
<th>Outcomes</th>
</tr>
</thead>
</table>
| Spinewine et al., 2007       | RCT, 203 patients, one acute geriatric unit, Belgium | | - ↑ appropriateness of prescribing (MAI, ACOVE)  
- 90% acceptance rate  
- Trend toward ↓ mortality and ED visits |
| Gillespie et al., 2009       | RCT, 400 patients ≥80y, 2 internal medicine wards, Sweden | | - 16% ↓ hospital visits  
- 46% ↓ ED visits  
- 80% ↓ drug-related readmissions |
<table>
<thead>
<tr>
<th>Drug-Related Problem</th>
<th>Interventions, n (%)</th>
<th>Drugs Most Often Involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underuse</td>
<td>169 (15.9)</td>
<td>calcium/vitamin D, antithrombotics, analgesics</td>
</tr>
<tr>
<td>Wrong dose</td>
<td>127 (11.9)</td>
<td>antibiotics, psycholeptics,^a^ psychoanalectics,^a^ ACE inhibitors, ARAs</td>
</tr>
<tr>
<td>Inappropriate duration of therapy</td>
<td>103 (9.7)</td>
<td>psycholeptics, heparins, antiasthmatics, antibiotics</td>
</tr>
<tr>
<td>Inappropriate choice of medicine</td>
<td>102 (9.6)</td>
<td>psycholeptics, psychoanalectics, analgesics</td>
</tr>
<tr>
<td>No valid indication</td>
<td>74 (6.9)</td>
<td>antithrombotics, antacids, antiulcer drugs</td>
</tr>
<tr>
<td>No specific problem^b</td>
<td>72 (6.8)</td>
<td>psychoanalectics, psycholeptics, ACE inhibitors, ARAs, hypolipemias</td>
</tr>
<tr>
<td>Inappropriate modalities of administration^c</td>
<td>65 (6.1)</td>
<td>analgesics, antibiotics, psychoanalectics, antiasthmatics</td>
</tr>
<tr>
<td>Adverse drug reaction^d suspected or confirmed</td>
<td>57 (5.3)</td>
<td>psychoanalectics, diuretics, analgesics</td>
</tr>
<tr>
<td>Error in medication history</td>
<td>55 (5.2)</td>
<td>psychoanalectics</td>
</tr>
<tr>
<td>Inappropriate follow-up</td>
<td>41 (3.8)</td>
<td>antianemics, cardiac therapy (digoxin)</td>
</tr>
<tr>
<td>Prescription writing error</td>
<td>36 (3.4)</td>
<td>psycholeptics</td>
</tr>
<tr>
<td>Drug–disease interaction (including allergy)</td>
<td>35 (3.3)</td>
<td>β-blockers, ACE inhibitors, ARAs, bisphosphonates, psychoanalectics</td>
</tr>
<tr>
<td>Duplication</td>
<td>34 (3.2)</td>
<td>psycholeptics, antiasthmatics</td>
</tr>
<tr>
<td>Less costly alternative</td>
<td>32 (3.0)</td>
<td>miscellaneous</td>
</tr>
<tr>
<td>Modalities of administration not practical for the patient</td>
<td>26 (2.4)</td>
<td>miscellaneous</td>
</tr>
<tr>
<td>Drug–drug interaction</td>
<td>24 (2.3)</td>
<td>antithrombotics</td>
</tr>
<tr>
<td>Other</td>
<td>14 (1.3)</td>
<td>miscellaneous</td>
</tr>
</tbody>
</table>

Spine wine et al., 2007
### Table 2. Summary of Outcomes at 12 Months’ Follow-up

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intervention Group (n=182)</th>
<th>Control Group (n=186)</th>
<th>Estimate (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visits to the hospital&lt;sup&gt;b&lt;/sup&gt;</td>
<td>266 (1.88)</td>
<td>316 (2.24)</td>
<td>0.84 (0.72-0.99)</td>
</tr>
<tr>
<td>Patients readmitted&lt;sup&gt;c&lt;/sup&gt;</td>
<td>106 (58.2)</td>
<td>110 (59.1)</td>
<td>0.96 (0.64-1.46)</td>
</tr>
<tr>
<td>Readmissions</td>
<td>217 (1.54)</td>
<td>223 (1.58)</td>
<td>0.97 (0.81-1.17)</td>
</tr>
<tr>
<td>Drug-related readmissions</td>
<td>9 (0.06)</td>
<td>45 (0.32)</td>
<td>0.20 (0.10-0.30)</td>
</tr>
<tr>
<td>Visits to the emergency department</td>
<td>49 (0.35)</td>
<td>93 (0.66)</td>
<td>0.53 (0.37-0.69)</td>
</tr>
<tr>
<td>Overall survival&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.69</td>
<td>0.67</td>
<td>0.94 (0.65-1.24)</td>
</tr>
</tbody>
</table>

