Clinical services with benefits: medicines optimisation

Workshop

EAHP conference

16-18 March 2016

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Conflict of interest:

We have nothing to disclose

eahp
european association of hospital pharmacists

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Goals for the workshop

Teaching goals

1. To introduce methods used in medicines optimisation
2. To discuss the effects of medicines optimisation and how to measure these effects
3. To show the advantages and disadvantages of applying these different tools

Learning objectives

After the workshop the participant should be able to:

- describe medicines optimisation and its effects
- evaluate different tools used in medicines optimisation

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1. **Are you able to describe what medicines optimisation is and why it should be done?** YES / NO
2. **Can you describe why a medication reconciliation should be performed?** YES / NO
3. **Can you mention two tools used for evaluation of the quality of prescribing?** YES / NO

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Outline of workshop

Brief introduction

Medication reconciliation
- the what´s, why´s, when´s, who´s and how´s
- practical example

Medication review
- to perform a medication review
- to assess the effects of a medication review

Discussion & summary

5

Medicines optimisation

"A **person-centered** approach to **safe and effective medicines use**, to ensure people obtain **the best possible outcomes from their medicines**."

NICE guidelines, March 2015

- When used correctly, medicines prevent and treat illness and increase survival
- However, wrong or inappropriate use of medications is common
- Inappropriate use can result in inadequate effect of the drug or cause adverse drug reactions
- Adverse drug reactions are the main cause of up to 25 % of hospital admissions

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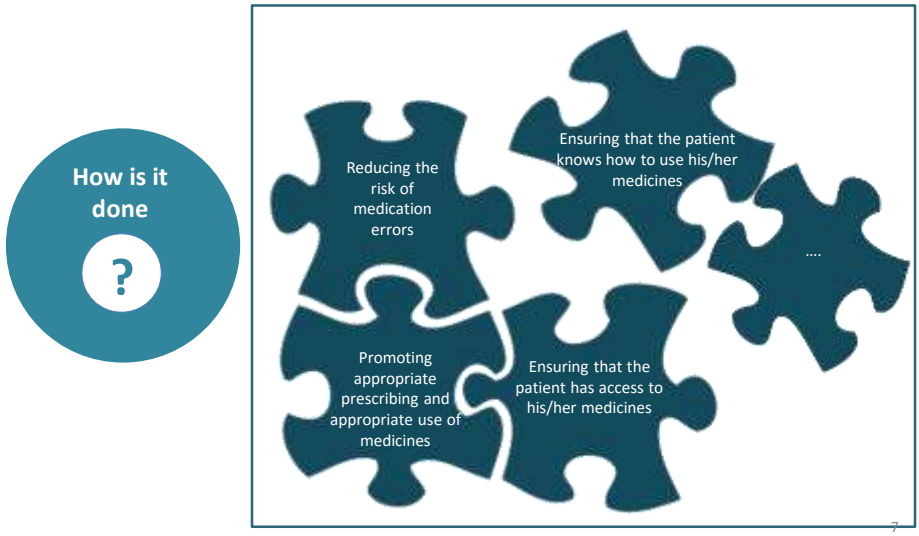
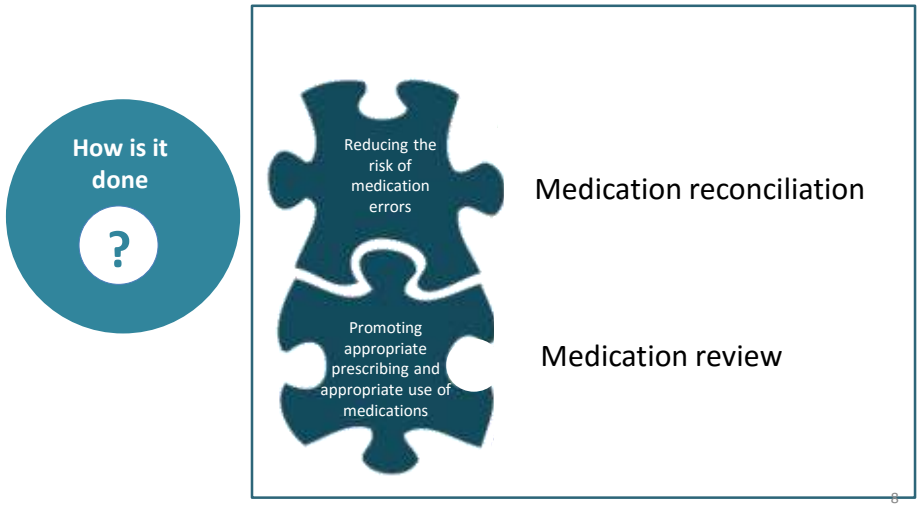
"A person-centered approach to safe and effective medicines use, to ensure people obtain the best possible outcomes from their medicines."



