Workshop - Check of Medication Appropriateness (CMA): an instrument to implement guidelines in practice

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UZ LEUVEN

Disclosure

Relevant Financial Relationship

None

Off-Label Investigational Uses

None

Interactive workshop

- Anonymous poll system
- Join us via

PollEv.com/thomasdr

Select the country where you work

Learning objectives

- Understand how a CMA program works based on a case-based approach
- Understand how to set up a CMA program in your own hospital
- Understand how to prioritize the clinical rules covered by CMA

- Understand how to integrate evidence based guidelines in CMA

Content

Introduction

- Clinical pharmacy in general
- Clinical validation in general
- Clinical validation in University Hospitals Leuven

Clinical practice: how to start?

- Conditions
- Clinical input
- Impact

Advanced CMA on a case-based approach

- How to integrate evidence-based guidelines?
- How to build your own algorithms?

Introduction

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- How to build your own algorithms?

Introduction: clinical pharmacy in general

- Shift in healthcare services
- USA/Canada/UK/Australia…:
  - Bedside clinical pharmacy implemented on all wards
- Limited resources in Belgian hospitals:
  - Only bedside clinical pharmacy on high risk wards

How many full-time working (FTE) pharmacists are employed in your hospital pharmacy?

< 1 FTE/ 100 BEDS

1 FTE / 100 BEDS

2 FTE / 100 BEDS

> 2 FTE / 100 BEDS

How many FTE's are available for clinical pharmacy?

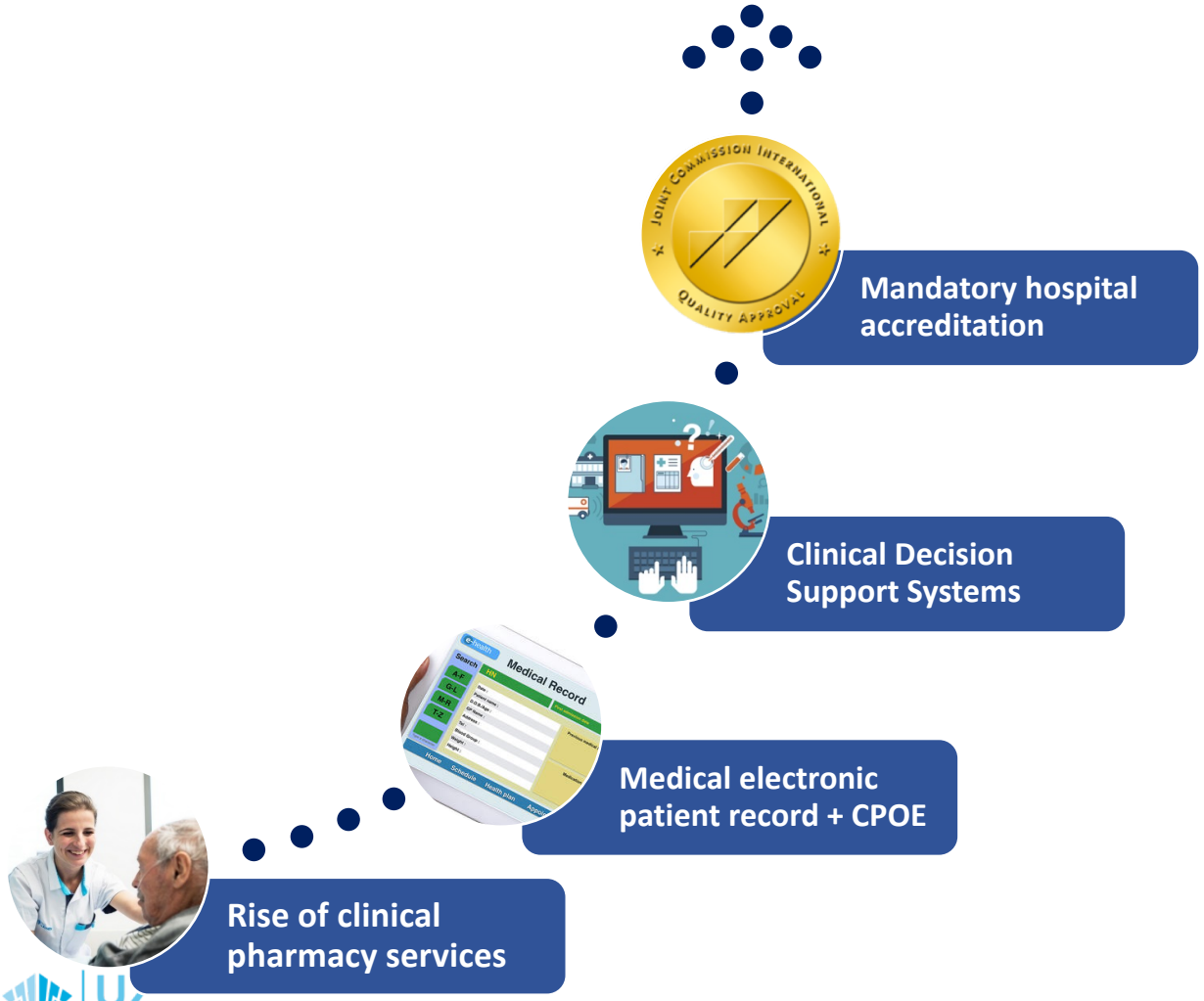
< 1 FTE/
200 BEDS

1 FTE /
200 BEDS

1 FTE /
300 BEDS

> 1 FTE /
300 BEDS

Introduction: clinical validation in general



Check of Medication Appropriateness

=

Clinical validation of prescriptions

➔ ***BACK OFFICE CLINICAL PHARMACY***

Quality + patient safety

How are clinical pharmacy services organized ?

No clinical pharmacy

Only BACK-office clinical pharmacy

Only FRONT-office clinical pharmacy

BACK+FRONT office clinical pharmacy

What kind of clinical validation are you doing?

No validation	Basic	Intermediate	Advanced
	• Without access to the patient's medical record • Posology	• Limited access to the patient's medical record • Posology, indication, interactions, allergy…	• Full access to the patient's medical record • Indication, interactions, allergy… • (Integrated)

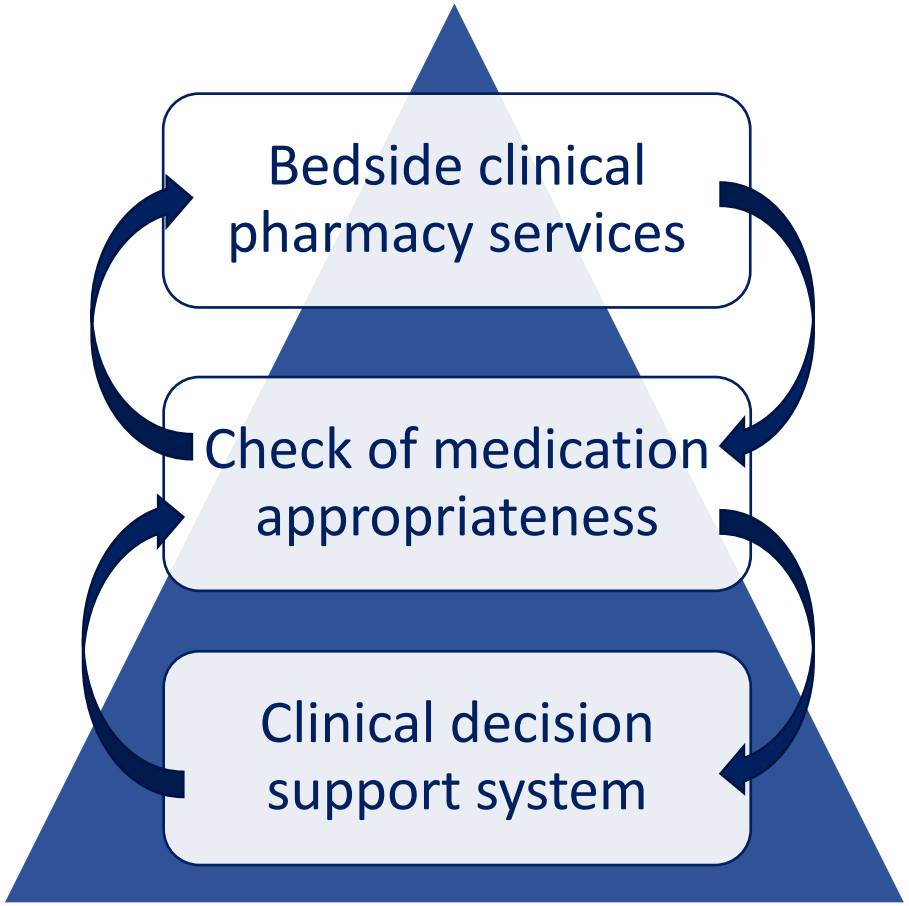
Introduction: clinical validation in University Hospitals Leuven

- Large hospital
  - 2000 beds, 5000 new prescriptions/day
  - 24,5 FTE
- Full medical electronic patient record
  - **CDSS**: drug-drug interactions, allergy, pregnancy, maximum dosage, therapeutic duplication
- **Bedside** clinical pharmacy on high risk wards:
  - Geriatrics
  - Abdominal surgery
  - Trauma surgery
  - Septic orthopedic
  - Pediatrics
- March 2016: **implementation CMA**

Introduction: clinical validation in University Hospitals Leuven

Target group:

1. For all patients potentially at risk for drug related problems
2. Evaluation at any time during hospitalization
3. Evaluation independently of drug dispensing



Introduction: clinical validation in University Hospitals Leuven

Method:

