Burden of polypharmacy in older people: defining the problems and interventions

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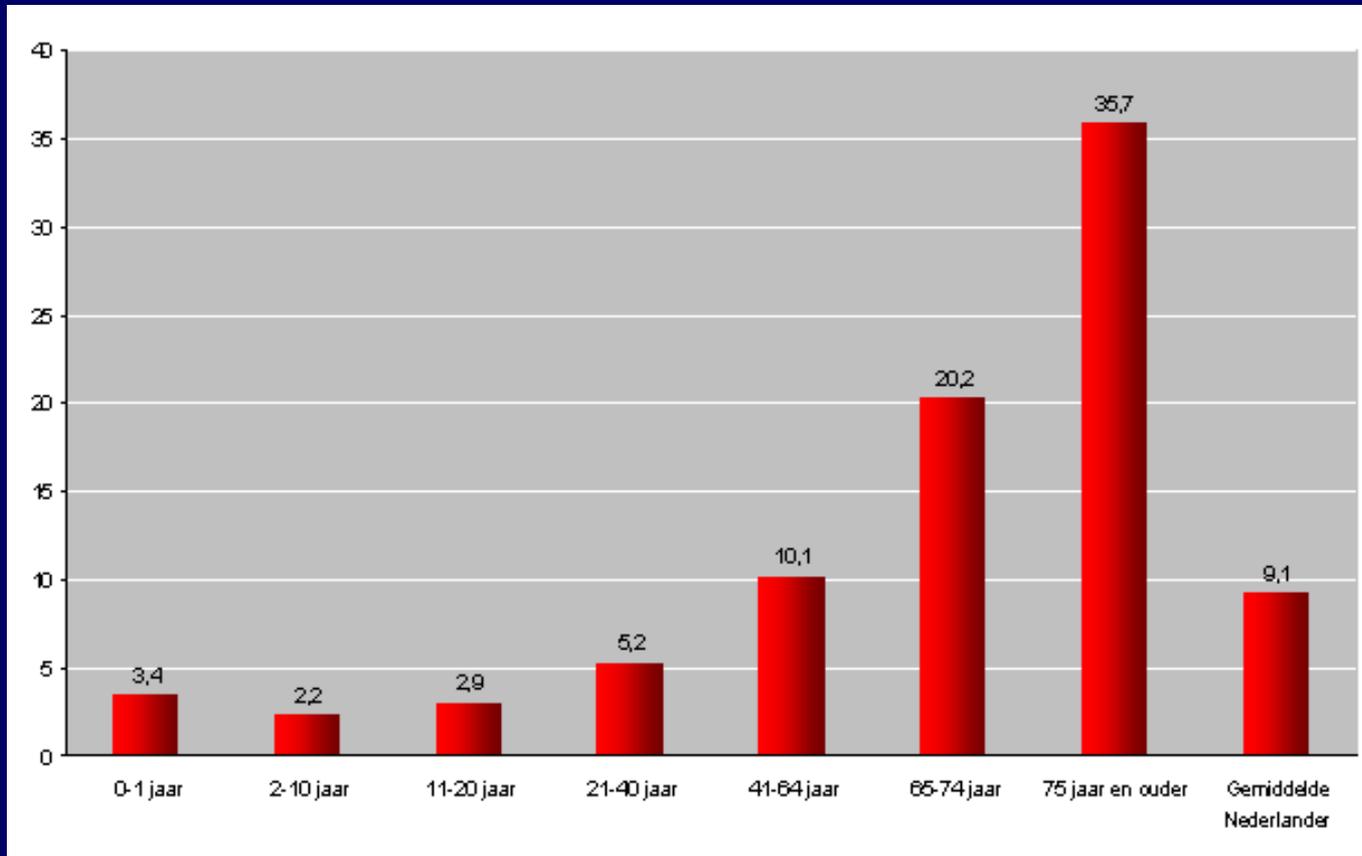3 Dept General Practice, KU Leuven, 4 Dept Family Medicine, Maastricht University

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Polypharmacy:

- Chronic intake of 5 or more medications
- Consultation with multimorbidity ≈ consultation with polypharmacy!