Today we are going to focus on two of the tools for medicines optimisation



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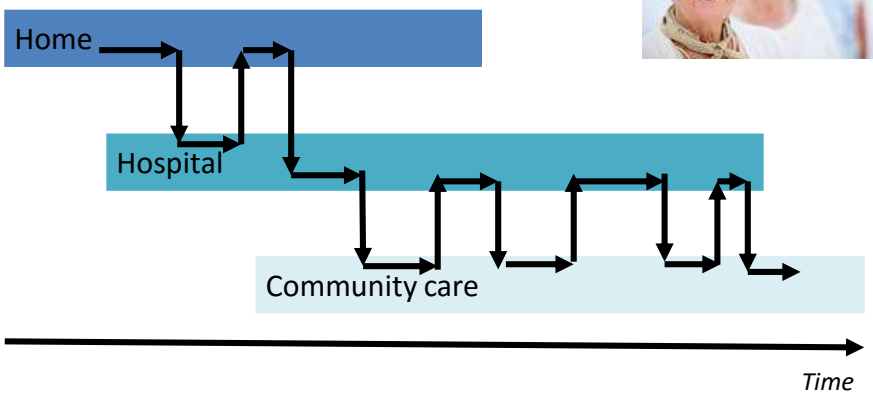
Discussion & summary

9

A patient typically moves in-between different levels of health-care



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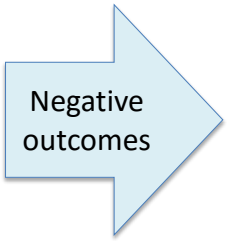
Many medication lists are not in accordance with what patients are actually taking

40-85%



Inappropriate use

Adverse drug reactions

Suboptimal drug therapy

Prolonged hospitalisation

Re-hospitalisations

Deaths

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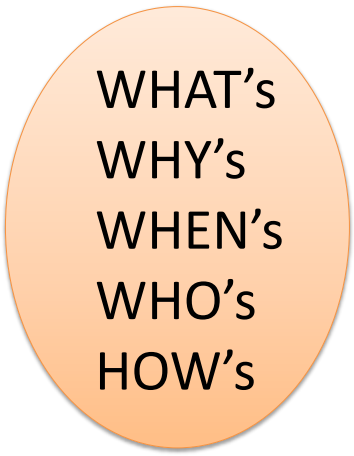
Medication reconciliation



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Medication reconciliation – definition

«The process of creating the most accurate list possible of all medications a patient is taking — including drug name, dosage, frequency, and route — and comparing that list against the physician's admission, transfer, and/or discharge orders, with the goal of providing correct medications to the patient at all transition points within the hospital»

International Healthcare Institute (IHI)

http://www.ihi.org/topics/adesmedicationreconciliation/Pages/default.aspx

Medication reconciliation – definition

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WHAT's

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1

2

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WHAT's

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GOAL

WHY's

Providing correct medications to the patient

Effectiveness
Safety
Quality of life
Economy

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WHY's

Correct medication lists at discharge	34%	->	**64%**
Hospital contacts due to wrong medications	8.9%	->	**4.5%**
Re-hospitalizations due to drug-related problems			**60-80%**

Midlöv et al. Pharm World Sci 2008 Jan;30(1):92-8
Hellstrom et al. Eur J Clin Pharmacol 2011 Feb 12

Northern Health and Social Care Trust

Reduction of errors in drug history at admission	**4.2** per patient
Reduction of length of stay	**2 days**
Increased time to readmission	**20 days**

Scullin et al. Journal of Clinical Evaluation 13, 781-8 (2007)

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WHY's

WHAT CAN GO WRONG?