Based on maximum integration of structured data from patient file

Risk analysis to identify high risk prescriptions

Formulating **queries** to screen for high risk prescriptions

Daily screening of all prescriptions generating a worklist

Validation by trained hospital pharmacists using **standardized algorithms**

Interventions via electronic alerts or phone calls

Introduction: clinical validation in University Hospitals Leuven

- **Maximum integration of structured data:**

291 new prescriptions/day for drugs that may elevate K^+ level

1117 K^+ analysis daily

Drugs that can elevate K^+ level

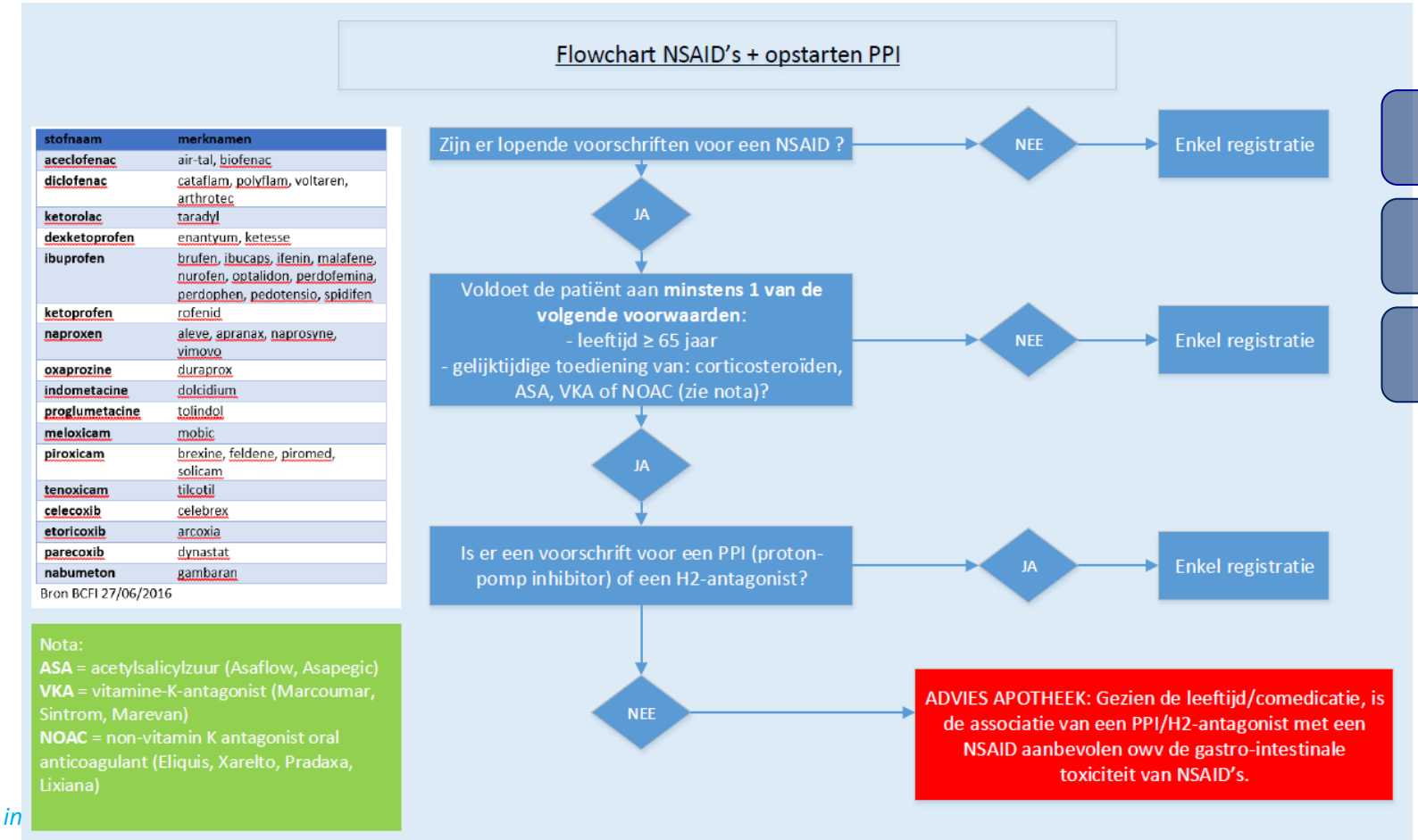
K^+ level > 5.5 mmol/L

Link-KWS	Check	Opvolgnota	gebeld	eadnr	eenheid	Geslach	naam	Leeftijd	kw
ost:12345/s	1	0	0	[redacted]	650	[redacted]	[redacted]	[redacted]	DA
http://local	1	0	0	[redacted]	467	[redacted]	[redacted]	[redacted]	MI
http://local	1	0	0	[redacted]	467	[redacted]	[redacted]	[redacted]	MI
ost:12345/s	1	0	0	[redacted]	650	[redacted]	[redacted]	[redacted]	DA
http://local	1	1	0	[redacted]	305	[redacted]	[redacted]	[redacted]	MI
ost:12345/s	1	1	1	[redacted]	454	[redacted]	[redacted]	[redacted]	RI

Worklist of 7 lines a day to be checked by a hospital pharmacist

Introduction: clinical validation in University Hospitals Leuven

- **Standardized algorithm:**



stofnaam	merknamen
aceclofenac	air-tal, biofenac
diclofenac	cataflam, polyflam, voltaren, arthrotec
ketorolac	taradyl
dexketoprofen	enantyum, ketesse
ibuprofen	brufen, ibucaps, ifenin, malafene, nurofen, optalidon, perdofemina, perdophen, pedotensio, spidifen
ketoprofen	rofenid
naproxen	aleve, apranax, naprosyne, vimovo
oxaprozine	duraprox
indometacine	dolcidium
proglumetacine	tolindol
meloxicam	mobic
piroxicam	brexine, feldene, piromed, solicam
tenoxicam	tilcotil
celecoxib	celebrex
etoricoxib	arcoxia
parecoxib	dynastat
nabumeton	gambaran

Bron BCFI 27/06/2016

Nota:
ASA = acetylsalicylzuur (Asaflow, Asapegic)
VKA = vitamine-K-antagonist (Marcoumar, Sintrom, Marevan)
NOAC = non-vitamin K antagonist oral anticoagulant (Eliquis, Xarelto, Pradaxa, Lixiana)

Queries

Uniform, standardized validation

Uniform, standardized advice

Introduction: clinical validation in University Hospitals Leuven

- 79 specific **algorithms** covering **4 pharmacotherapeutic areas**:

Drugs with restrictive indication or dosing

Medication-related biochemical changes

Evaluation of overruled interventions raised by CDSS

Sequential therapy for bio-equivalent drugs

Introduction: clinical validation in University Hospitals Leuven

- **First results (March 2016-September 2017):**

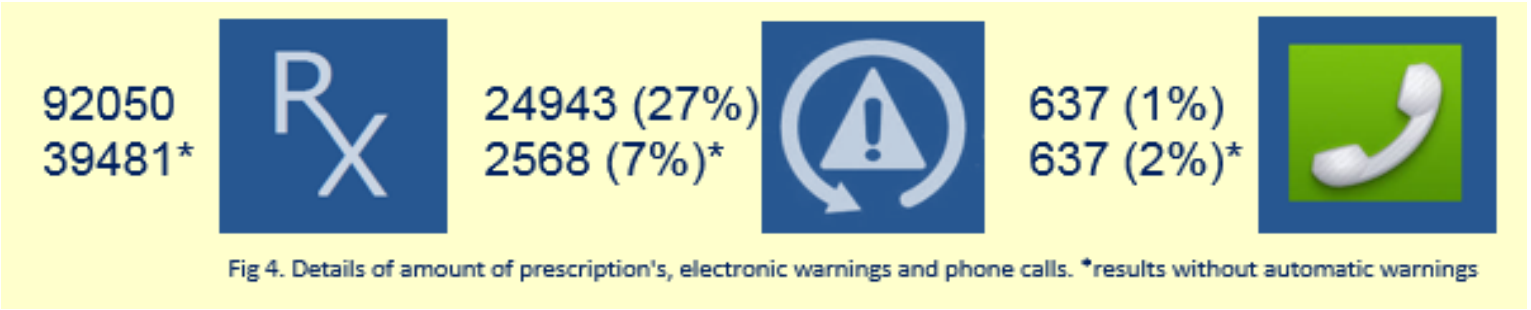


Fig 4. Details of amount of prescription's, electronic warnings and phone calls. *results without automatic warnings

	Number of prescriptions checked (n)	Number of electronic notes (n (%))	Number of electronic notes + phone calls (n(%))
Drug use in renal insufficiency	9,381	444 (4.7%)	81 (0.9%)
Drugs with high potential of QT prolongation	4,223	608 (14.4%)	139 (3.3%)
Drugs with restrictive indication or dosing	5,276	448 (8.5%)	142 (2.7%)
Overruled severe DDIs	18,902	939 (5%)	259 (1.4%)

Introduction: clinical validation in University Hospitals Leuven

Example CMA:

Medication	8-1-2018	9-1-2018	10-1-2018
NaCl 0.9% (1,000 ml VIAFLO) IV	60 ml/uur	60 ml/uur	60 ml/uur
Pantoprazole (tabl 20 mg) oral	20 mg	20 mg	20 mg
Ondansetron (amp IV 4 mg/2 ml) IV	4x 4mg	4x 4mg	
Enoxaparine (20 mg/0.2 ml) SC	20 mg	20 mg	20 mg
Edoxaban (tabl 30 mg) oral	30 mg	30 mg	30 mg
Paracetamol (fl inj 500 mg/50 ml) IV	4x 500 mg	4x 500 mg	4x 500 mg
Haldol (amp inj 5 mg/1 ml) IV	2.5 mg	2.5 mg	2.5 mg
Quetiapine (caps 12.5 mg) oral	12.5 mg	12.5 mg	12.5 mg

Which checks would you do on this prescription?

Medication	8-1-2018
NaCl 0,9% (fl inf 1,000ml VIAFLO) IV-inf	60 ml/uur
Pantoprazole (tabl 20 mg) PO	20 mg
Ondansetron Braun (amp IV 4mg/2ml) IV-bolus	4x 4mg
Enoxaparine (20 mg/0.2ml) SC	20 mg
Edoxaban (tabl 30 mg)	30 mg
Paracetamol (fl inj 500mg/50ml) IV-inf	4x 500 mg
Haldol (amp inj 5 mg/1ml) IV-inf	2.5 mg
Quetiapine (caps 12.5mg)	12.5 mg

Posology

Interactions

IV-PO switch

Contra-indications

Allergy

All checks

Introduction: clinical validation in University Hospitals Leuven

Example CMA:

Medication	8-1-2018	9-1-2018	10-1-2018
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Quetiapine (caps 12.5 mg) oral	12.5 mg	12.5 mg	12.5 mg

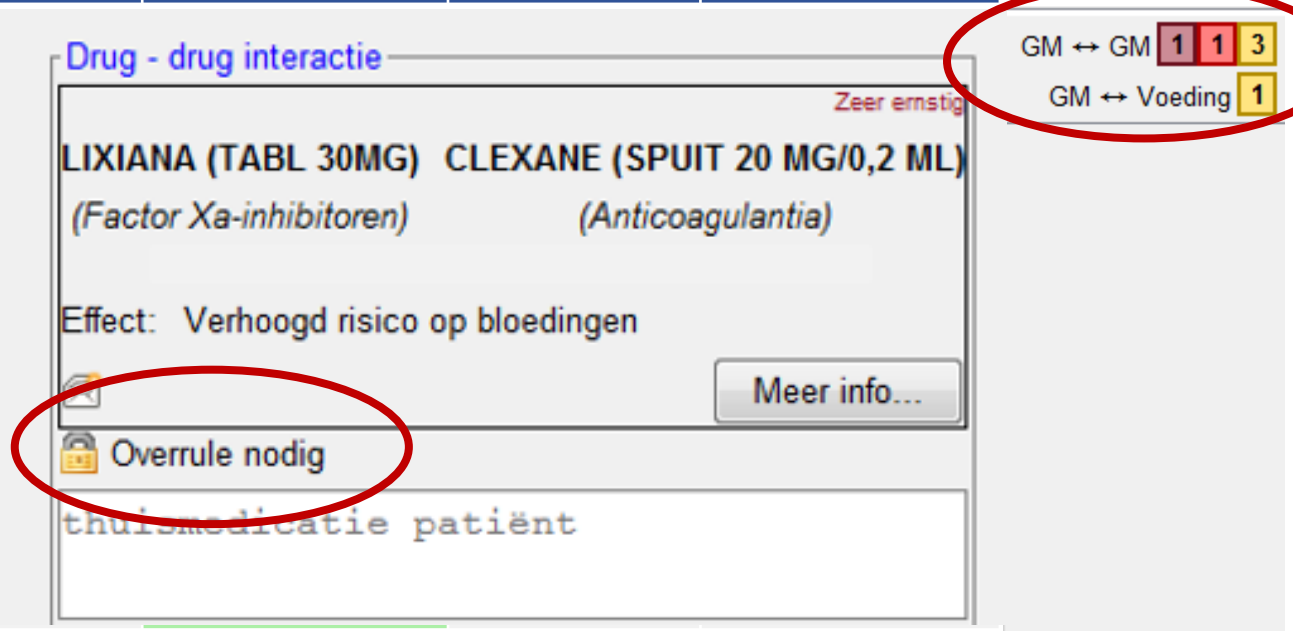
1. Prescription of a very serious drug-drug interaction