Number of prescriptions in age groups - NL

Source: Foundation for Pharmaceutical Statistics, 2009

Polypharmacy - consequences

Adverse drug events (ADE)

- 6.5% of hospitalisations, of which 30
  - 70% avoidable[1,2]

- Risk ADE with 2 medications: 13%, with 5 medications: 58%[3]

[1] Schneeweiss S, et al. (2002) Eur J Clin Pharmacol; 58 (4): 285-291; [2] Pirmohamed M, et al. (2004) BMJ; 329 (7456): 15-19; [3] Fulton M, et al. (2005) J Am Ac Nurse Practitioners; 17(4):123-32

Interventions to improve the appropriate use of polypharmacy for older people

- Cochrane review – 2014 [1]
- 12 studies; 22,438 participants
- Complex, multi-faceted interventions
- Limitations: small sample sizes and poor quality

[1] Patterson S, et al (2014). Cochrane; CD008165
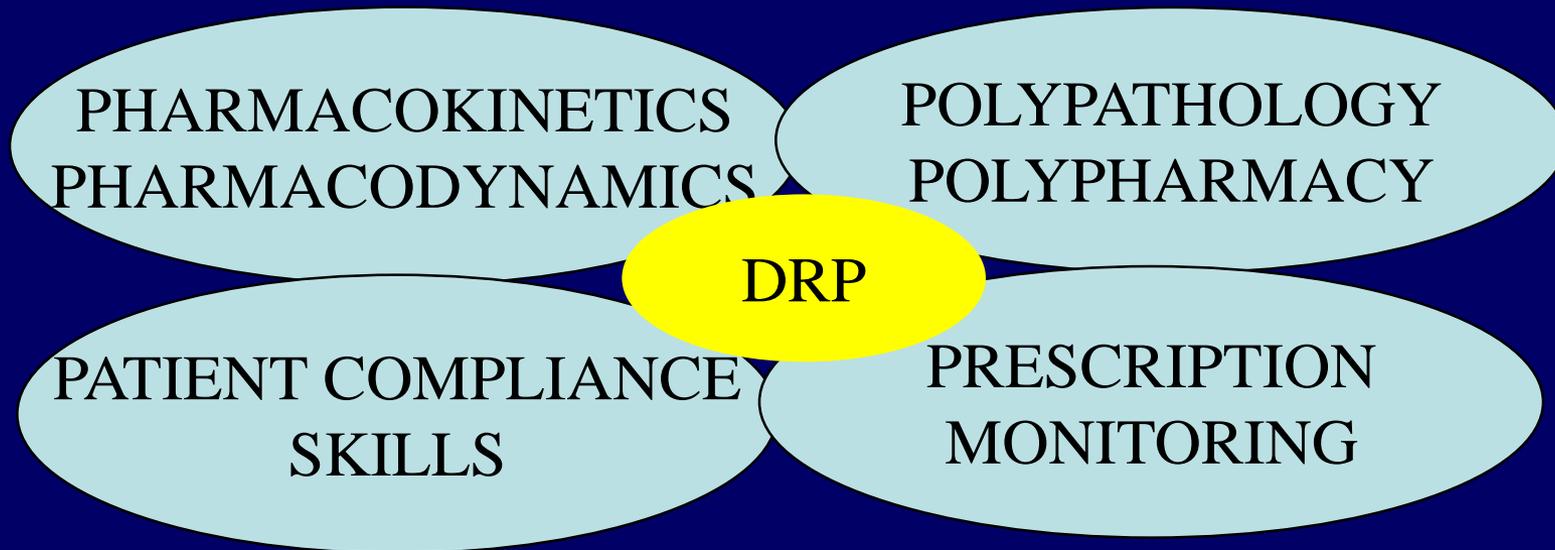
Cochrane - results

- Primary outcomes: appropriateness of prescriptions →
  - MAI improved
  - Beers criteria improved, no clinical significance
  - STOPP criteria no effect
  - Underusage decreased
- Secondary outcomes:
  - ADEs: no consistent intervention effect;
  - QoL: 2 studies, no difference

Policy - dilemma

- Increasingly quality indicators (based on guidelines) are economic incentives → undermines efforts to individualize care
- Patient preferences

Factors for DRPs in older people

PHARMACOKINETICS PHARMACODYNAMICS

POLYPATHOLOGY POLYPHARMACY

DRP

PATIENT COMPLIANCE SKILLS

PRESCRIPTION MONITORING

Most important factor for DRPs is the number of prescribed drugs.

Approaches to screen and prevent the occurrence of polypharmacy and DRPs

- Screening- identification of subjects at risk
- Medication review
- Avoiding use op potentially inappropriate medications (PIM)
- Computer-based prescribing systems
- Comprehensive geriatric assessment (CGA)

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

Onder G, Petrovic M, Tangiisuran B, Meinardi M, Markito-Notenboom W, Somers A, Rajkumar C, Bernabei R, van der Cammen T.

Variables of the GerontoNet ADR risk score

	Odds Ratio	95% CI	Points
≥ 4 co-morbid 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
   5-7
   ≥ 8
	
	1
	1.90
	4.07
		
		1.35 - 2.68
		2.93 - 5.65
			
			0
			1
			4

Previous ADR	2.41	1.79 - 3.23	2
Renal failure**	1.21	0.96 - 1.51	1

*transaminases > 2 x upper normal limit; ** GFR < 60 ml/min

Screening- identification of subjects at risk of ADR

- The GerontoNet ADR risk score represents a tool to identify patients at risk of ADR, which may be target of interventions aimed at reducing their risk of ADR

- However…

  – *it still should be validated in different settings and studies*

  – *the need for identification of new risk factors to be added to the score*

  O'Connor M. et al. Age Ageing 2012;41:771-6.

Brighton Adverse Drug Reactions Risk (BADRI) Model

	Odds Ratio	95% CI
Hyperlipidemia	3.32	1.81- 6.07
No of drugs ≥ 8	3.30	1.93 - 5.65
Length of stay ≥ 12 days	2.27	1.35 - 3.83
Use of anti-diabetic agents	1.91	1.04 - 3.49
High WCC on admission	1.55	0.94 - 2.55

Medication review

- An individualized assessment provided by a clinical pharmacist: during which the medication list is analyzed in a structured manner, with full access to the medical file, in order to identify drug related problems.

  - *First step*: <u>identification</u> of all the medications that the patient is taking.
  - *Second step*: the medication list is <u>screened</u> for drug related problems i.e. any misuse, underuse or overuse of drugs.
  - *Third step*: possible <u>solutions</u> to the drug related problems (DRPs) are then discussed with the treating physician and, if possible, with the patient.

Avoiding use of potentially inappropriate medications (PIM)

Medication Assessment Tools

1) Explicit (criteria based): drugs to avoid
- Beers (1991, updates 1997, 2003, 2012)
- McLeod (1997)
- ACOVE: Assessing Care of Vulnerable Elders (2001)
- IPET: Improved Prescribing in the Elderly Tool (2002)
- STOPP: Screening Tool of Older Person's Prescriptions/ START: Screening Tool to Alert doctors to Right Treatment) (2008)
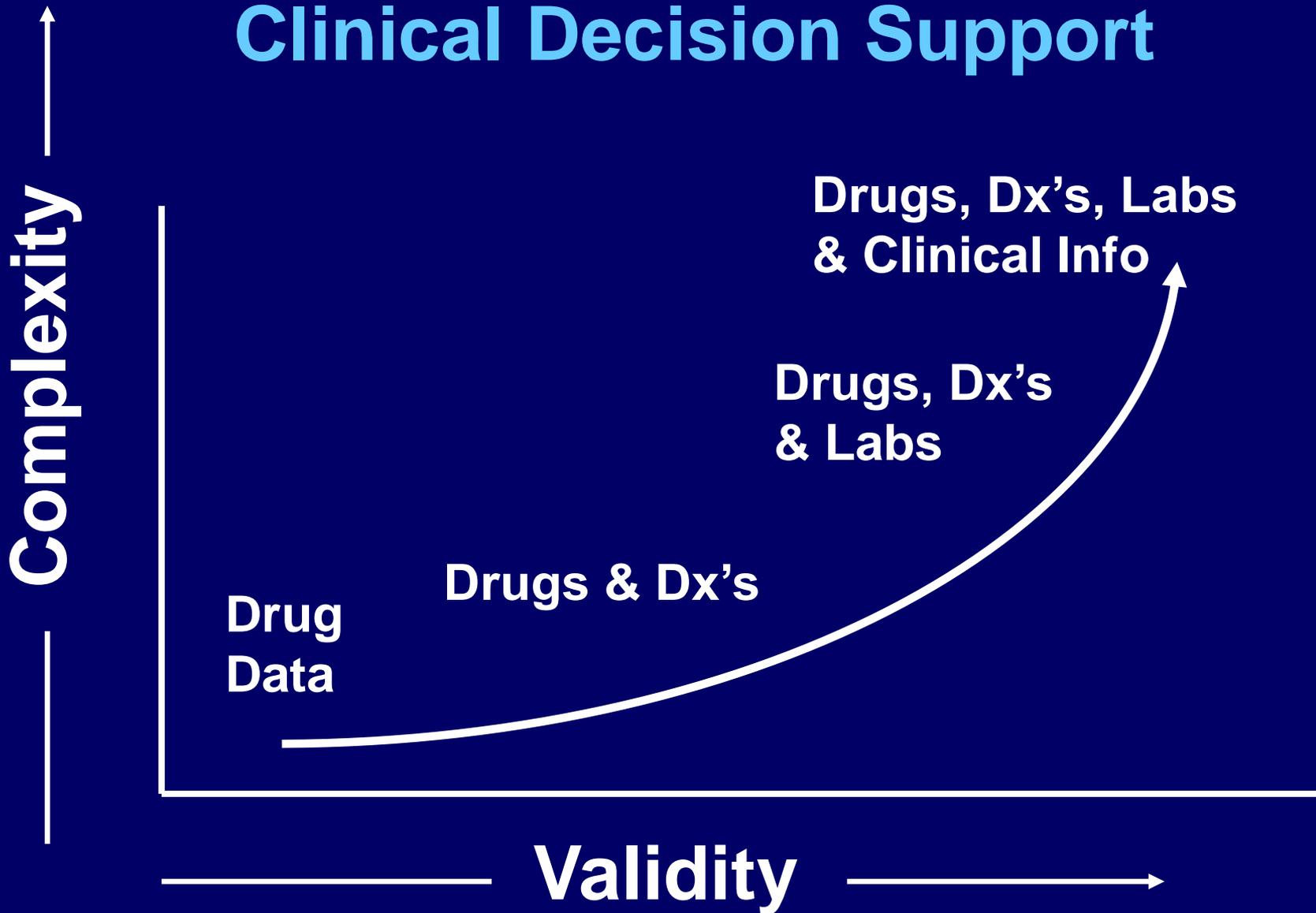
2) Implicit (judgement based):
- MAI: Medication Appropriateness Index (1992)
- GMA: Geriatric Medication Algorithm (1994)
- Lipton's criteria (1993)