<sup>a</sup> Gillespie et al., 2009

### Table 3. Drug-Related Readmissions

<table>
<thead>
<tr>
<th>Drug-Related Cause for Readmission</th>
<th>Intervention Group (n=9)</th>
<th>Control Group (n=45)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digoxin intoxication</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Overprescribing of antihypertensive agents</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Suboptimal drug therapy</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Heart failure</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Dehydration due to overprescribing of diuretics</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Anemia due to aspirin or nonsteroidal anti-inflammatory drugs</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Confusion and/or fall due to sedatives, opioids, or anticholinergic drugs</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Diarrhea due to antibiotic treatment</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Hyperkalemia</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Hyponatremia due to diuretics and selective serotonin reuptake inhibitor therapy</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Lack of drug treatment for atrial fibrillation (embolism)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Bleeding (hematoma) due to warfarin sodium</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Patients</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------</td>
<td>----------</td>
</tr>
</tbody>
</table>
| Spinewine et al., 2007 | RCT    | 203      | Belgium | Pharmaceutical care from admission to discharge | ↑ appropriateness of prescribing (MAI, ACOVE) | 90% acceptance rate  
|                        |        |          |         |                                   | ↓ mortality and ED visits |
| Gillespie et al., 2009 | RCT    | 400      | Sweden  | Pharmaceutical care from admission to discharge (+ after) | 16% ↓ hospital visits | 46% ↓ ED visits  
|                        |        |          |         |                                   | 80% ↓ drug-related readmissions |
| Lisby et al., 2010     | RCT    | 100      | Denmark | Medication history and treatment discussion with clinical pharmacologist | <50% acceptance rate |

- LOS: Length of Stay  
- QOL: Quality of Life
Summary: evidence for impact?

- **Good evidence** that collaboration with pharmacists can decrease the risk of drug-related problems.

- **Mixed / lacking evidence** for effect on:
  - Clinical outcomes
    - ? Wrong measures selected? Too multifactorial?
  - HRQOL
  - Cost effectiveness
Summary: evidence for impact?

- **Heterogeneity**
  - Content, ‘intensity’ and duration of interventions
  - Background practice
  - Culture
    - ≠ countries or settings → ≠ challenges
  - ...

- Background practice
- Culture
Summary: Key success factors

- Knowledge and skills

Perspective: Is Pharmacy Ready for the Baby Boomers?

Joseph T. Hanlon, PharmD, MS
Summary: Key success factors

- Knowledge and skills
- Full access to patients’ records
  - Past medical Hx, drug Hx, laboratory data, evolution,…
- See the patient/carer
  - Drug history, compliance,…
- Close collaboration with other HCPs
  - Multidisciplinary team work
Summary: Perspectives

- Effect on ADEs
- Cost-effectiveness
- Patient targeting: how?
- Standardisation of interventions; team-based
- Multi-center European studies
- Effect of direct participation of patients or caregivers in the intervention process
- ...
CONTINUING EVALUATION AND IMPROVEMENT OF ACTIVITIES OF CLINICAL PHARMACISTS FOR OLDER INPATIENTS

Ariane Mouzon MPharm, Christian Swine MD, Anne Spinewine PhD

**METHOD**

The data collected encompass:

**Measures of activity**

b) Number and percentage of patients admitted on the unit and cared for by the clinical pharmacist (automated measures)

c) Number and characteristics of interventions performed by the clinical pharmacist (data collected 4 weeks/year)

d) Number of educational presentations (yearly measure)

e) Rate of acceptance of interventions (data collected 4 weeks/year)

**RESULTS**

From 05/2010 to 04/2011, the results relative to clinical pharmacy on the geriatric unit, and the decisions taken in consequence to these, include the following:

b) The pharmacist took care of 379 patients in one year, representing 87% of patients admitted on the unit.

c) Average of 45 interventions per week with two frequent issues: overuse and underuse (Table 2).

d) In 2010, the pharmacist performed 7 educational presentations. Three of them were dealing with optimization of prescriptions in older people; others related to the management of heart failure, drug interactions in cancer patients and intravenous to oral switch.

Performance measures

e) 92% of interventions were accepted (83% fully, 9% partially)

f) Overall satisfaction of doctors and nurses: excellent (median at
Thank you for your attention

Thanks to
- Stephen Byrne and Daniela Fialova
- all Belgian colleagues that moved clinical pharmacy forward
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1- No funds were received in support of this presentation.
2- No benefits in any form have been or will be received from a commercial party related directly or indirectly to the subject of this presentation.

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