

Appropriate use of medicines in care of the elderly

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*Factors underlying inappropriateness, and
impact of the clinical pharmacist*

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PhD thesis - Public defense

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Introduction

Optimising the use of medicines hospitals is central to the quality of patient care in hospitals.

A spoonful of sugar, NHS 2001

- Medicines can save lives. But they can harm too.
- Landmark study on adverse drug events (ADEs)
(Bates, 1995 and 1997)
 - 6.5 ADEs / 100 hospital admissions
 - 12% life threatening, 30% serious
 - 28-42% are **preventable**
 - Annual cost for a 700-bed teaching hospital: \$2.8 million

1



Introduction

Optimising the use of medicines hospitals is central to the quality of patient care in hospitals.

A spoonful of sugar, NHS 2001

- How to prevent « preventable ADEs »?
 - Prescription and administration must be optimised
 - Build safety into the *systems* of care (≠ blame *individuals*)
 - « 2 of the most interesting changes (...) are **computerised-physician order entry**, and redefinition of the role of **pharmacists** to make them onsite members of the unit patient care team. » (Bates, 1995)

Introduction

- Clinical pharmacy – pharmaceutical care
 - A clinical pharmacist should aim to maximise therapeutic effect, to minimise risk, to minimise cost and to respect patient choice. (Barber, 1996)

Patient-centered services

« Ward pharmacy »
« Pharmaceutical care »



Introduction



- Clinical pharmacy : International experience
 - 35-year experience in US/Canada/UK
 - Pharmacists attend rounds in 80% of large US hospitals (Pedersen, 2005)
 - 94% of Canadian hospitals provide clinical pharmacy services (Bussières, 2001)
 - 40% of pharmacists' time devoted to clinical activities
 - 60% of hospital pharmacists in the UK provide patient counselling (Cotter, 1994)
 - Evidence of positive impact on various outcomes (Spinewine, 2003)
 - Clinical: ↓ ADEs, ↓ morbidity, ↓ mortality
 - Economic: ↓ direct and indirect costs
 - Humanistic: ↑ satisfaction

Introduction

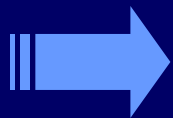


- Clinical pharmacy: Belgian experience in 2000
 - Patient-centered services: (almost) inexistant
(Spinewine 2003, Willems 2005)
- Hospital pharmacists' activities:
 - 70% distribution, 16% manufacturing or compounding
 - 10% other activities
 - When regular ward visits:
 - 1 hour/day
 - Stock control, collecting prescriptions, solving drug-related problems

Introduction



- Clinical pharmacy: Belgian experience
 - BUT...
 - Opportunities for development:
 - National willingness to improve quality and safety, ↓ nb of doctors
 - Barriers to overcome:
 - Resources, acceptance, training
- (Spinewine and Dhillon, 2002)

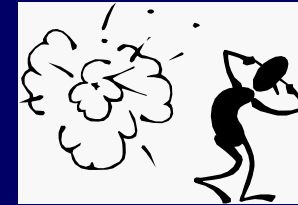
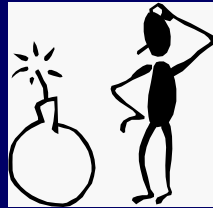


Main research hypothesis:

Pharmaceutical care provided to patients at high risk of drug-related problems improves the quality of use of medicines

(1) Target: frail elderly patients

High risk of drug-related problems



Risk factors

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

Problems with drugs

- Polymedication
- Inappropriate prescribing
- Poor compliance
- ...

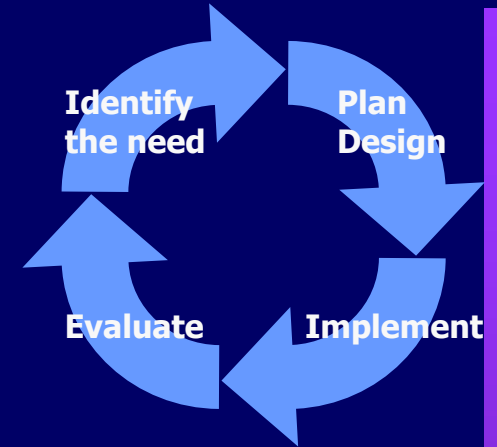
Consequences

- *Clinical*
↑ ADEs, morbidity, mortality
- *Economic*
↑ costs
- *Humanistic*
↓ quality-of-life

Examples:

- 50% of admissions to hospital that are secondary to an ADE are preventable
- 50% of elderly patients do not take their drugs as intended
- 1 € spent on drugs → 1.33 € spent to treat drug-related problems (Bootman, 1997)