Anything & Everything

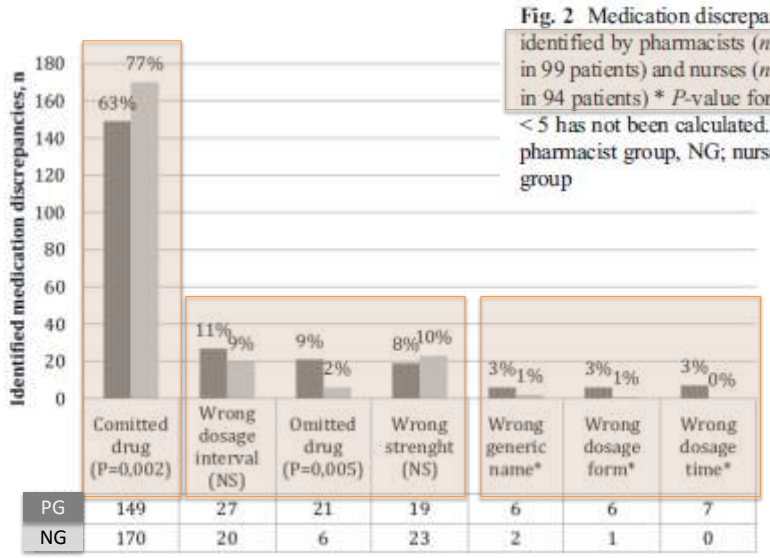

Fig. 2 Medication discrepancies identified by pharmacists (n=235 in 99 patients) and nurses (n=222 in 94 patients) * P-value for cells < 5 has not been calculated. PG; pharmacist group, NG; nurse group

Aag T, Garcia BH, Viktil K
Eur J Clin Pharmacol (2014) 70:1325–1332

WHEN's

Medicine Reconciliation
A Practice Guide

NHS Cumbria

When should it happen?

Medicines should be reconciled at the transfer of care between different settings
e.g. hospital admission (planned and emergency)
hospital discharge
Movement between settings step up step down and ward/department transfer
Entry into residential/nursing care

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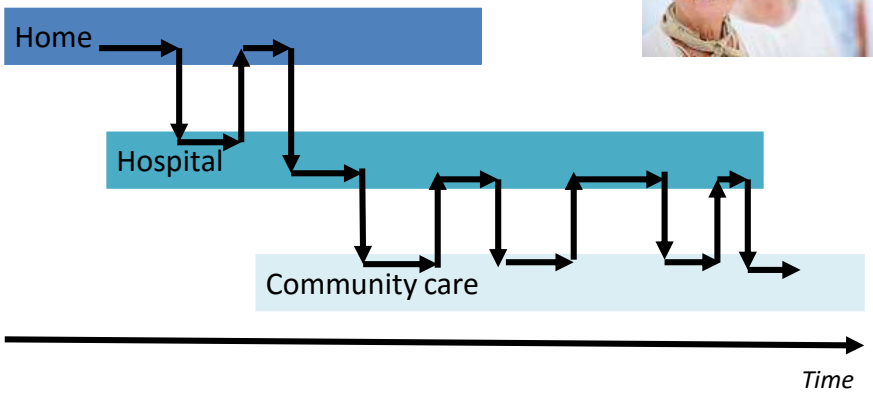
A patient typically moves in-between different levels of health-care



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WHEN's

Medicine Reconciliation
A Practice Guide

NHS Cumbria

When should it happen?

Medicines should be reconciled at the transfer of care between different settings
e.g. hospital admission (planned and emergency)
hospital discharge
Movement between settings step up step down and ward/department transfer
Entry into residential/nursing care

1.3.1 In an acute setting, accurately list all of the person's medicines (including prescribed, over-the-counter and complementary medicines) and carry out medicines reconciliation within 24 hours or sooner if clinically necessary, when the person moves from one care setting to another – for example, if they are admitted to hospital.

NICE guideline
Published: 4 March 2015
nice.org.uk/guidance/ng5

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WHO's

Medicine Reconciliatio
A Practice Guide

NHS Cumbria

Who Should Carry Out Medicine Reconciliation?

The responsibility for medicine reconciliation rests with all individuals involved with the transfer of care between different settings.


Pharmacist


Physician


Nurse


Pharmacist technician

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WHO's

Medicines optimisation: the safe and effective use of medicines to enable the best possible outcomes

NICE guideline
Published: 4 March 2015
nice.org.uk/guidance/ng5

1.3.5 Organisations should ensure that medicines reconciliation is carried out by a trained and competent health professional – ideally a pharmacist, pharmacy technician, nurse or doctor – with the necessary knowledge, skills and expertise including:

Therapeutic Knowledge

Medicine Management

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HOW's

METHODOLOGY

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Example from the LIMM model

INTEGRATED
MEDICINES
MANAGEMENT

Northern Health and Social Care Trust

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Top of Medication reconciliation form – LIMM model