Introduction: clinical validation in University Hospitals Leuven

Example CMA:

2. Alert generated by CDSS

Medication	8-1-2018	9-1-2018	10-1-2018
NaCl 0.9% (1,000 ml VIAFLO) IV			
Pantoprazole (tabl 20 mg) oral			
Ondansetron (amp IV 4 mg/2 ml) IV			
Enoxaparine (20 mg/0.2 ml) SC			
Edoxaban (tabl 30 mg) oral			
Paracetamol (fl inj 500 mg/50 ml) IV			
Haldol (amp inj 5 mg/1 ml) IV			
Quetiapine (caps 12.5 mg) oral			



1. Prescription of a very serious interaction

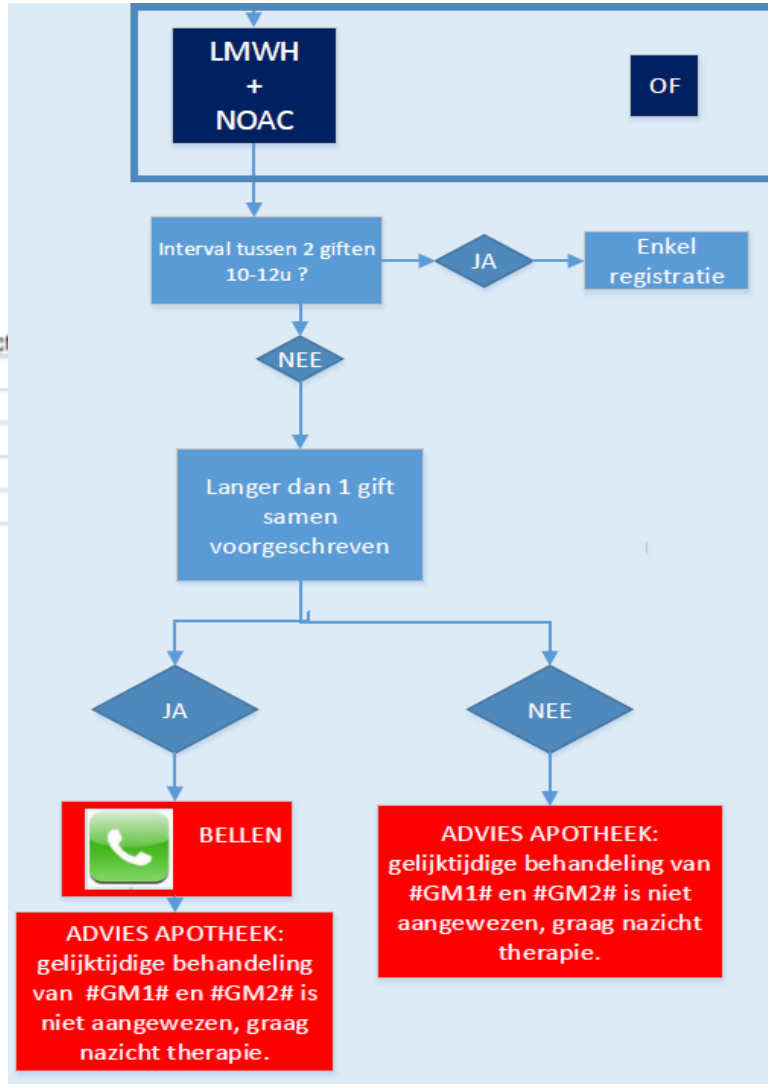
Introduction: clinical validation in University Hospitals Leuven

Example CMA:

- In case of an **overrule** by the treating physician: **listed on the CMA worklist**

1	Link-KWS	Check	Opvolgnota	Opvolgnota-gebeld	eadnr	voorschrijver	sendTime	overruleInteract
32	http://localhost:1234						Jan 8 2018	DRUG_DRUG
33	http://localhost:1234						Jan 8 2018	DRUG_DRUG
34	http://localhost:1234						Jan 9 2018	DRUG_DRUG
35	http://localhost:1234						Jan 8 2018	DRUG_DRUG
36	http://localhost:1234						Jan 9 2018	DRUG_DRUG

- Validation of interaction by the pharmacist based on **specific flowchart**



Introduction: clinical validation in University Hospitals Leuven

Example CMA:

- Call to the treating physician +
  formulating an electronic alert in the patient's medical record

09-01-2018 16:40	TRH	opvolgnota	ADVIES APOTHEEK: gelijktijdige behandeling van Lixiana en Clexane is niet aangewezen, graag nazicht therapie.
09-01-2018 16:40	TRH	opvolgnota	ADVIES APOTHEEK: De dosis van Lixiana wordt aangepast aan patiëntenkarakteristieken (nierfunctie, en/of gewicht). Graag nazicht therapie.

- Result:

Medication	8-1-2018	9-1-2018	10-1-2018
NaCl 0.9% (1,000 ml VIAFLO) IV	60 ml/uur	60 ml/uur	60 ml/uur
Pantoprazole (tabl 20 mg) oral	20 mg	20 mg	20 mg
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Enoxaparine (20 mg/0.2 ml) SC	20 mg	20 mg	20 mg
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Clinical practice: how to start?

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- Clinical input
- Impact

Advanced CMA on a case-based approach

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How to start: conditions

POLICY

IT

TOOLS

How to start: conditions

POLICY

- In relation with **drug dispensing**:

Drug dispensing depending on clinical validation

Validation of drugs before delivery

- Deadline stress
- Low performance
- Missing decentralized drug dispensing

Independent services

- High performance
- Check decentralized drug dispensing

Administration of drugs before validation

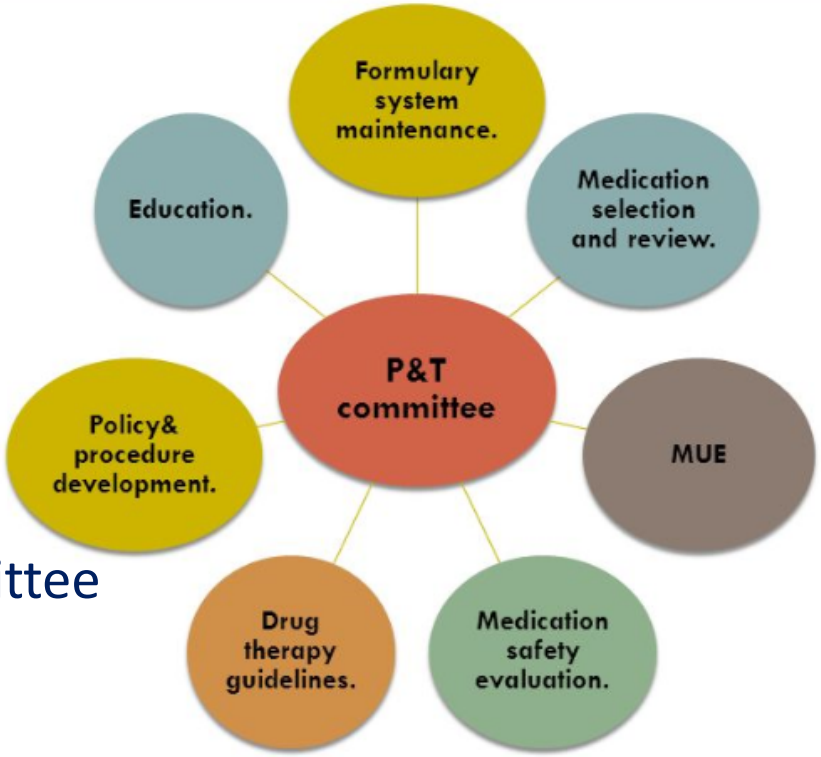
How to start: conditions

POLICY

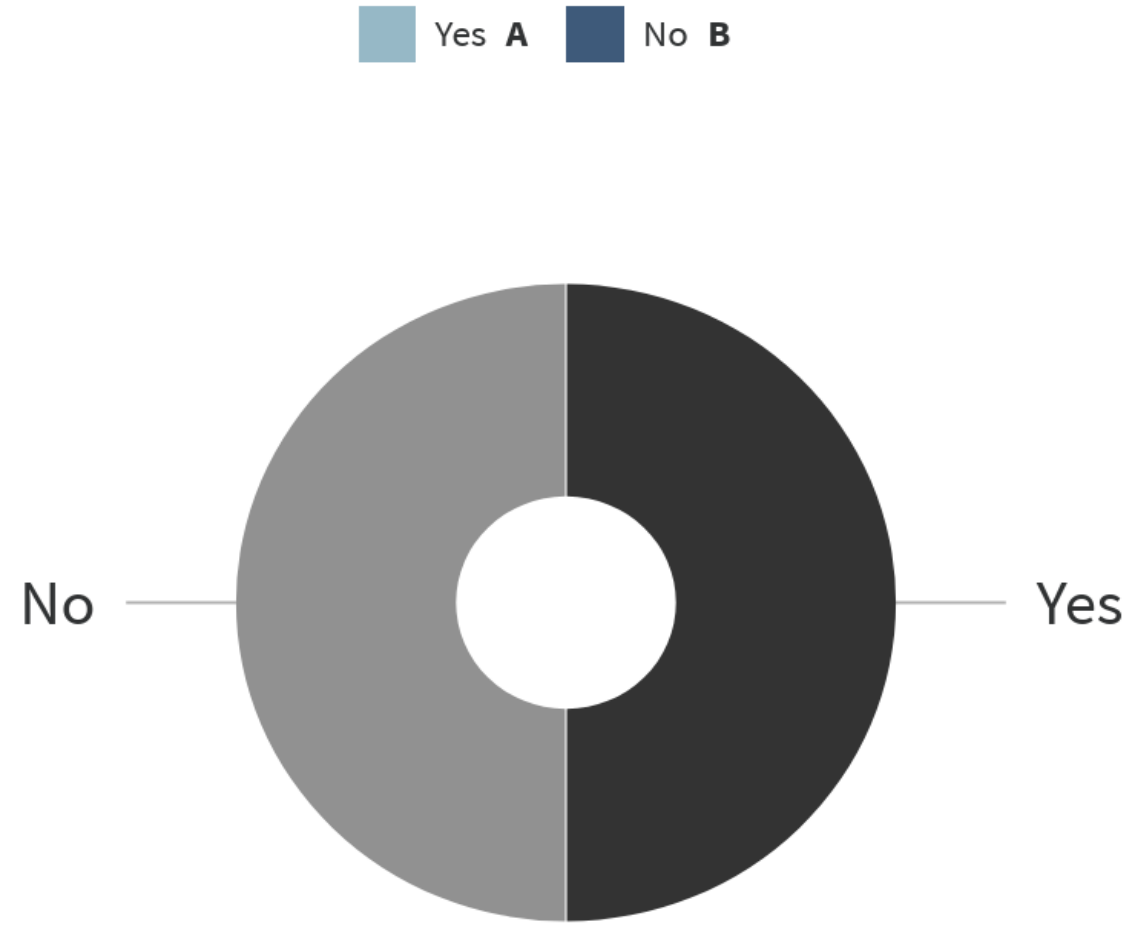
- **Multidisciplinary collaboration**:
  - **Hospital Board**
    - Hospital wide communication – newsletter
    - Reporting results
  - Pharmaceutical and Therapeutics **(P&T) Committee**
    - Identifying high risk prescriptions
    - Validation (of algorithms)
  - Medical **Ethics committee**
    - Law on Patients' Rights
  - **Other committees**: e.g. Antimicrobial stewardship committee

➔ ***Hospital-wide support***

  - Relevant national professional associations
  - Partner Hospitals



Do hospital pharmacists actively participate in committees?