(2) Rigorous evaluation of impact



- Structured and logical approach
 1. Assess the baseline level of appropriateness of use of medicines → needs identification
 2. Design the intervention (must address the needs)
 3. Implement the intervention / service
 4. Evaluate impact on quality
 1. Robust study design
 2. Validated process and outcome measures

(2) Rigorous evaluation of impact



Identify
the need

- Structured and logical approach
 1. Assess the baseline level of appropriateness of use of medicines → needs identification

I. Qualitative study - objective



Identify
the need

- 1a. To explore the perceptions of HCPs on the appropriateness of use of medicines for elderly inpatients
- 1b. To identify the processes leading to (in)appropriate use of medicines

with regard to prescribing, counselling, and transfer of information to the general practitioner

Appropriateness of use of medicines in elderly inpatients: qualitative study

Spinewine A, Swine C, Dhillon S, Dean Franklin B, Tulkens PM, Wilmotte L, Lorant V.

British Medical Journal 2005;331:935-9.

Qualitative research in health care

QUALITATIVE

↔ *quantitative*

Approach

often exploratory work: “how” and “why”

↔ how many?

hypothesis generating

↔ testing

Why does inappropriate use of medicines occur?

What is the % of inappropriate prescriptions?

What is the impact of clinical pharmacists on this %?

Qualitative research in health care

QUALITATIVE

↔ quantitative

Approach

often exploratory work: “how” and “why”
hypothesis generating

↔ how many?

↔ testing

Methods

interviews, observation, documents

↔ survey, RCT

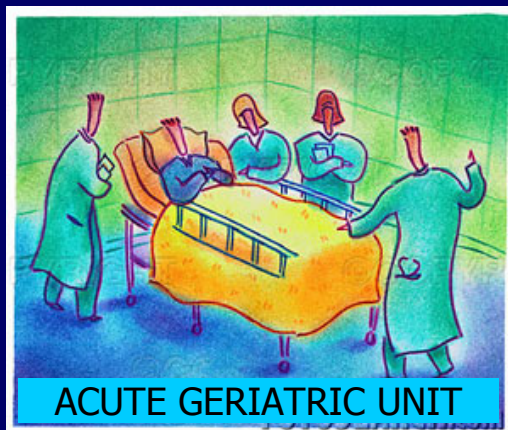
Sample

small and purposive

↔ large, random

I. Qualitative study - design

1. DATA COLLECTION



5 doctors
4 nurses
3 pharmacists

} Individual interviews

17 patients

} Group interviews
(focus groups)

2 acute geriatric
units

} 1-month observation by
clinical pharmacists

2. DATA ANALYSIS

Read transcripts → themes → coding → ...

Inductive, multidisciplinary approach

Software support: QSR N-Vivo



I. Qualitative study - results

- Perceived appropriateness

- Inappropriate prescribing does occur
- Patient counselling is insufficient
- Information given to the general practitioner upon discharge, and relating to medicines, is insufficient

→ **Why** does this occur?

Categories underlying inappropriate use of medicines

Reliance on general acute care and short term treatment

- Review of treatment driven by acute considerations; other considerations overlooked
- Limited transfer of information on medicines from primary to secondary care

1. • “One size fits all”: prescribing behaviour not tailored to the older patient

Passive attitude towards learning

2. • Anticipated inefficiency in searching for medicines information
- Reliance on being taught (teacher centred) rather than self directed learning

Paternalistic decision making

3. • Patients thought to be conservative
- Patients declared as unable to comprehend
- Ageism
- Difficulty in sharing decisions about treatment with other prescribers

I. Qualitative study - results

Why does inappropriate prescribing occur?

1. Prescribing is not tailored to ELDERLY patients

« Doctors haven't necessarily been trained in geriatrics. They will start with 10mg of morphine every 4 hours. That's too much. »

2. Searching for medicines information: takes too long

« I don't really know drug interactions very well. And to always go and look in the compendium is a bit difficult in terms of time. »

3. Paternalism – patients are thought to be conservative

« Patients are attached to their medicines. It is difficult to go against that. »

I. Qualitative study - discussion

- Underlying factors → approaches for improvement
- Multi-faceted approaches are needed
- Support by a clinical pharmacist could tackle several of the underlying factors

I. Qualitative study - discussion



Plan
Design

How can pharmaceutical care address these factors?