Department	Bed	Name	Date of birth

Medication reconciliation form (Integrated Medicine

Inkl.nr:	Rnd.nr:	Gender	Age	☐ Interview ☐ AL	Performed (date, signat

Patient administers medication him/herself
☐Y ☐N ☐Partly

Multidosage disepensed drugs?
☐ N ☐ Y, date _____
Pill organizer from home-care service: ☐N ☐Y

Dosages*

Date IN	Medication, adm. Form, strenght	Dosage	Comments	Discontinuation date	P	Ph
->	Metoprolol, depot, 100 mg	1-0-0-0	P: Not sure about dosage Ph: 50 mg		1-0-0-0	1-0-0-0

*Information from: patient (P), next of kin (NK), general practitioner (GP), specialist (S), Community health care (CH), multidosage dispensing pharmacy (M), Pharmacy system (PS), electronic patient journal (EPJ)

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Patient knowledge and adherence is also identified and documented

Patient administers medication him/herself
☐Y ☐N ☐Partly

Date IN	Medication, adm. Form, strenght	Dosage	Problem (x) No problem (✓) Indication	Adherence
->	Metoprolol, depot, 100 mg	1-0-0-0	V	X

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Bottom of Medication reconciliation form – LIMM model

Information from patient record:
Reason for admission:

Previous diseases:

Social information:

Are you taking any other drugs? ☐ pain ☐ heart ☐ stomach ☐ diabetes ☐ ostoporosis ☐ sleep/anxiety ☐ Eye-/eardrops/nasal spray ☐ inhalation drugs ☐ injections ☐ cream/patches ☐ suppositories/vagitories ☐ con prostata/potency ☐ OTC drugs ☐ natural remedies or supplements ☐ drugs taken every week/month/year ☐ dis relation to admission

Problems handling medicines? ☐ swollowing; crushing/parting/opening ☐ get the drug out of package ☐ inh taking drug

Adverse reactions? ☐ **Allergies?** ☐

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Discussion & summary

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Mary
87 years old

Diagnoses: Systolic heart failure, atrial fibrillation

Problems with: Unsteadiness, irritated skin, fatigue, sleeping difficulties, shortness of breath.

Renal function: 70 ml/min, S-digoxin: 0.6 nmol/L. BP 120/60, HR 60/min

Case work – medication reconciliation
Instructions
1. Use the medication list & tool in front of you
2. Listen to the interview
3. Note discrepancies between the medication list and what the patient tells the pharmacist
4. Summary – which discrepancies did you identify?

Medication list (before medication reconciliation)

Lisinopril tab	5 mg	1 morning
Metoprolol PR tab	50 mg	1 morning
Digoxin tab	0,25 mg	1 morning
Warfarin tab	2,5 mg	as indicated in list
Zopiclone tab	10 mg	1 evening
Furosemide tab	40 mg	1 morning

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What did you identify?

Was the medication list we started out with correct?

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Department	Bed	Name: MARV	Date of birth: 1929

Medication reconciliation form (Integrated Medicines Management)

Inkl.nr:	Rad.nr:	Gender	Age	☐ Patient interview ☐ Only other sources	Performed (date, signature)

Patient administers medication him/herself: ☑ Y ☐ N ☐ Partly

Multidosage dispensed drugs? ☑ N ☐ Y, date _____

Pill organizer from home-care service: ☑ N ☐ Y

Date IN	Medication, adm. form, strength	Dosage	Comments	Discontinuation date	Dosages*			Problem (x) No problem (✓)	
					P			Indication	Adverse
->	Lisinopril, tab, 5 mg	1-0-0-0			—				
->	Metoprolol, PR tab, 50 mg	1-0-0-0			1x1			✓	✓
->	Digoxin, tab. 0,25 mg	1-0-0-0	P: at lunch time		0-½-0			✓	✓
->	Warfarin, tab, 2,5 mg	As indicated on the list			1x1			✓	✓
->	Zopiclone, tab, 10 mg	0-0-0-1	P: never used		—				
->	Furosemide, tab, 40 mg	1-0-0-0	P: Stopped		—				
->	Nitrazepam, tab, 5mg		P: almost every night		1 prn			✓	✓ but.
->	Omeprazol, tab, 20mg		P: since dec. '15		1x1			✓	✓
->	Canderm cream 5%		P: inlps. Every 2nd week.		prn			✓	✓