How to start: conditions

POLICY

- **Accreditation:**
  - JCI
  - NIAZ Qmentum

Nederlands Instituut voor Accreditatie in de Zorg

- **Human resources:**
  - How many FTE employing on clinical validation?
  - All hospital pharmacists, or only clinical educated hospital pharmacists?

How many FTE's are employed for clinical validation?

0 FTE

0,5 FTE

0,5-1 FTE

> 1 FTE

How to start: conditions

IT

- **Necessities** to do intermediate/advanced clinical validation:
  - Medical electronic patient record
  - CPOE
- **Added values**
  - Clinical Decision Support Systems (CDSS)
    - (Drug-drug) interactions
    - Maximum doses
    - Drug use during pregnancy/lactation
    - Therapeutic duplication
    - Allergy
    - …
  - Artificial Intelligence

How to start: conditions

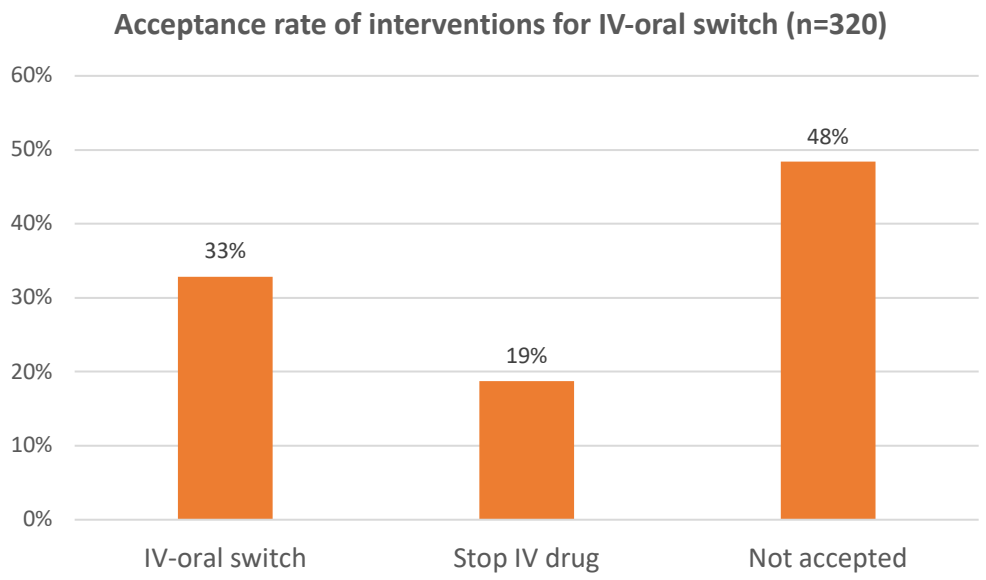
TOOLS

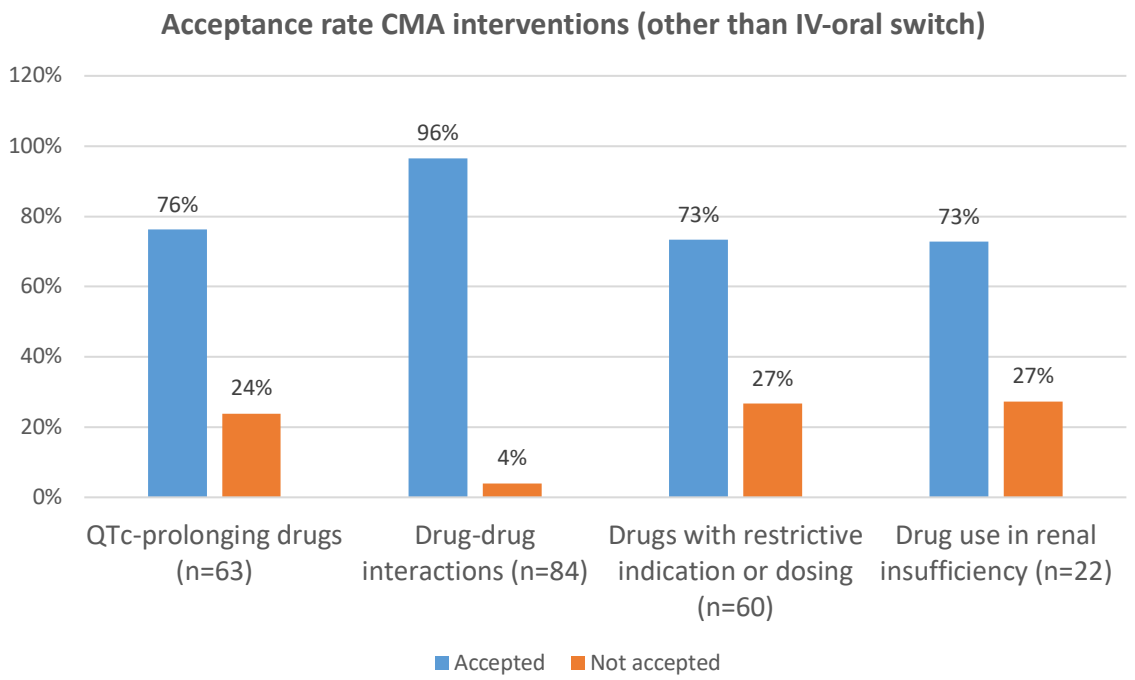
- **Registration of interventions + registration of acceptability**
  - Traceability
  - Documenting clinical service
    - Hospital Board
    - Accreditation
  - Evaluating & optimizing the service

How to start: conditions

TOOLS

- **Acceptance rate**
  - **Preliminary results**





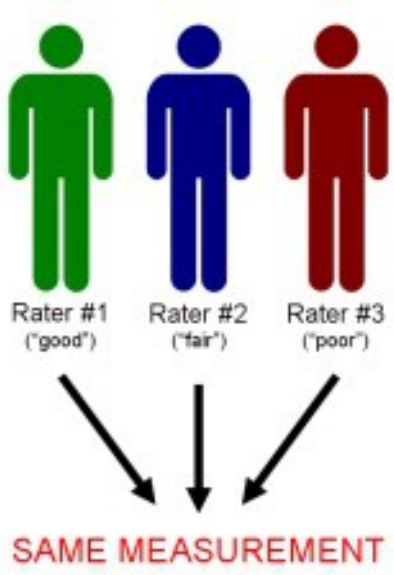
How to start: conditions

TOOLS

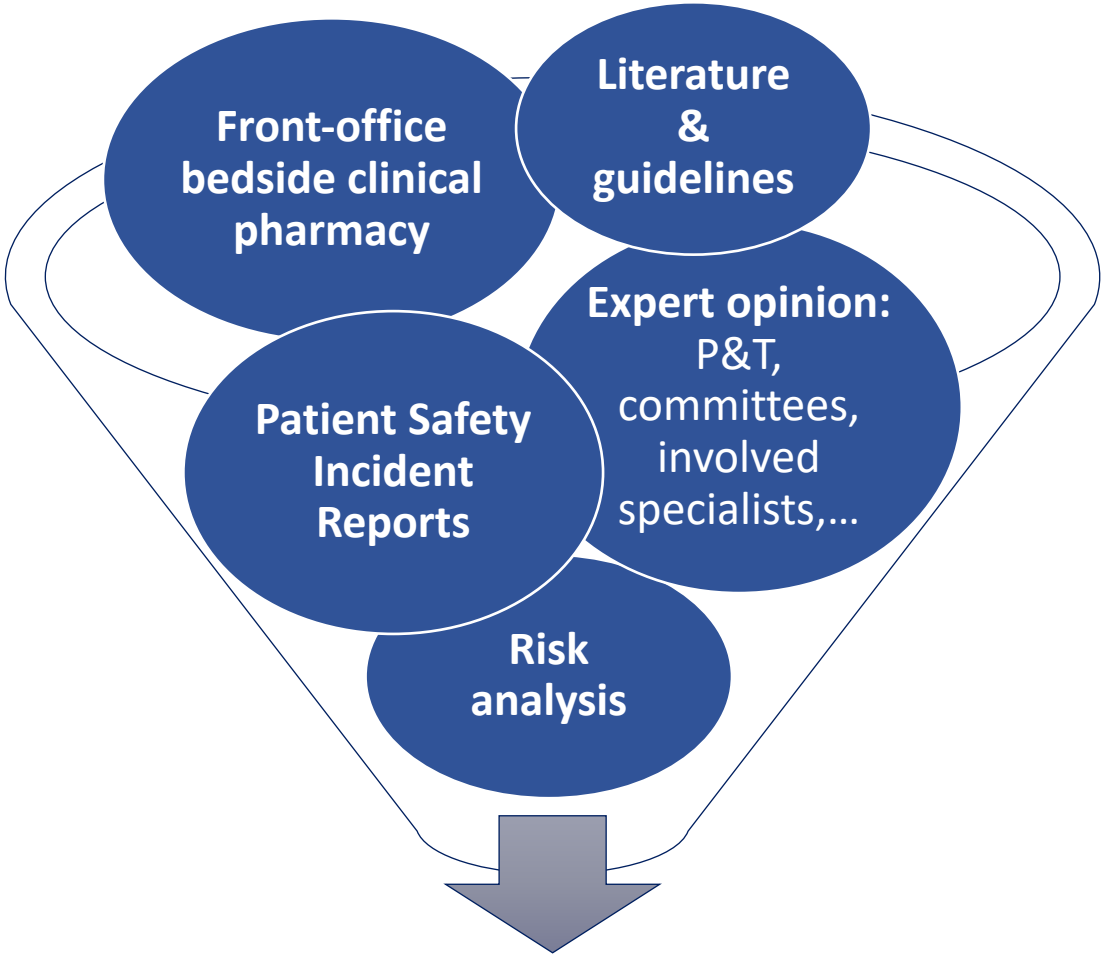
- **Education of hospital pharmacists**
  - Start-up training for all pharmacists
  - Continuous learning and retraining of new guidelines
  - E-learning modules

  - Clinical pharmacy => inter pharmacist variability
    - How much homogeneity in the validation done by different pharmacists?