1. Prescribing is not tailored to ELDERLY patients

Knowledge in the pharmaco-logy and -therapy of drugs for elderly patients

2. Searching for medicines information: takes too long

Efficient in searching medicines information → answer questions

3. Paternalism – patients are thought to be conservative

Patient-centered approach – attention to shared-decision making

Pharmaceutical care process used in the study

Plan
Design

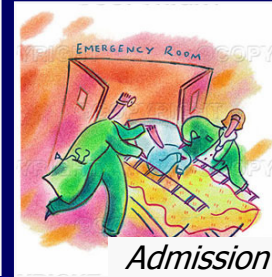


Pharmaceutical care process used in the study

Step 1: Gathering relevant information on the patient on admission

Medication history

- Patient / caregiver
- General practitioner
- Community pharmacist

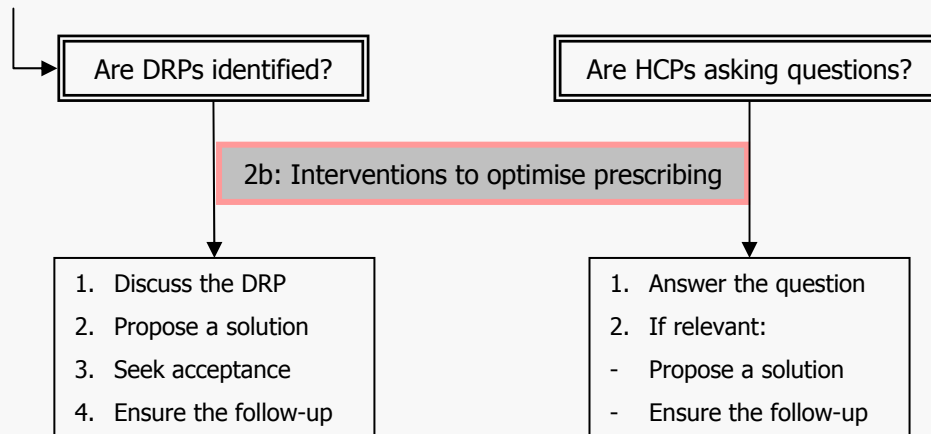


Plan
Design

Pharmaceutical care process used in the study



Step 2 – 2a: Systematic analysis of medicines prescribed



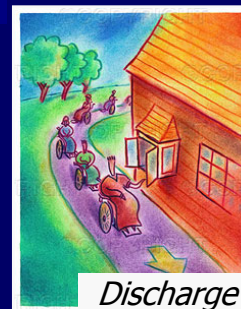
Pharmaceutical care process used in the study

Plan
Design

Step 3: Information at discharge

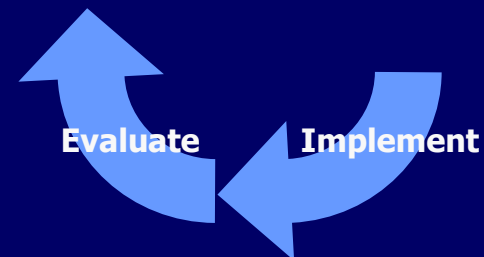
Counselling

- Patient / caregiver
- General practitioner



Discharge

III. Implementation and evaluation



Objectives

3a. To evaluate the feasibility to provide pharmaceutical care

3b. To evaluate the impact on the quality of use of medicines

Acute geriatric unit, Mont-Godinne teaching hospital, 7 months

Implementation of ward-based clinical pharmacy services in Belgium – Description of the impact on a geriatric unit

Spinewine A, Dhillon S, Mallet L, Tulkens PM, Wilmotte L, Swine C.

Annals of Pharmacotherapy 2005;331:935-9.

Medication Appropriateness Index: reliability and recommendations for future use

Spinewine A, Dumont C, Mallet L, Swine C.

Journal of the American Geriatrics Society 2006;54:720-2.

How to evaluate the impact of pharmaceutical care?

- Descriptive approach
 - Description of interventions made by the clinical pharmacist to optimise the use of medicines
- Comparative approach
 - Comparison with a control group
 - Measures of impact

III. Evaluation – descriptive study

- 101 patients
- 82.2 ± 6.9 years
- 7.8 ± 3.5 prescribed drugs

Mean nb of interventions per patient

Initiated by:

- The pharmacist: 8.9 ± 6.0
- Another professional: 1.6 ± 1.6

Most frequent recommendations:


- Discontinue medicine 24.5%
- Add a new drug 18.6%
- Change dose 12.5%
- Educate HCP 10.0%
- Switch to other drug 8.9%

Acceptation

- Fully accepted 88%
- Partially accepted 7%
- Rejected 5%

III. Evaluation – descriptive study

Clinical significance (n=700) :

– Moderate	68.3%		5 « moderate » interventions per patient
– Major	28.6%		2 « major » interventions per patient
– Minor	2.6%		