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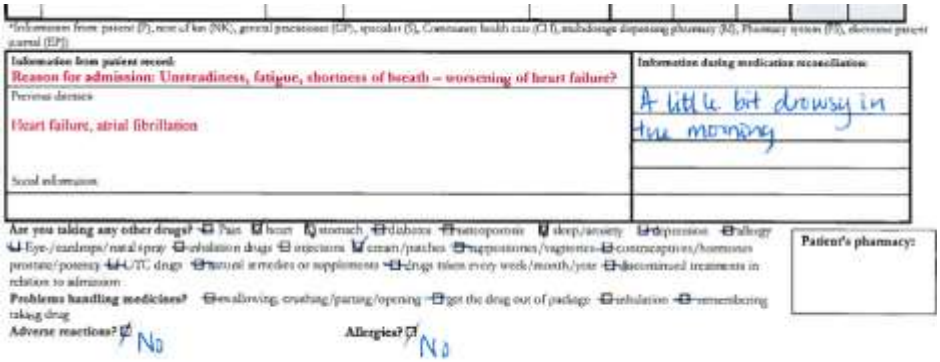

*Information from patient (P), next of kin (NK), general practitioner (GP), specialist (S), Community health care (CH), multidosage dispensing pharmacy (M), Pharmacy system (PS), electronic patient journal (EPJ)

Information from patient record:	Information during medication reconciliation:
Reason for admission: Unreadiness, fatigue, shortness of breath – worsening of heart failure?	
Previous diseases Heart failure, atrial fibrillation	A little bit drowsy in the morning
Social information	

Are you taking any other drugs? ☐ Pain ☑ heart ☐ stomach ☐ diabetes ☐ osteoporosis ☑ sleep/anxiety ☐ depression ☐ allergy ☐ Eye-/eardrops/nasal spray ☐ nebulation drugs ☐ injections ☑ cream/patches ☐ suppositories/vaginetics ☐ contraceptives/hormones prostate/potency ☐ OTC drugs ☐ natural remedies or supplements ☐ drugs taken every week/month/year ☐ discontinued treatments in relation to admission

Problems handling medicines? ☐ swallowing, crushing/parting/opening ☐ get the drug out of package ☐ nebulation ☐ remembering taking drug

Adverse reactions? ☑ No

Allergies? ☑ No

Patient's pharmacy:

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Outline of workshop

Brief introduction

Medication reconciliation

* practical example

Medication review

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- to assess the effects of a medication review

Discussion & summary

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The medication review aims to optimize the prescribing of medicines and the use of prescribed medicines

For each patient, ask…

✓ **Indication?**	• Is there an indication for each drug? • Are there any untreated indications?
✓ **Effect?**	• Is each drug effective for the condition? • Are the dosages correct (or too low)?
✓ **Safety?**	• Are there any drug-drug interactions or drug-disease interactions? • Does the patient have any adverse drug reaction(s)? • Are the doses correct (or too high)?
✓ **Compliance?**	• Does the patient know how to use the drugs correctly? • Is the patient able to use the drugs correctly?

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Mary

87 years old

Diagnoses: Systolic heart failure, atrial fibrillation

Problems with: Unsteadiness, irritated skin, fatigue, sleeping difficulties, shortness of breath.

Renal function: 70 ml/min, S-digoxin: 0.6 nmol/L. BP 120/60, HR 60/min

Case work: Medication review

Instructions

1. Work in groups of two or three
2. Perfom a medication review by using the information you have about Mary (and the checklist on the handout)

Medication list (before medication review)

T. Warfarin	2,5 mg	*as indicated on the list*
T. Digoxin	0,125 mg	1x1 (*at lunch time)*
T. Omeprazole	20 mg	1x1 *(since Dec 2015)*
T. Metoprolol	50 mg	1x1
T. Nitrazepam	5 mg	1x1 prn
Cream Canoderm	5 %	*when needed*

37

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T. Metoprolol	50 mg	1x1
T. Nitrazepam	5 mg	1x1 prn
Cream Canoderm 5 %		*when needed*

Medication list (after medication review)

T. Warfarin	2,5 mg	*as indicated on the list*
T. Digoxin	0,125 mg	1x1 (*in the morning)*
~~T. Omeprazole~~	~~20 mg~~	1x1 *(since Dec 2015)*
T. Metoprolol	50 mg	1x1
~~T. Nitrazepam~~	~~5 mg~~	1x1 prn
Cream Canoderm 5 %		*when needed*
Enalapril	*5 mg*	*1x1*

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The benefit of the medication review can be evaluated by assessing the quality of prescribing

- Frequency of ”drug-related problems”