    ➔ Interrater reliability



How to start: clinical input



Building algorithms

How to start: clinical input

Case:

- Female, 84 y, 52 kg
- Geriatrics
- Diagnosis: Urinary tract infection & delirium
- Medical history: Afib, Diabetes Mellitus type 2, Chronic Renal Insufficiency (CrCl 22 ml/min)
- Microbiology:
  - *E.coli:* sensitive to fluoroquinolones and beta-lactam antibiotics
  - *Clostridium difficile* +

Prescribed medication
Amoxicillin/clavulanic acid oral 850/125 mg dt q8h
Apixaban oral 5 mg dt q12h
Zolpidem oral 10 mg dt q24h
Metformin oral 850 mg dt q8h
Paracetamol IV 1g dt q6h
Carbamazapine oral 200 mg dt q12h

Which checks would you do on this prescription?

Prescribed medication
Amoxicillin/clavulanic acid oral 850/125 mg dt q8h
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Zolpidem oral 10 mg dt q24h
Metforming oral 850 mg dt q8h
Paracetamol IV 1g dt q6h
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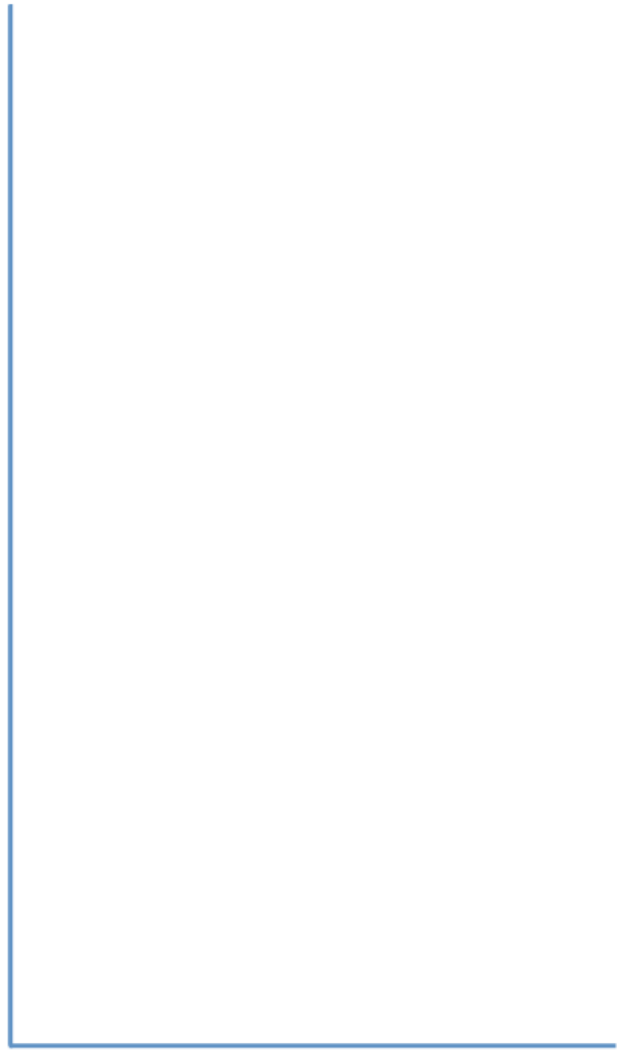


How to start: clinical input

A. POSOLOGY (standard)

- **Amoxicillin/clavulanic acid**
  - UTI: e.g. ESCMID guidelines[1]
- **Apixaban**
  - Afib: e.g. ESC guidelines[2,3]
  - Standard dosing Afib: 2x 5 mg
  - Posology based on indication, weight, renal function and age
- **Carbamazepine**
  - Standard dosing: 100 -1200 mg/day

ESCMID EUROPEAN SOCIETY OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES

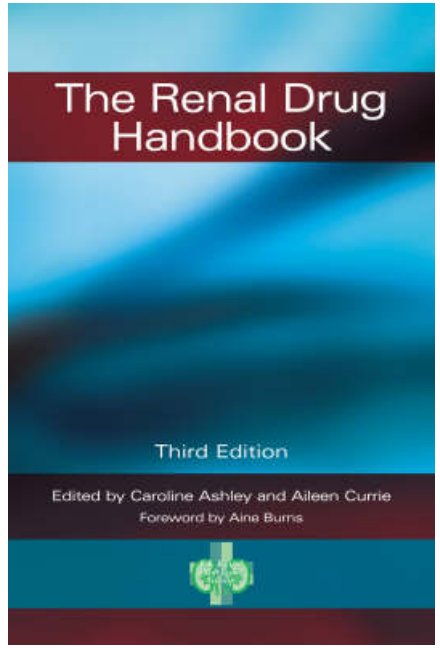
EUROPEAN SOCIETY OF CARDIOLOGY

(1) Gupta K, et al. Clin Infect Dis 2011:52(5):e103-120.
(2) Kirchhof P, et al. Eur Heart Journal 2016:37(38):2893-296.
(3) Heidbuchek H, et al. Eurospace 2015:17:1467-1507.

How to start: clinical input

B. RENAL FUNCTION

- **Dose adjustments to renal function:**
  - Amoxicillin/clavulanic acid
  - Apixaban[1]
  - Metformin[2]
- **Guidelines:**
  - Renal Drug Handbook[2]
  - Clinicalpharmacology.com
  - Summary of product characteristics (SmPC)



(1) Heidbuchek H, et al. Eurospace 2015:17:1467-1507.
(2) ADA: Standards of Medical Care in Diabetes; 2016.
(3) Ashley C., et al. Aust Prescr. 2015;38(2).

How to start: clinical input

C. Interactions

- **Apixaban + carbamazepine[(1)]**
  - CYP3A4 substrate + CYP inducer
  - Decrease in serum concentration of apixaban
    - Effect on apixaban plasma level (AUC): - 54%
    - Contraindication for simultaneous use
- **Interactions:**
  - Interaction database: e.g. UpToDate.com (Lexicomp®), Clinicalpharmacology.com

(1) Heidbuchek H, et al. Eurospace 2015:17:1467-1507.

How to start: clinical input

D. IV-ORAL switch

- **Paracetamol IV?**
  - Bio-equivalent drug?
  - Intact gastrointestinal tract?
  - Ability to swallow?
    - Prescription for other oral medication
    - Food consumption
    - Without planned surgical procedures

How to start: clinical input

E. Untreated indications

- ***Clostridium difficile* infection (CDI)**
  - IDSA guidelines(1), ESCMID guidelines (2)
  - Diagnosis: presence of symptoms + stool test positive for toxins
  - Treatment

Table 1. Recommendations for the Treatment of *Clostridium difficile* Infection in Adults

Clinical Definition	Supportive Clinical Data	Recommended Treatment[a]	Strength of Recommendation/ Quality of Evidence
Initial episode, non-severe	Leukocytosis with a white blood cell count of ≤15000 cells/mL and a serum creatinine level <1.5 mg/dL	• VAN 125 mg given 4 times daily for 10 days, OR • FDX 200 mg given twice daily for 10 days • Alternate if above agents are unavailable: metronidazole, 500 mg 3 times per day by mouth for 10 days	Strong/High Strong/High Weak/High
Initial episode, severe[b]	Leukocytosis with a white blood cell count of ≥15000 cells/mL or a serum creatinine level >1.5 mg/dL	• VAN, 125 mg 4 times per day by mouth for 10 days, OR • FDX 200 mg given twice daily for 10 days	Strong/High Strong/High

(1) Clifford McDonald L, et al. Clin Infect Dis 2018.
(2) Tschudin-Sutter S, et al. Clin Microbiol Inf 2018.

How to start: clinical input

PCR *Clostridium difficile* positive and toxine positive

'Diarrhea' recorded in patient file

Presence of symptoms + stool test positive for toxins

+

NO treatment for *Clostridium difficile* in CPOE

NO prescripton for oral vancomycin or IV/oral metronidazole or oral fidaxomicin

Link-KWS	Check	Opvolgnota	gebeld	eadnr	eenheid	Geslach	naam	Leeftijd	kw
ost:12345/s	1	0	0	[redacted]	650	[redacted]	[redacted]	[redacted]	DA
http://local	1	0	0	[redacted]	467	[redacted]	[redacted]	[redacted]	MI
http://local	1	0	0	[redacted]	467	[redacted]	[redacted]	[redacted]	MI
ost:12345/s	1	0	0	[redacted]	650	[redacted]	[redacted]	[redacted]	DA
http://local	1	1	0	[redacted]	305	[redacted]	[redacted]	[redacted]	MI
ost:12345/s	1	1	1	[redacted]	454	[redacted]	[redacted]	[redacted]	RI

On worklist to be checked by a hospital pharmacist

How to start: clinical input

F. Allergy

- **Penicillin allergy?**

(1) Kirchhof P, et al. Eur Heart Journal 2016:37(38):2893-296.
(2) Ashley C., et al. Aust Prescr. 2015;38(2).

How to start: clinical input

G. Microbiology

- **UTI**
  - Betalactam antibiotics inferior to fluoroquinolones? ESCMID guidelines[1]
- **Local guidelines > Antibiotic policy committee**

UZ LEUVEN

(1) Gupta K, et al. Clin Infect Dis 2011:52(5):e103-120.

Which check is the most important?

Prescribed medication
Amoxicillin/clavulanic acid oral 850/125 mg dt q8h
Apixaban oral 5 mg dt q12h
Zolpidem oral 10 mg dt q24h
Metforming oral 850 mg dt q8h
Paracetamol IV 1g dt q6h
Carbamazapine oral 200 mg dt q12h

IV-oral switch paracetamol

Posology - antibiotic, NOAC and carbamazepine

Untreated indications (CDI)

Allergy - penicillins

Microbiology

Renal function - antibiotic, NOAC, metformin

How to start: measuring impact

- Acceptance rate
- Clinical relevance
- Satisfaction survey
- Economic analysis

→ ***Important to keep:***

evaluating the service

defining new goals & developing new checks

optimizing the service & improving performance

Advanced CMA on a case-based approach

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Advanced CMA on a case-based approach

- How to integrate evidence-based guidelines?
- How to build your own algorithms?