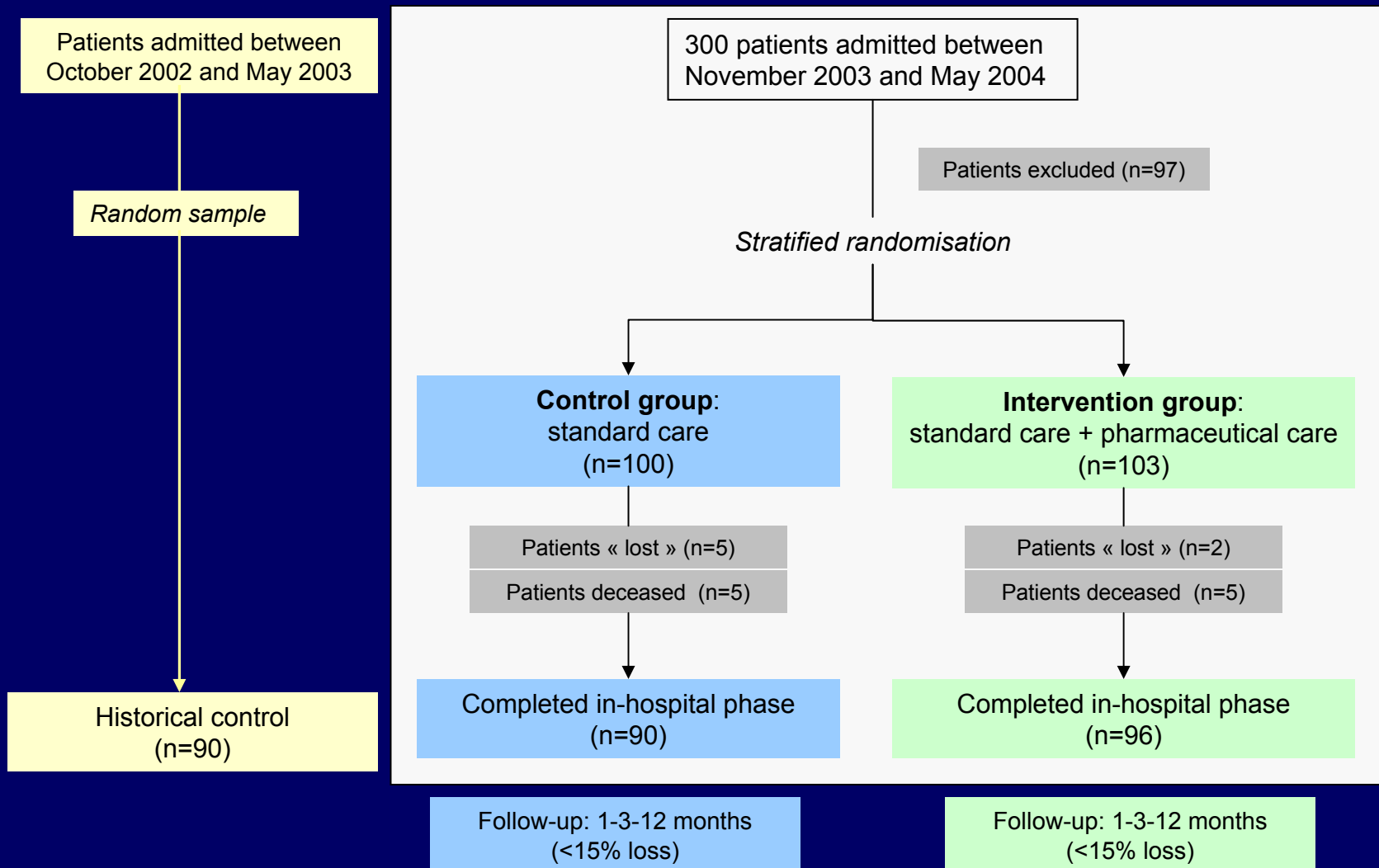
How to evaluate the impact of pharmaceutical care?

- Descriptive approach
 - Description of interventions made by the clinical pharmacist to optimise the use of medicines
- Comparative approach
 - Comparison with a control group
 - Measures of impact
 - « Process » measures : quality measures
 - Appropriateness of prescribing
 - « Outcome » measures
 - Clinical: ADE, length of stay, mortality, readmission
 - Economic: cost of drugs, cost of hospital stay,...
 - Humanistic: quality-of-life, satisfaction

III. Evaluation – RCT – design

- Descriptive approach
 - Description of interventions made by the clinical pharmacist to optimise the use of medicines
- Comparative approach
 - **Comparison with a control group**
 - Measures of impact
 - « Process » measures : quality measures
 - Appropriateness of prescribing
 - « Outcome » measures
 - Clinical: ADE, length of stay, mortality, readmission
 - Economic: cost of drugs, cost of hospital stay,...
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III. Evaluation – RCT – design



III. Evaluation – RCT – design

- Descriptive approach
 - Description of interventions made by the clinical pharmacist to optimise the use of medicines
- Comparative approach
 - Comparison with a control group
 - Measures of impact
 - « Process » measures : quality measures
 - Appropriateness of prescribing (on admission and at discharge)
 - « Outcome » measures
 - Clinical: ADE, length of stay, mortality, readmission
 - Economic: cost of drugs, cost of hospital stay,...
 - Humanistic: quality-of-life, satisfaction

1°

How to measure appropriateness of prescribing in older patients?