Computer-based prescribing systems

- Clinical Decisions Support Systems (CDSS) and Computerized Prescription Support System (CPSS) are interactive softwares, designed
  - As potentially powerful tools to prevent ADRs
  - To support at the time of prescribing
  - All categories of inappropriate prescribing can be addressed, if prescription data are linked to clinical data

- Computerized Provider Order Entry Systems (CPOE), which are based on these softwares, enable providers to enter medical orders into a computer system that is located within an inpatient or ambulatory setting.

Schiff G et al. JAMA 1998; 279: 1024-9.

Translating Quality Measures into Clinical Decision Support

Complexity

Validity

Drugs, Dx's, Labs & Clinical Info

Drugs, Dx's & Labs

Drugs & Dx's

Drug Data

Computer-based prescribing systems

- Disadvantages
  - Very few studies demonstrated an improvement in patient outcomes
  - Challenging to implement
  - Existing systems are not geriatric specific
  - High volume of alerts: risk of unimportant warnings
  - Some prescribers are reluctant to use

Gurwitz J et al. J Am Geriatr Soc 2008; 56: 2225-2233.
Wolfstadt J et al. J Gen Inten Med 2008;23:451-458.
Strom B et al; Arch Intern Med. 2010;170:1578-1583.

Comprehensive geriatric assessment (CGA)

- Medical complexity plays an important role in the onset of ADR and should always be considered before prescribing a pharmacological treatment in older people.

- Drugs which use is indicated in clinical guidelines should be used carefully in complex older adults since they may
  - interact with co-existing diseases or geriatric syndromes,
  - not be assumed correctly because of presence of cognitive deficits, disability or social problems or
  - be useless because the health expectancy of the patient is too short to determine a beneficial effect of the drug.

Tinetti M et al. N Engl J Med 2004; 351: 2870–74.

Comprehensive geriatric assessment (CGA): evidence

- CGA in association with a multidisciplinary team (assessing and managing the health care problems identified by the CGA, and developing individualized care plans) results in more detailed evaluation, improved care planning, and overall better quality of care.

  Ellis G et al. BMJ. 2011; 343:d6553.

- Limitation: heterogeneity in terms of structural components and care processes.

Comprehensive geriatric assessment (CGA): evidence

- CGA allows a complete and global assessment and management of the health care problems, including *evaluation of drugs* with the goal of recognizing and preventing potential drug-related problems and improve quality of prescribing.

    Onder G et al. Curr Drug Metab 2011; 12:647-651.

- CGA associated with a multidisciplinary team approach, as compared with usual care in frail older adults shows a 35% reduction in the risk of a serious ADRs and a substantial reduction in unnecessary and inappropriate drug use.

    Schmader K et al. Am J Med. 2004; 116:394-401.

THM: Conclusions (cont.)

- Most of the available research is focused on a single intervention targeting either clinical or pharmacological factors causing ADR.

- When these approaches were combined- as for studies assessing the efficacy of an intervention based on experienced pharmacists performing medication review in the context of a multidisciplinary team- positive effects on patients' health outcomes were shown.

- Safe drug use goes along with global assessment of patients clinical and functional parameters and that integration of skills from different health care professionals is needed to address medical complexity of older adults.

- The challenge for future research is to integrate valuable information obtained by existing instruments and methodologies in a complete and global approach targeting all potential factors involved in the onset of ADR.

COLLABORATIVE CARE

- Multidisciplinary teams
  - Geriatric medicine services/CGA
- Collaboration with
  - General practitioners
  - Clinical pharmacists
  - Nurses
- Collaboration with the patient
  - Computerized support
  - Educational approaches