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Case:

- Female, 81 y, 75 kg
- Admitted on trauma surgery because of a hip fracture

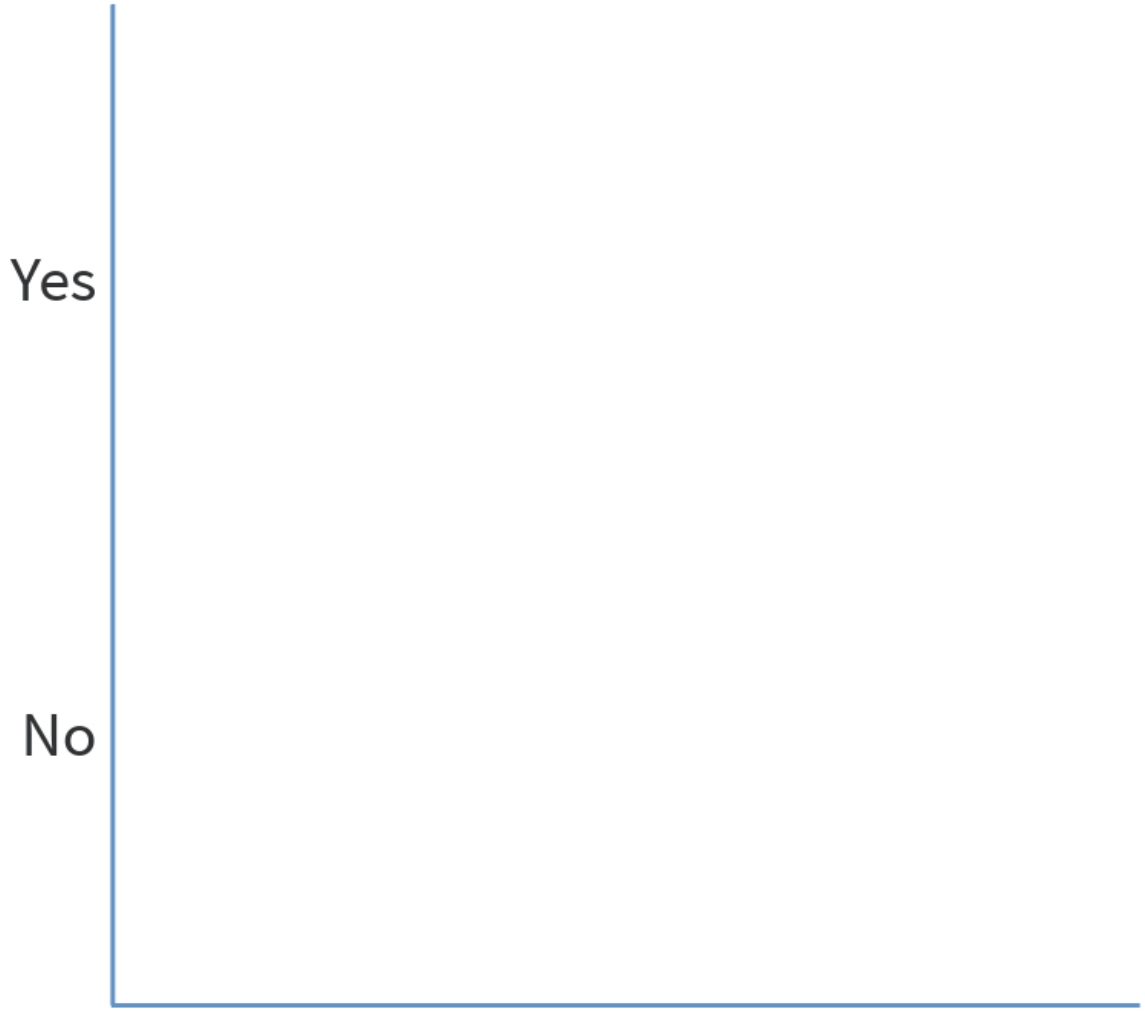
MEDICAL HISTORY
Arterial hypertension
Depression
Gastroesophageal reflux disease (GERD)
Hypothyroidism
Episode of atrial fibillation (Afib)

LAB RESULTS	
Parameter	Result
eGFR	57 mL/min
Potassium	3.71 mmol/L
Blood pressure	13/9 mmHg
Heart rate	81 BPM
TSH (0.27-4.2 mIU/L)	0.75 mIU/L
T4 (12-22 pmol/L)	0.75 pmol/L

Medication (CPOE)
Pantoprazole oral 20 mg, q24h
Amlodipine oral 5 mg, q24h
Bisoprolol oral 2.5 mg, q24h
Calcium-vitamin D oral 1000 mg-800 IE, q24h
Levothyroxine oral 50 mcg, q24h
Escitalopram oral 10 mg, q24h
Lormetazepam oral 1 mg, q24h

Are there drug-drug interactions?

Medication (CPOE)
Pantoprazole oral 20 mg, q24h
Amlodipine oral 5 mg, q24h
Bisoprolol oral 2.5 mg, q24h
Calcium-vitamin D oral 1000 mg-800 IE, q24h
Levothyroxine oral 50 mcg, q24h
Escitalopram oral 10 mg, q24h
Lormetazepam oral 1 mg, q24h



Are there drugs that need a dose adjustment based on the lab results

Medication (CPOE)
Pantoprazole PO 20 mg, q24h
Amlodipine PO 5 mg, q24h
Bisoprolol PO 2.5 mg, q24h
Calcium-vitamin D PO 1000 mg-800 IE, q24h
Levothyroxine PO 50 mcg, q24h
Escitalopram PO 10 mg, q24h
Lormetazepam PO 1 mg, q24h

Parameter	Result
eGFR	57 mL/min
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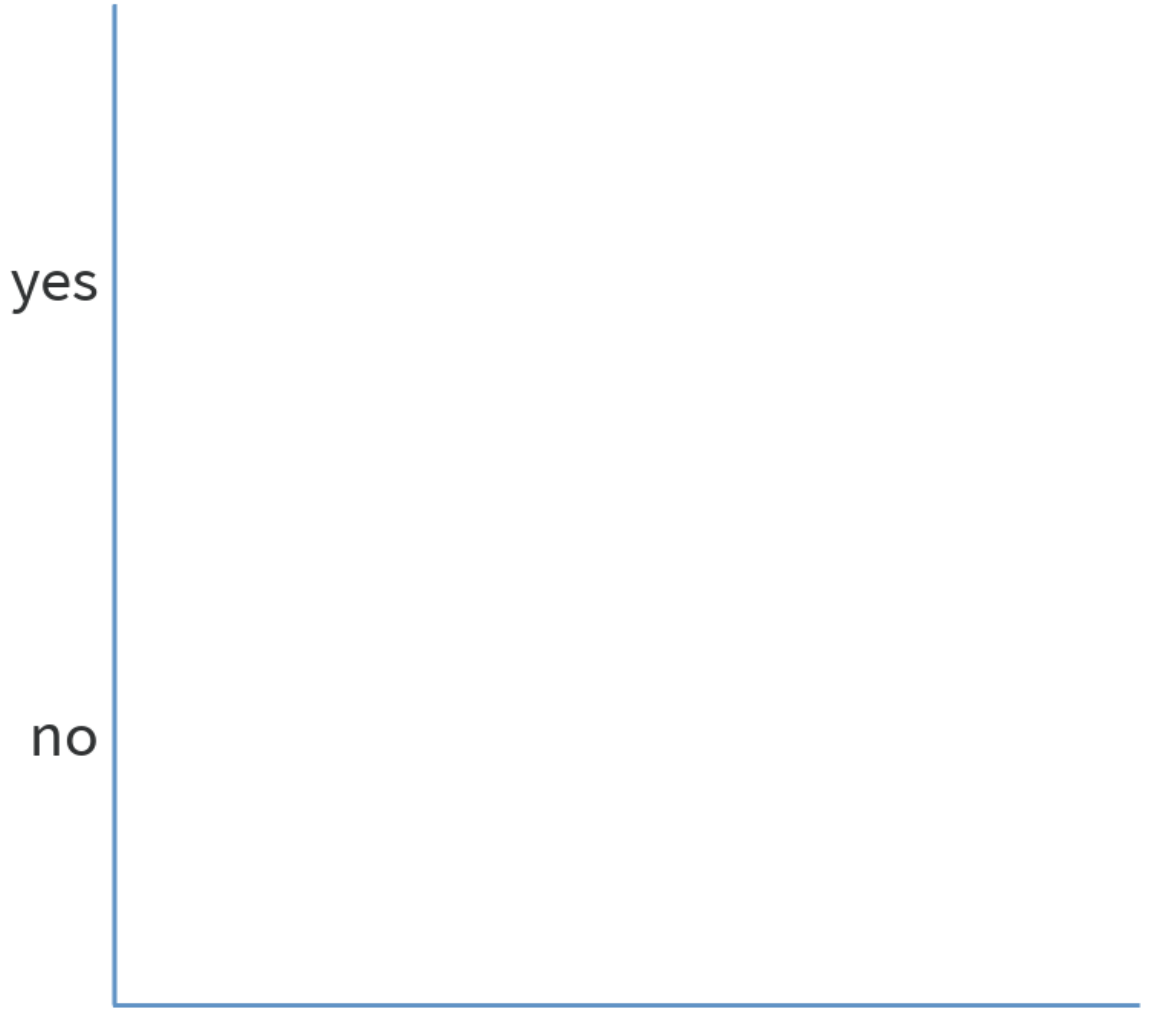


Does the patient have a contra-indication for some of the drugs?