1. Medication Appropriateness Index (MAI)

% of patients with ≥ 1 inappropriate rating?

1. Valid indication?
2. Appropriate choice?
3. Correct dose?
4. Modalities of treatment correct?
5. Modalities of treatment practical?
6. Clin. significant drug-drug interactions?
7. Clin. significant drug-disease interactions?
8. Duplication?
9. Appropriate duration?
10. Cost?

How to measure appropriateness of prescribing in older patients?

1. Medication Appropriateness Index (MAI)

% of patients with ≥ 1 inappropriate rating?

2. Drug-to-avoid criteria (Beers) e.g. long-acting BZD, amitriptyline, dipyridamole

% of patients taking ≥ 1 Beers' drug?

% of patients with previous fall and taking a BZD?

How to measure appropriateness of prescribing in older patients?

1. Medication Appropriateness Index (MAI)

% of patients with ≥ 1 inappropriate rating?

2. Drug-to-avoid criteria (Beers)

% of patients taking ≥ 1 Beers' drug?

% of patients with previous fall and taking a BZD?

3. Underuse ACOVE criteria

e.g. patient with myocardial infarction and not on aspirin
e.g. patient with osteoporosis and not treated

% of patients with ≥ 1 underuse event ?

How to measure appropriateness of prescribing in older patients?

1. Medication Appropriateness Index (MAI)

% of patients with ≥ 1 inappropriate rating?

2. Drug-to-avoid criteria (Beers)

% of patients taking ≥ 1 Beers' drug?

% of patients with previous fall and taking a BZD?

ON ADMISSION
versus
AT DISCHARGE

3. Underuse ACOVE criteria

% of patients with ≥ 1 underuse event ?

How to measure appropriateness of prescribing?

How to measure healthy food?

1. Medication Appropriateness Index (MAI)

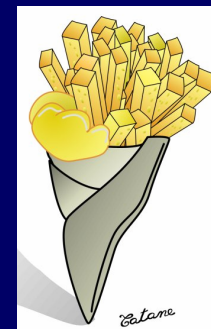
% of patients with ≥ 1 inappropriate rating?



2. Drug-to-avoid criteria (Beers)

% of patients taking ≥ 1 Beers' drug?

% of patients with previous fall and taking a BZD?



3. Underuse ACOVE criteria

% of patients with ≥ 1 underuse event ?



III. Evaluation – RCT – results

ON ADMISSION

1. Medication Appropriateness Index (MAI)

% of patients with ≥ 1 inappropriate rating?

20% --- 84%
Dupli ---- Dose

2. Drug-to-avoid criteria (Beers)

% of patients taking ≥ 1 Beers' drug?

30%

% of patients with previous fall and taking a BZD?