- Standardized and validated tools:
  - ”Implicit”, judgement-based criteria
    - Medication Appropriateness Index (MAI)

  - ”Explicit”, checklist-based criteria
    - Eg. Beers’ criteria, PRISCUS, STOPP & START, …

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Medication Appropriateness Index (MAI)

- Ten questions about each drug
- When an answer indicates inappropriateness, a score is assigned
- Scores are weighted and summated

1. Is there an indication for the drug?
2. Is the medication effective for the condition?
3. Is the dosage correct?
4. Are the directions correct?
5. Are the directions practical?
6. Are there clinically significant drug-drug interactions?
7. Are there clinically significant drug-disease/condition interactions?
8. Is there unnecessary duplication with other drug(s)?
9. Is the duration of therapy acceptable?
10. Is this drug the least expensive alternative compared to others of equal utility?

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The STOPP and START criteria

- Checklist-based criteria
- Based on literature review and expert opinion
- Can be used as a tool for evaluation of prescribed medications but also when performing medication reviews

- STOPP: Screening Tool Of Older People's potentially inappropriate Prescriptions
  - 80 criteria
- START: Screening Tool to Alert doctors to Right (i.e. appropriate, indicated) Treatment
  - 34 criteria

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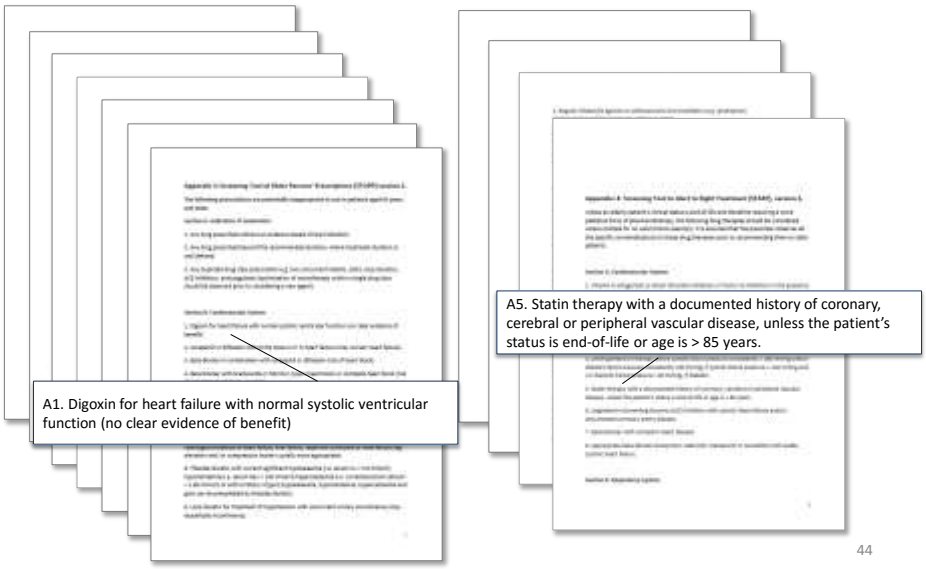
The STOPP and START criteria



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Medication list

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T. Metoprolol	50 mg	1x1
T. Nitrazepam	5 mg	1x1 prn
Cream Canoderm 5 %		*when needed*

45

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Cream Canoderm 5 %		*when needed*

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~~T. Nitrazepam~~	~~5 mg~~	1x1 prn
Cream Canoderm 5 %		*when needed*
Enalapril	*5 mg*	*1x1*

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Mary

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MAI assessment

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Cream Canoderm 5 %		*when needed*

1	2	3	4	5	6	7	8	9	10
				1					
3								1	1
						2			

= 8

1. Indication?
2. Effectiveness?
3. Dosage correct?
4. Directions correct?
5. Directions practical?
6. Drug-drug interactions?
7. Drug-disease interactions?
8. Unnecessary duplication?
9. Duration of therapy acceptable?
10. Cost-effectiveness?

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~~T. Nitrazepam~~	~~5 mg~~	~~1x1 prn~~
Cream Canoderm 5 %		*when needed*
Enalapril	5 mg	1x1

1	2	3	4	5	6	7	8	9	10
				~~1~~					
~~3~~								~~1~~	~~1~~
						~~2~~			

= 0

1. Indication?
2. Effectiveness?
3. Dosage correct?
4. Directions correct?
5. Directions practical?
6. Drug-drug interactions?
7. Drug-disease interactions?
8. Unnecessary duplication?
9. Duration of therapy acceptable?
10. Cost-effectiveness?

Mary STOPP/START assessment

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Cream Canoderm 5 %		*when needed*

STOPP	START
1 (A1)	
1 (D5 or K1)	
	1 (A6)

A1: Any drug prescribed without an evidence-based clinical indication

D5: Bensodiazepines for ≥ 4 weeks

K1: Drugs that predictably increase the risk of falls in older people: Bensodiazepines

A6: ACE-inhibitor with systolic heart failure and/or documented coronary artery disease

= 3

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Mary STOPP/START assessment

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T. Metoprolol	50 mg	1x1
~~T. Nitrazepam~~	~~5 mg~~	~~1x1 prn~~
Cream Canoderm 5 %		*when needed*
Enalapril	5 mg	1x1

STOPP	START
~~1~~	
~~1~~	
	~~1~~

= 0

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PLOS ONE

Effects of Pharmacists' Interventions on Appropriateness of Prescribing and Evaluation of the Instruments' (MAI, STOPP and STARTs') Ability to Predict Hospitalization—Analyses from a Randomized Controlled Trial

Ulrika Gillespie[1]*, Anna Alassaad[2], Margareta Hammarlund-Udenaes[1], Claes Mörlin[3], Dan Henrohn[4,2], Maria Bertilsson[5], Håkan Melhus[3]

1 Division of Pharmacokinetics and Drug Therapy, Department of Pharmaceutical Biosciences, Uppsala University and Uppsala University Hospital, Uppsala, Sweden, 2 Department of Medical Sciences, Uppsala University and Uppsala University Hospital, Uppsala, Sweden, 3 Department of Medicine, Uppsala University Hospital, Uppsala, Sweden, 4 Medical Products Agency, Uppsala, Sweden, 5 Uppsala Clinical Research Center, Uppsala, Sweden

Table 2. Scores on admission and at discharge and change from admission.

Instrument		Intervention group (n = 182)			Control group (n = 186)			p-value
		Admission	Discharge	Change from admission[a]	Admission	Discharge	Change from admission[a]	
MAI[b]	Mean (SD)	6.5 (6.0)	5.0 (4.2)	−1.5 (3.1)	6.7 (7.3)	10.0 (7.3)	1.3 (5.1)	p<0.001
	Median (Min, Max)	6 (0–33)	5 (0–20)	−2 (−26–8)	7 (0–34)	8.5 (0–42)	0 (−7–12)	
STOPP[c]	Mean (SD)	1.4 (1.5)	0.9 (1.0)	−0.5 (1.0)	1.5 (1.5)	1.7 (1.5)	0.2 (0.7)	p<0.001
	Median (Min, Max)	1 (0–7)	1 (0–5)	0 (−4–3)	1 (0–7)	1 (0–8)	0 (−3–3)	
START[d]	Mean (SD)	0.4 (0.7)	0.7 (0.3)	0.3 (0.6)	0.4 (0.7)	0.5 (0.7)	0.10.4)	p<0.001
	Median (Min, Max)	0 (0–4)	0 (0–2)	0 (−4–0)	0 (0–3)	0 (0–3)	0 (−3–2)	

SD, Standard deviation.
[a]Summated MAI score per patient.
[b]Number of PIMs per patient.
[c]Number of PPOs per patient.
[d]Change from admission calculated as Score at discharge-Score on admission.
[e]p-values from rank analysis of covariance for the effect of group status (Intervention or Control) on change from admission, adjusted for the score on admission.

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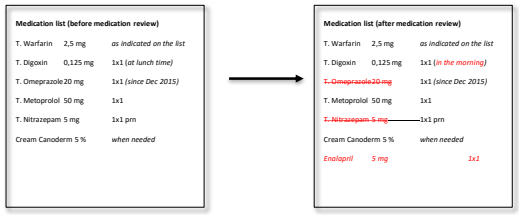
- The clinical pharmacist intervention improved the quality of prescribing, as measured with MAI, STOPP and START

Pros and cons with the tools for appropriate prescribing

	Implicit (judgement-based)	**Explicit (criterion-based)**
+	• Focus on the individual patient and are judgement-based and therefore more sensitive • … • …	• Are easy to use • Are not dependent on the experience and knowledge of the user • Can be applied to large quantities of patients • …
−	• Are time-consuming • Require access to more extensive information about the patient	• Don´t account for the presence of co-morbidities or patient preferences • The inclusion of drugs/criteria can be subject for controversy • Need to be continuously updated • …

Are tools for evaluating appropriate prescribing associated with clinical outcomes?