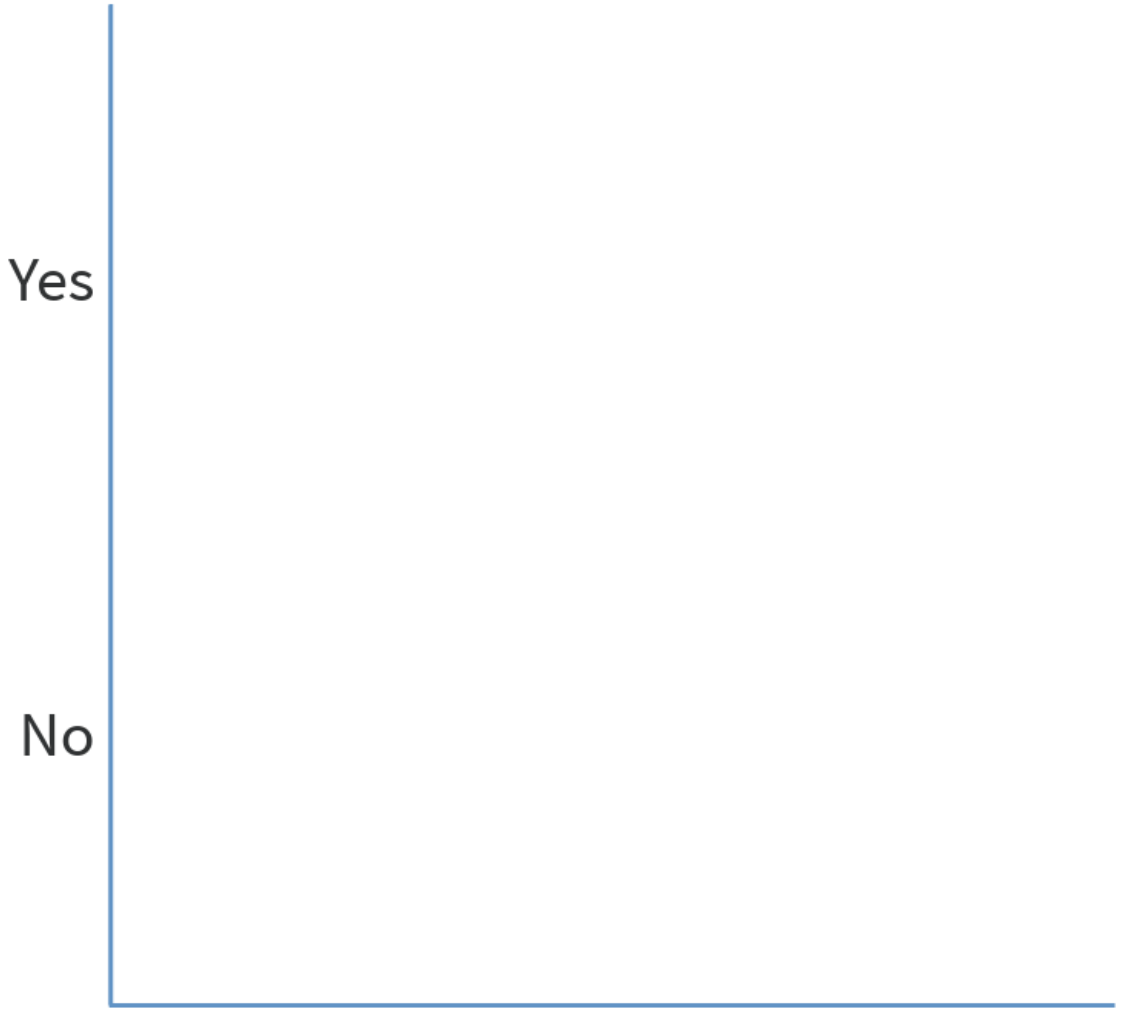
MEDICAL HISTORY	Medication (CPOE)
Arterial hypertension	Pantoprazole PO 20 mg, q24h
Depression	Amlodipine PO 5 mg, q24h
Gastroesophageal reflux disease (GERD)	Bisoprolol PO 2.5 mg, q24h
Hypothyroidism	Calcium-vitamin D PO 1000 mg-800 IE, q24h
Episode of atrial fibillation (Afib)	Levothyroxine PO 50 mcg, q24h
	Escitalopram PO 10 mg, q24h
	Lormetazepam PO 1 mg, q24h

Yes

No

In conclusion, can the therapy be validated as safe?

Medication (CPOE)
Pantoprazole PO 20 mg, q24h
Amlodipine PO 5 mg, q24h
Bisoprolol PO 2.5 mg, q24h
Calcium-vitamin D PO 1000 mg-800 IE, q24h
Levothyroxine PO 50 mcg, q24h
Escitalopram PO 10 mg, q24h
Lormetazepam PO 1 mg, q24h



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In conclusion, can the therapy be validated as safe?

No →  **Untreated indication**

Which is the untreated indication?

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Untreated indication:

Afib

Anticoagulant therapy to prevent stroke

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How to **build your own algorithm** to screen for untreated Afib?

+

How to integrate **evidence-based guidelines**?

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How to **build your own algorithm** to screen for untreated Afib?

1st step:

- Screen for patients, currently hospitalized, with a proven diagnosis of Afib (reported in ECG protocols)

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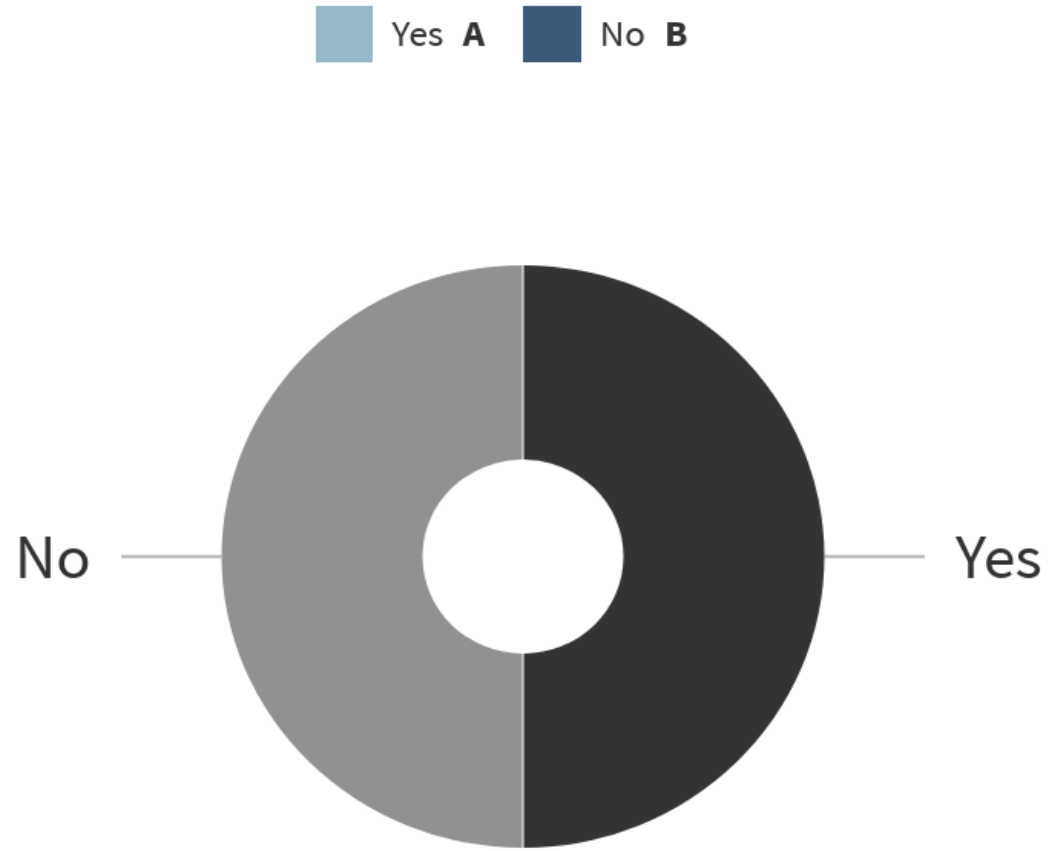
How to **build your own algorithm** to screen for untreated Afib?

2nd step:

- Screen for patients, currently hospitalized, with a proven diagnosis of Afib
- **AND** who do need anticoagulant therapy

Does every patient, currently hospitalized, with a proven diagnosis of Afib need to be treated with anticoagulant therapy?



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How to **build your own algorithm** to screen for untreated Afib?

Does every patient, currently hospitalized, with a proven diagnosis of Afib need to be treated with anticoagulant therapy?

No

Based on the risk for stroke
(CHA_2DS_2-VASc score)

ESC guideline: Atrial Fibrillation Management

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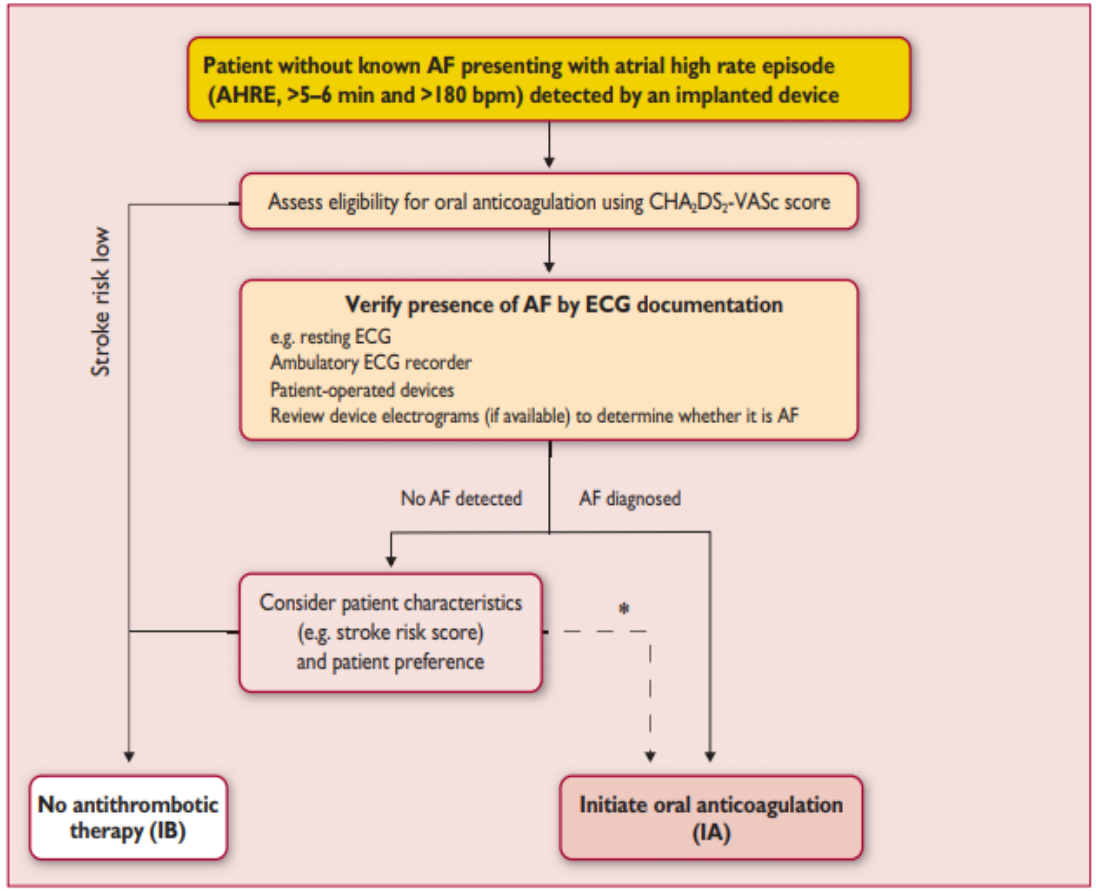
ESC guideline: Atrial Fibrillation Management

9. Stroke prevention therapy in atrial fibrillation patients

OAC therapy can prevent the majority of ischaemic strokes in AF patients and can prolong life.[38,39,42,194,201,329,350–352] It is superior to no treatment or aspirin in patients with different profiles for stroke risk.[353,354] The net clinical benefit is almost universal, with the exception of patients at very low stroke risk, and OAC should therefore be used in most patients with AF (*Figure 8*). Des-



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ESC guideline: Atrial Fibrillation Management