62%

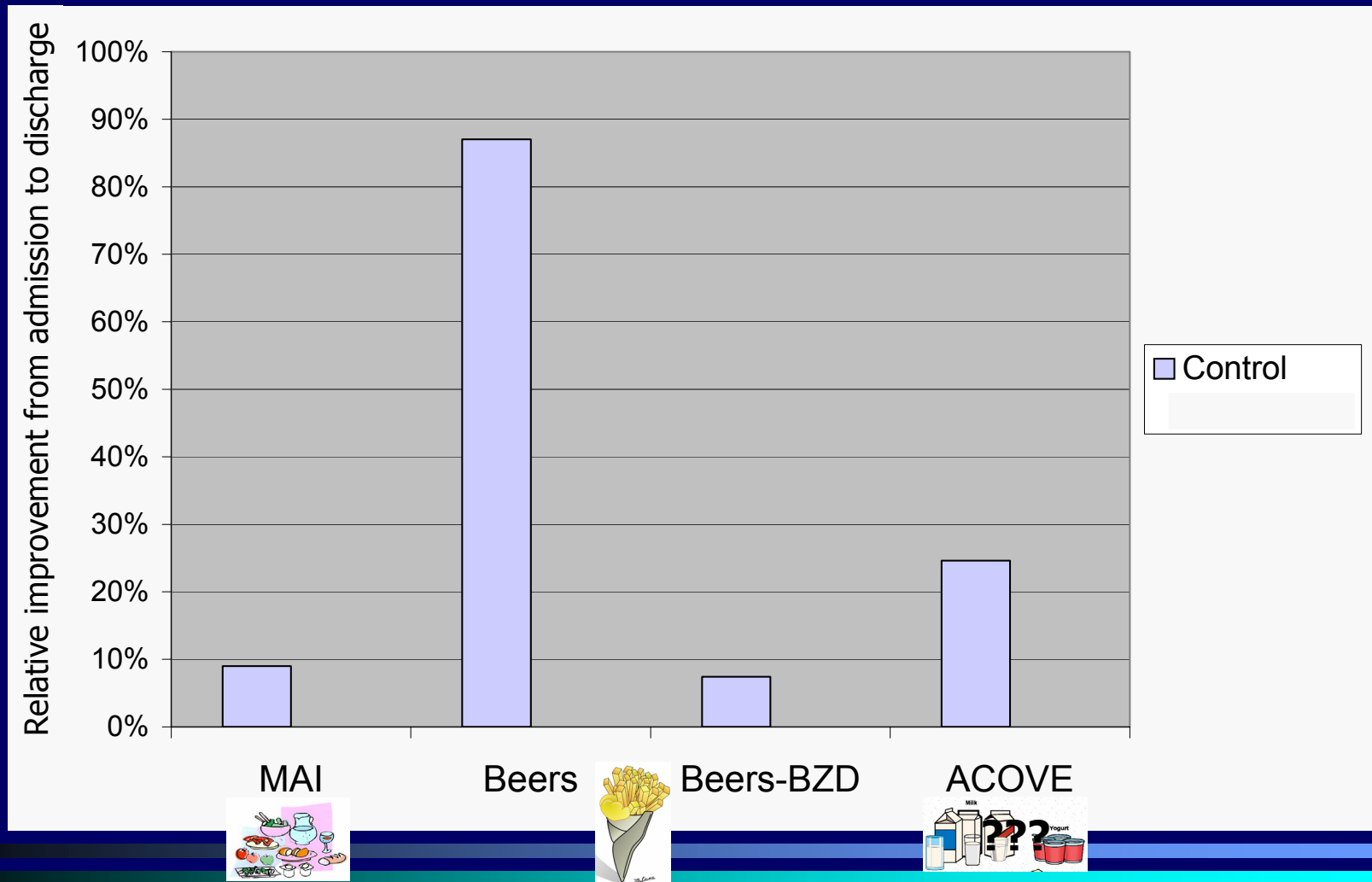
3. Underuse ACOVE criteria

% of patients with ≥ 1 underuse event ?

55%

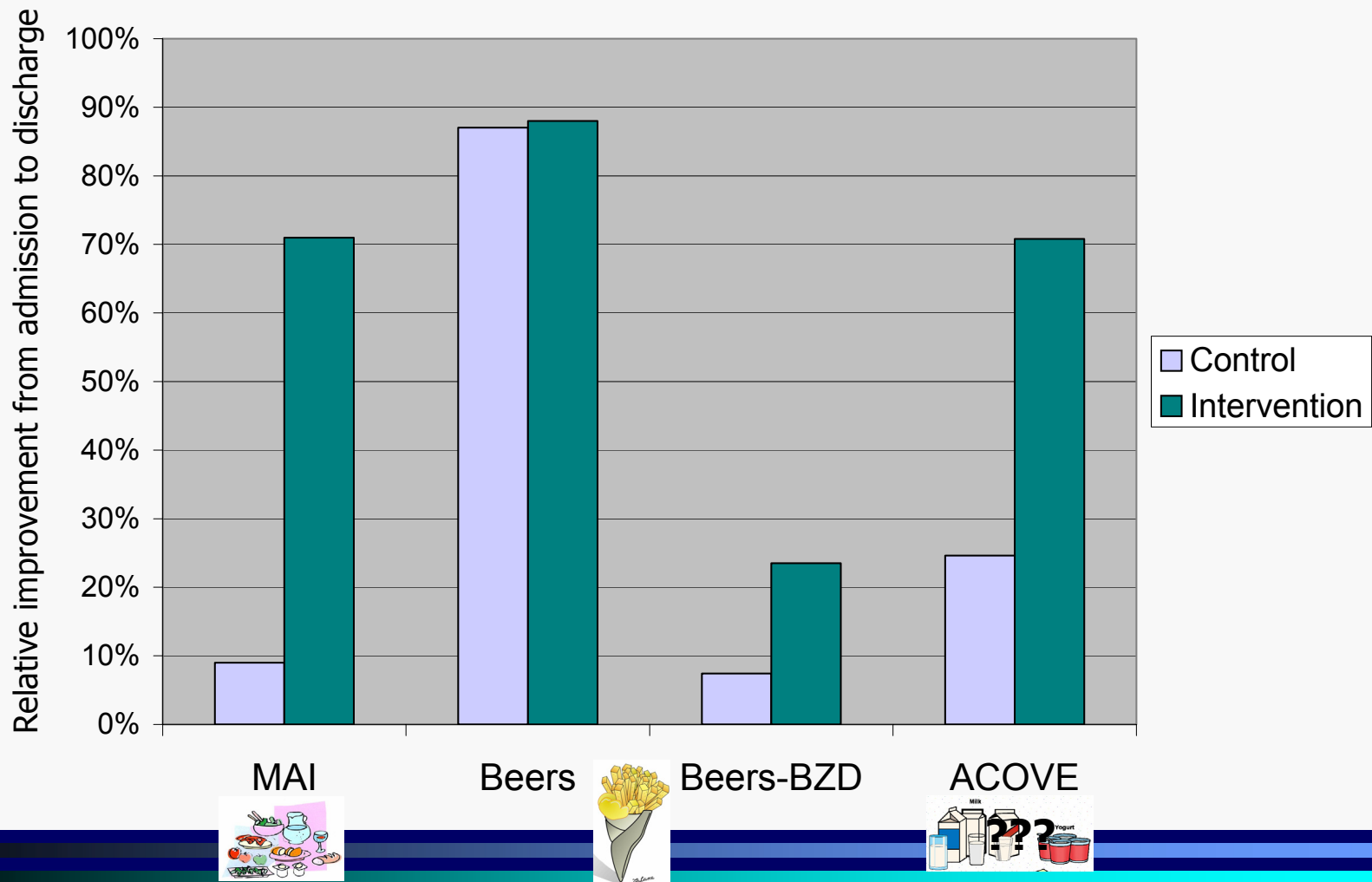
III. Evaluation – RCT – results

IMPROVEMENTS FROM ADMISSION TO DISCHARGE



III. Evaluation – RCT – results

IMPROVEMENTS FROM ADMISSION TO DISCHARGE



III. Evaluation – RCT – results

- Descriptive study
 - Description of interventions made by the clinical pharmacist to optimise the use of medicines
- Comparative study
 - Comparison with a control group
 - Measures of impact
 - « Process » measures
 - Appropriateness of prescribing – maintenance of improvements after discharge
 - « Outcome » measures
 - **Clinical:** ADE, length of stay, mortality, ↓ readmission
 - **Economic:** cost of drugs, cost of hospital stay, ...
 - **Humanistic:** quality-of-life, satisfaction ↑

2°

III. Evaluation – discussion

- Moderate/high levels of inappropriate prescribing at baseline
- Impact of pharmaceutical care:

At the prescriber level:

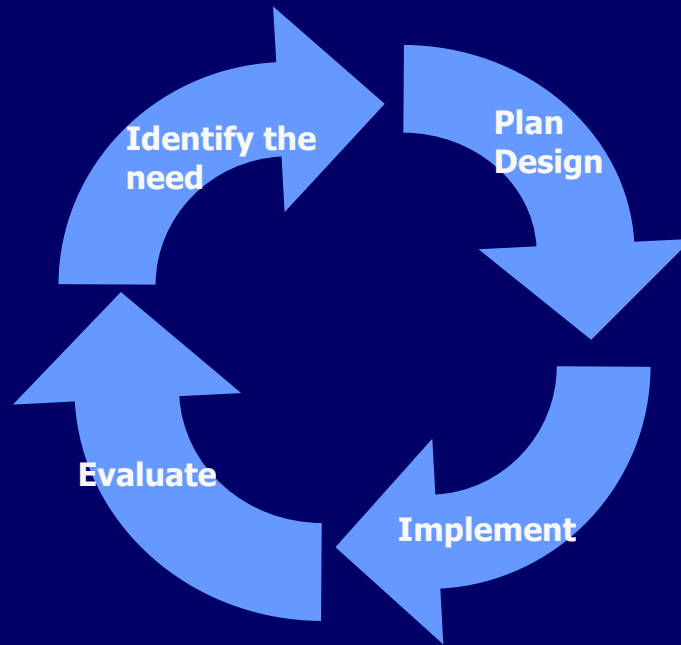
- Improvement in the quality of medicines use
- Persistence after discharge
- Possible educational bias

At the patient level:

- Increased satisfaction with information received on medicines
- Impact on clinical outcomes? Sample too small

- Relative impact compared to other approaches for optimisation?
 - Comparison with computerised prescribing





Discussion – What have we learned?



- Need to optimise use of medicines in the elderly
- Several categories of causal factors need to be addressed
- Providing pharmaceutical care
 - is feasible and well accepted
 - improves the quality of use of medicines
 - cannot be replaced by a computerised prescr. system
- New European data on inappropriate prescribing
- 1st time qualitative approach taken
- New and robust data on impact in acute geriatrics
- Of interest for implementation in other European countries

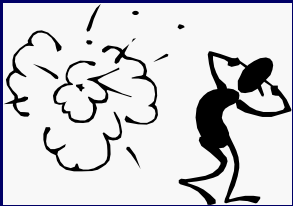
En français SVP...



↑ Efficacité
↑ Sécurité
↓ Coût



Faisabilité?
Impact?



Evaluation des
besoins
d'optimisation

Définition des
composants du
service de pharmacie
clinique

- Entrée
- Séjour
- Sortie

Evaluation

Implémentation

- Interventions
- Qualité

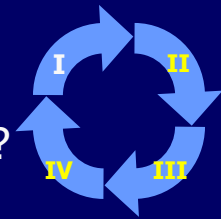
Perspectives



A. Use of medicines in geriatrics

- What would be the effect of educational-type interventions focusing on frequent and significant DRPs?
- What are the determinants of patients' reluctance to treatment change? What would be the effect of improved concordance?
- What is the link between inappropriate prescribing and adverse outcomes?

- Pharmaceutical care for geriatric outpatients
 - There is a need for optimising medicines use!
 - What would be the most appropriate intervention?
 - Address barriers for implementation



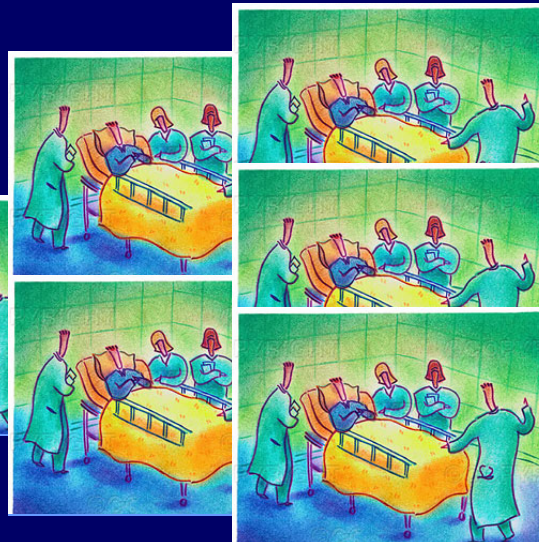
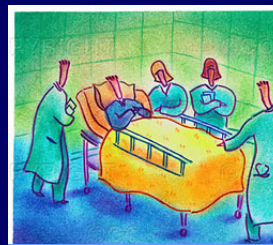
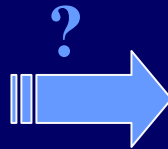
Perspectives



B. Clinical pharmacy in Belgium – What's next?

1. Generalisability of our results

- to other hospitals, units, pharmacists
- ongoing pilot studies; new positions created (Ampe, 2006)
- Perspective: use similar tools to evaluate impact; design a multicenter study



Perspectives



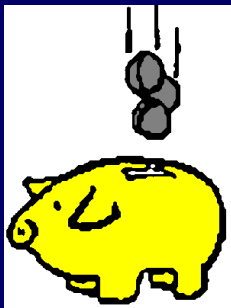
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1. Generalisability of our results

- to other hospitals, units, pharmacists
- ongoing pilot studies; new positions created (Ampe, 2006)
- Perspective: use similar tools to evaluate impact; design a multicenter study

2. Economic impact ???

- Impact on direct v. indirect costs
- Literature: mean benefit:cost ratio = 4.68:1 (Schumock, 2003)
- Belgian data are essential for successful expansion
- Perspective: evaluate impact in the context of the new prospective budgeting system



Perspectives



Final thoughts for the future

- The needs differ between units and patients – Always adapt the service to the needs, and prioritise.
- Essential components of success: clinical pharmacists must have:
 - Direct contacts with patients and HCPs
 - Access to patient records
 - A structured approach to treatment review and optimisation
 - Adequate knowledge and skills → current efforts to develop specific educational programs should be pursued and extended.
- Articulate pharmaceutical care services with decentralised clinical pharmacy services (eg guideline development, computerised prescribing)

Thanks to...

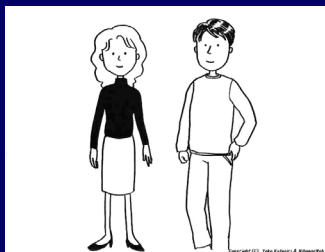
P Tulkens, S Dhillon, C Swine, L Wilmotte

Members of the Jury, and Steering Committee

International collaborators (B Dean, L Mallet, F Smith)

Belgian collaborators

(S Arman, S Boitte, B Boland, P Cornette, C Dumont, JM Feron, P Lambert, E Lecoutre, V Lorant, D Paulus, D Schoevaerds, A Somers, M McGarry)



Students

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FNRS

Hospital pharmacists
FACM-istes

Elderly patients
and their carers