Is a high quality of prescribing…



… linked to positive clinical outcomes?

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Relationship between appropriate prescribing and clinical outcome

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PLOS

Effects of Pharmacists' Interventions on Appropriateness of Prescribing and Evaluation of the Instruments' (MAI, STOPP and STARTs') Ability to Predict Hospitalization—Analyses from a Randomized Controlled Trial

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Table 3. Effect of MAI, START, STOPP on number of total visits to hospital, number of readmissions and number of drug-related readmissions (N = 368).

	Number of total visits to hospital	Number of readmissions	Number of drug-related readmissions
Model*	IRR (95% CI)*	IRR (95% CI)*	IRR (95% CI)*
MAI			
Unadjusted	1.02 (1.00–1.03), p = 0.051	1.02 (1.00–1.04), p = 0.03	1.08 (1.03–1.13), p = 0.001
Adjusted	1.02 (1.00–1.03), p = 0.055	1.02 (1.00–1.04), p = 0.069	1.09 (1.04–1.14), p = 0.001
STOPP			
Unadjusted	1.05 (0.97–1.14), p = 0.24	1.08 (0.99–1.19), p = 0.07	1.30 (1.15–1.50), p < 0.05
Adjusted	1.05 (0.97–1.15), p = 0.23	1.08 (0.97–1.20), p = 0.20	1.34 (1.20–1.50), p < 0.05
START			
Unadjusted	1.03 (0.97–1.08), p = 0.40	1.17 (0.99–1.44), p = 0.06	1.49 (0.92–2.39), p = 0.10
Adjusted	1.09 (0.90–1.32), p = 0.39	1.16 (0.95–1.42), p = 0.14	1.49 (0.91–2.45), p = 0.11

*Negative binomial regressions. Adjusted models include age, gender, weight, social support and medical history.
*IRR, Rate ratio; CI, Confidence interval.
doi:10.1371/journal.pone.0062401.t003

- High MAI and STOPP scores at discharge were associated with a higher number of drug-related readmissions
- No statistically significant relationship was found between the scores and the total number of re-visits to hospital

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Outline of workshop

Brief introduction

Medication reconciliation
- the what´s, why´s, when´s, who´s and how´s
- practical example

Medication review
- to perform a medication review
- to assess the effects of a medication review

Discussion & summary

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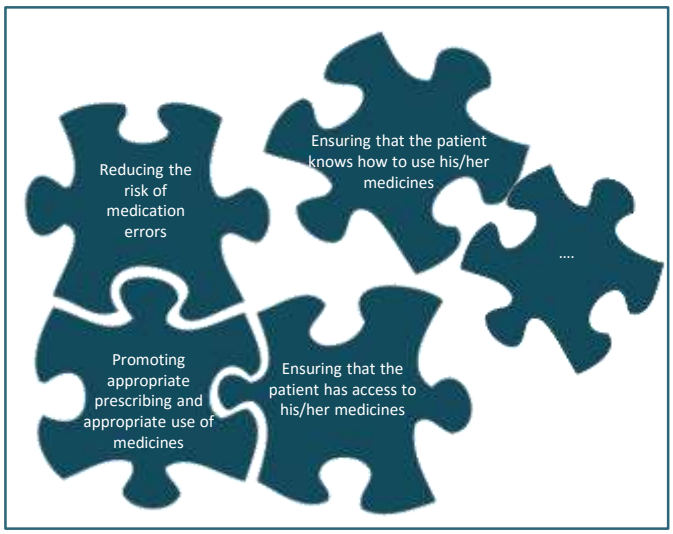
Medicines optimisation



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NICE guideline
Published: 4 March 2015
nice.org.uk/guidance/ng5

Medicines optimisation: the safe and effective use of medicines to enable the best possible outcomes

Contents

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Goals for the workshop

Teaching goals

1. To introduce methods used in medicines optimisation
2. To discuss the effects of medicines optimisation and how to measure these effects
3. To show the advantages and disadvantages of applying these different tools

Learning objectives

After the workshop the participant should be able to:

- describe medicines optimisation and its effects
- evaluate different tools used in medicines optimisation

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1. **Are you able to describe what medicines optimisation is and why it should be done?** YES / NO

2. **Can you describe why a medication reconciliation should be performed?** YES / NO

3. **Can you mention two tools used for evaluation of the quality of prescribing?** YES / NO

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Enjoy your congress !

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