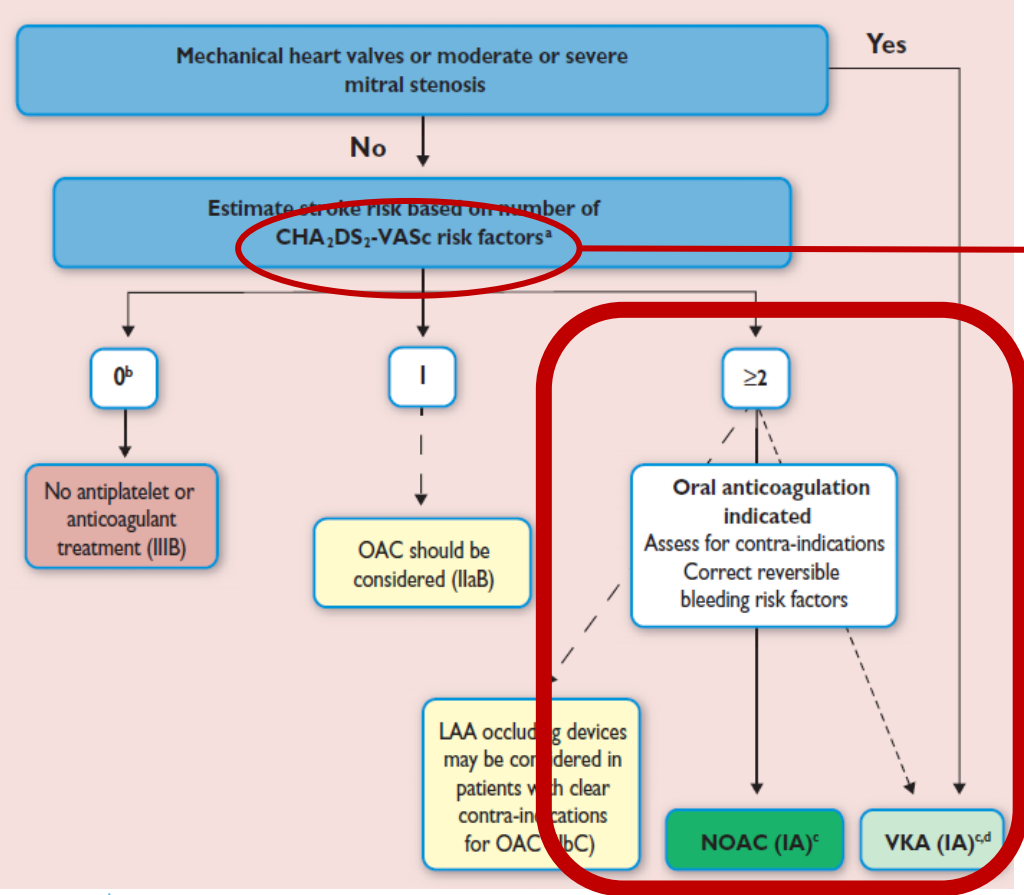

Table 11 Clinical risk factors for stroke, transient ischaemic attack, and systemic embolism in the CHA_2DS_2-VASc score

CHA_2DS_2-VASc risk factor	Points
Congestive heart failure Signs/symptoms of heart failure or objective evidence of reduced left ventricular ejection fraction	+1
Hypertension Resting blood pressure >140/90 mmHg on at least two occasions or current antihypertensive treatment	+1
Age 75 years or older	+2
Diabetes mellitus Fasting glucose >125 mg/dL (7 mmol/L) or treatment with oral hypoglycaemic agent and/or insulin	+1
Previous stroke, transient ischaemic attack, or thromboembolism	+2
Vascular disease Previous myocardial infarction, peripheral artery disease, or aortic plaque	+1
Age 65–74 years	+1
Sex category (female)	+1

CHA_2DS_2-VASc = Congestive Heart failure, hypertension, Age ≥75 (doubled), Diabetes, Stroke (doubled), Vascular disease, Age 65–74, and Sex (female).

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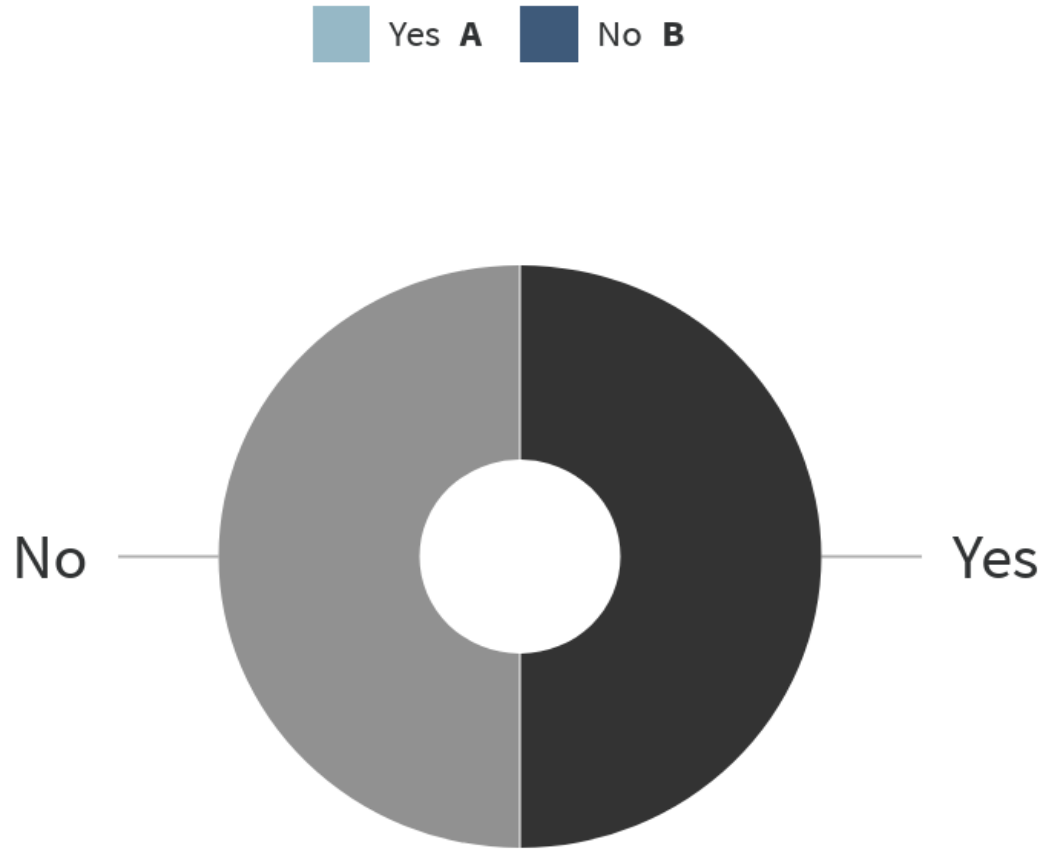
How to **build your own algorithm** to screen for untreated Afib?

2nd step:

- Screen for patients, currently hospitalized, with a proven diagnosis of Afib
- **AND** who do need anticoagulant therapy based on the CHA_2DS_2-VASc score
  - In practice: calculation based on registered care paths and/or ATC codes
  - In case: > 75 y (2) + arterial hypertension (1) + woman (1) = 4

Does the algorithm need to select currently hospitalized patients who ever had a proven diagnosis of Afib and a CHA2DS2-VASc score of ≥ 2?



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How to **build your own algorithm** to screen for untreated Afib?

Does the algorithm need to select, currently hospitalized patients who ever had a proven diagnosis of Afib and a CHA_2DS_2-VASc score of ≥ 2?

No

→

Only patients **without a prescription for anticoagulant therapy**

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How to **build your own algorithm** to screen for untreated Afib?

3rd step:

- Screen for patients, currently hospitalized, with a proven diagnosis of Afib
- **AND** who do need anticoagulant therapy based on the CHA_2DS_2-VASc score
- **AND** <u>without a prescription for anticoagulants</u>

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How to **build your own algorithm** to screen for untreated Afib?

CONCLUSION: Algorithm needs to screen for

Hospitalized patients + With a proven diagnosis of Afib + With a thrombosis risk score of ≥2 + Without a prescripton for anticoagulants

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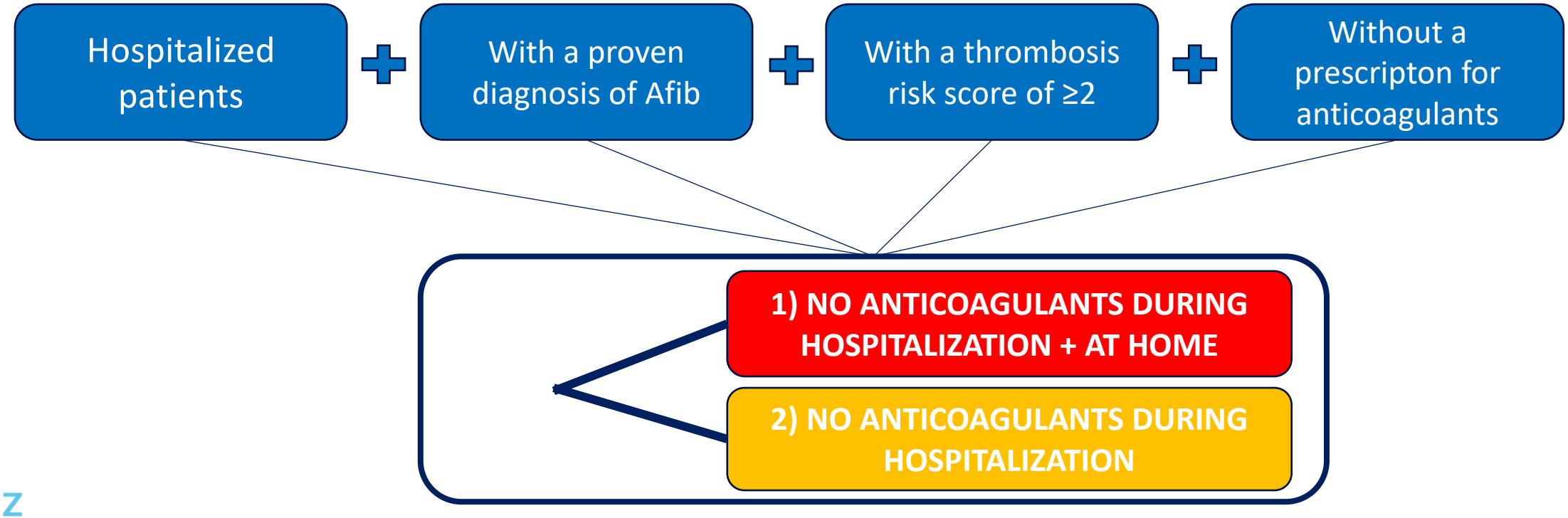
How to **build your own algorithm** to screen for untreated Afib?

In addition: rank the selected patients



Take home messages

1. *Clinical validation can operate as a **liaison between CDSS and bedside clinical pharmacy***

2. *Screen for prescriptions with a high risk of **drug related problems***

3. *Clinical input for the validation service needs to be based on*
   - ***(Inter)national guidelines***
   - ***Gained bedside knowledge***
   - ***Local patient safety incident reports***
   - ***Expert opinions***

4. *Hospital-wide support is essential (hospital board, IT, P&T, experts…)*

Thank you for your attention

Call for feedback

				
Very Unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied