

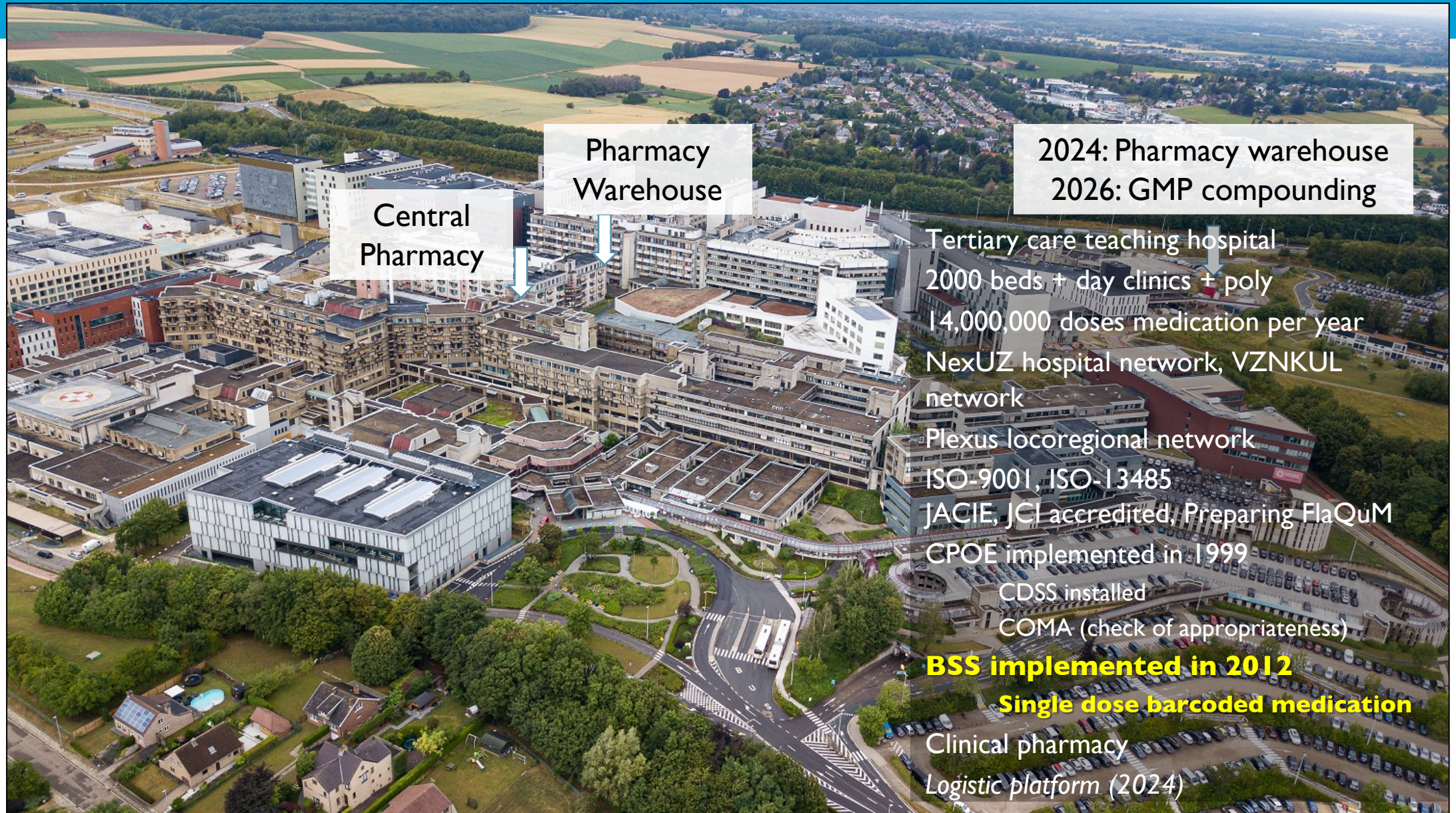
# Bedsidescanning in practice

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# University Hospitals Leuven



Central  
Pharmacy

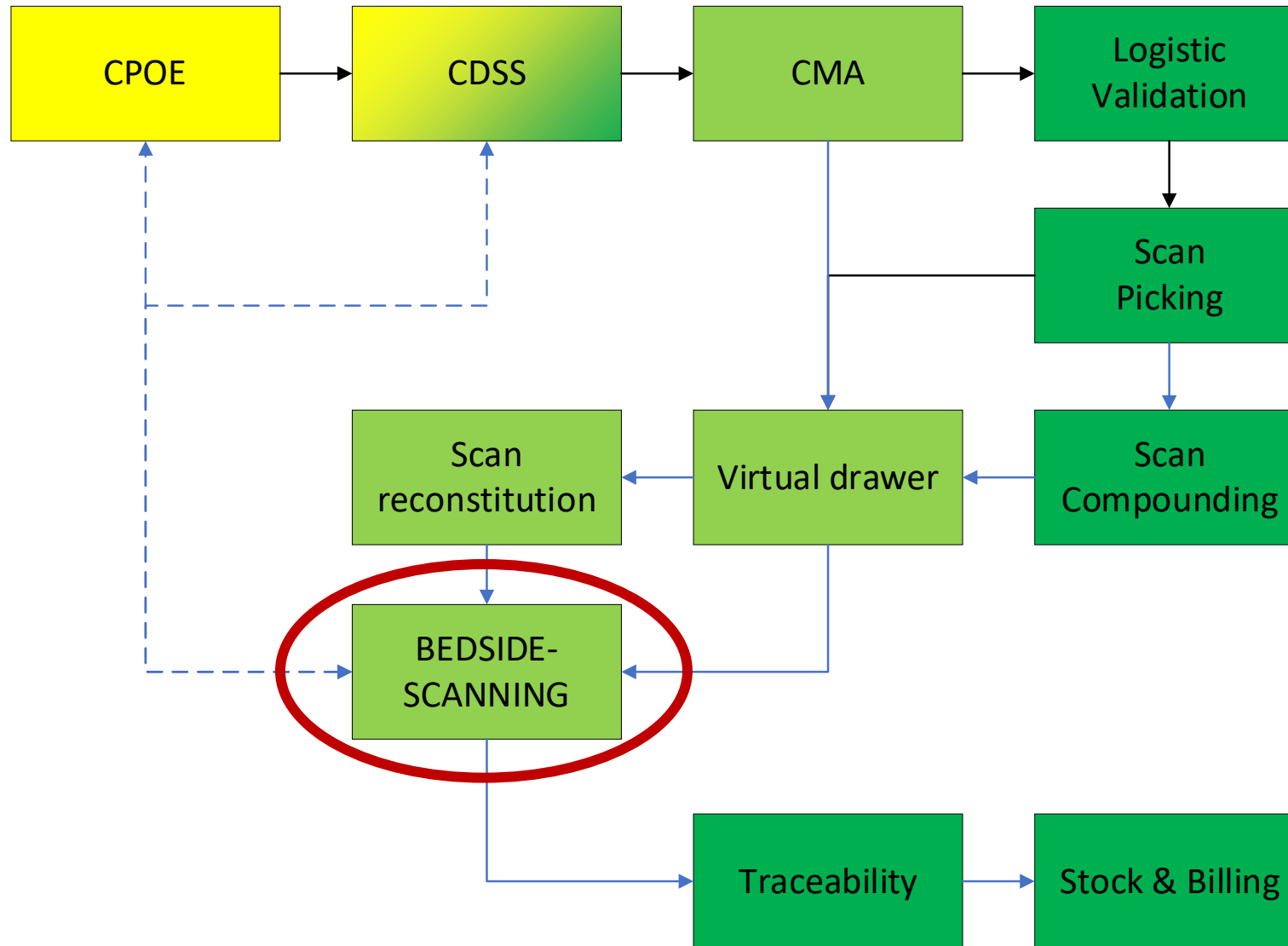
Pharmacy  
Warehouse

2024: Pharmacy warehouse  
2026: GMP compounding

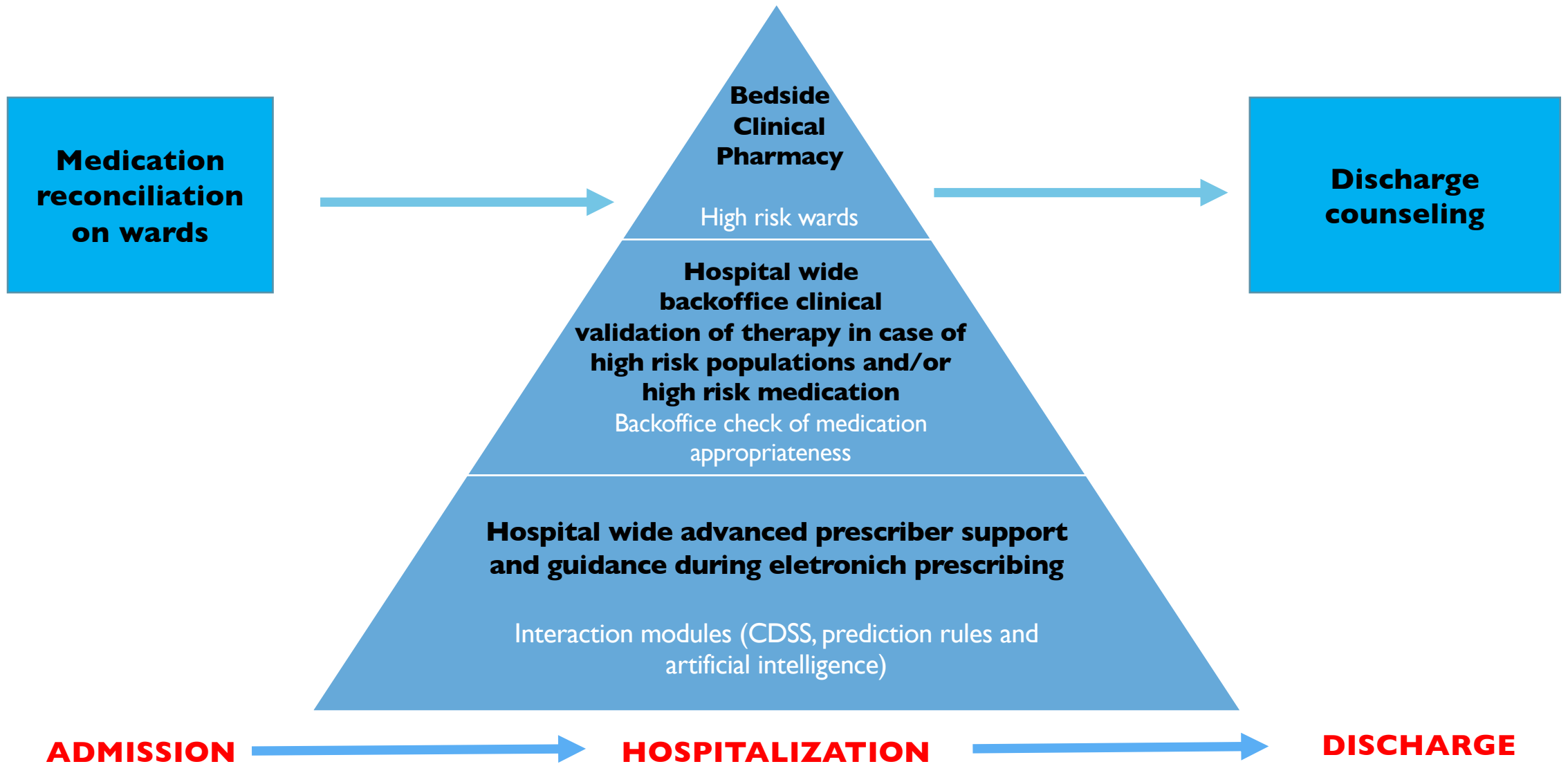
Tertiary care teaching hospital  
2000 beds + day clinics + poly  
14,000,000 doses medication per year  
NexUZ hospital network, VZKNUL  
network  
Plexus locoregional network  
ISO-9001, ISO-13485  
JACIE, JCI accredited, Preparing FlaQuM  
CPOE implemented in 1999  
CDSS installed  
COMA (check of appropriateness)  
**BSS implemented in 2012**  
**Single dose barcoded medication**  
Clinical pharmacy  
Logistic platform (2024)



# Closed loop medication management



# Clinical pharmacy in Leuven : vision



# Bedsidescanning as final checkpoint

Royal Decree 2020: unit dose and traceability mandatory in hospitals

- Extra driver for Belgian hospitals

Bedsidescanning is final checkpoint (in place since 2012)

- Requires fully deployed CPOE and scannable unit doses
- >95% of all doses is scannable (60 % from industry, 35 % repacked)
- Intelligent interpretation of captured data
- Drives logistics and billing (<> need for e-cupboards)
- Drives traceability, if variable data are available in barcode – WAKE UP CALL PHARMA

Deployment in OR: traceability of med dev (MDR and CTR)

# Bedside scanning in practice (2015)



1111





# Methylprednisolone 16 mg ?

SS - Medicatie toedienen

SS voorraadeenheid: 0 Patient eenheid: 0 Patient: KWS-TESTPATIENT NUMMER 8 (8)

☐ Niet aanrekenen

**Dosis onvoldoende**

Product	Vorm	Dosis	+/-	< Scans	To...	Product
MEDROL	TABL 4 MG	4 mg	-	8 mg	✓	MEDROL (TABL 16 MG)
MEDROL	TABL 4 MG	4 mg	-	16 mg		

Voorschriften >

Wanneer: 04-03-2015 05:00 Scan van: 04-03-2015 13:00 Scan tot: 04-03-2015 20:00

Medicatie

Medicatie	Toed.	05	06	07	08	09	10	11	12	13	14
CLONAZEPAM (TABL 0,5 MG)	P0										
MEDROL (TABL 16 MG)	P0										
MOXICLAV SANDOZ (FL INF 1 G-200 MG) - 1 g	IV-Inf										
NATR.CHLORIDE 0,9 % (FL INF 50 ML VIAFLO) - 50 ml											
CLONAZEPAM (TABL RETARD 1 G-62,5 MG)	P0										
PARACETAMOL (FL INF 1 G/100 ML)	IV-Inf										

**Dosis klopt (gedeeld)**

+/-	< Scans	To...	Product
-	16 mg *	✓	MEDROL (TABL 16 MG)


**Confirmeer**

**DOSIS afwijking of nakijken:**  
16 mg \* (verwacht: 16 mg)

Ingescande product(en):	Gekoppelde voorschrift(en):
<ul style="list-style-type: none"> <li>MEDROL (TABL 32 MG) - 16 mg</li> </ul>	04.03.2015 17:00: MEDROL (TABL 16 MG) Dosis: 16 mg

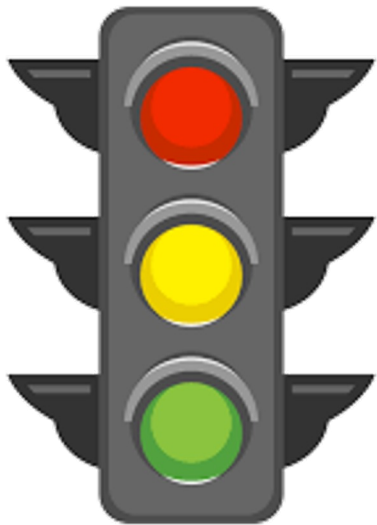
Dosis: 16 mg \* (verwacht: 16 mg)

Extra info



$4 \times 4 = 16$   
 $1 \times 16 = 16$   
 $\frac{1}{2} \times 32 = 16$

# Paracetamol 1000 mg oral

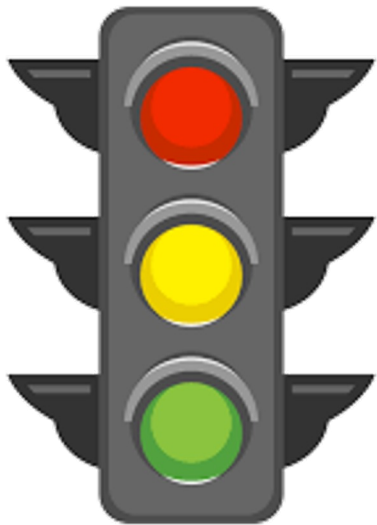




# Carbamazepine 200 mg oral



# Amlodipine 5 mg oral





# What-irizine ?



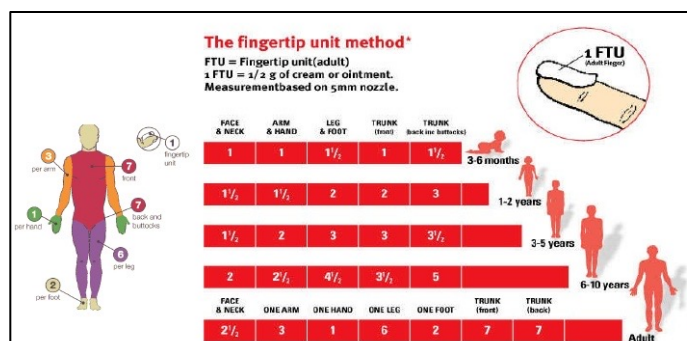
- Cetirizine 10 mg  
(racemic)



Levo-cetirizine 5 mg  
(l-enantiomer)



# Multidose products ?



Every scan = a bottle or a tube ?  
 Every scan = nurse overrule volume ?

“Reconstitution” → new BC linked to a patient & prescribed dose



# Simple mathematics ?

- Tacrolimus 9 mg
  - Prescription versus administration
    - Different # lines ( $9 = 5 + 3 + 1 \text{ mg}$ )
    - Show one line to enhance readability and overview of therapy



- Dafalgan 480 mg
  - Suggestion dose rounding
  - % mismatch
    - Relevant decimals
    - Compounding possible

DAFALGAN vorm formularium

Effectieve dosis: 480 mg

Toedieningsweg: PO

Uurschema: 8 12 16 20

Lengte: 1.7 m


Gewicht: 49.8 kg

BSA: 1.566 m<sup>2</sup>

Dosis per gift: 480 mg

vorm	08	12	16	20	% afwijking
FL OPL 30 MG/ML 90 ML (PED)	16 ml = 480 mg	16 ml = 480 mg	16 ml = 480 mg	16 ml = 480 mg	0
TABL FORTE 1 G	0.5 stuks	0.5 stuks	0.5 stuks	0.5 stuks	4
TABL FORTE BRUIS 1 G	0.5 stuks	0.5 stuks	0.5 stuks	0.5 stuks	4
TABL ODIS 500 MG	1.0 stuks	1.0 stuks	1.0 stuks	1.0 stuks	4
TABL BRUIS 500 MG	1.0 stuks	1.0 stuks	1.0 stuks	1.0 stuks	4

# Nothing forgotten ?


**Confirmatie**
✕

Volgende voorschriften zijn nog niet toegediend ...  
Gelieve deze te annuleren wanneer ze niet meer van toepassing zijn.

**G** Geen actie


**OK** Toedienen (enkel voor medicatie in zelfbeheer)


**A** Annuleren

**€** Aanrekenen (opgelet bij multidosi: volledig artikel wordt aangerekend, dus uitvinken als je geen nieuw artikel gebruikt hebt!)

Voorschrift	Datum	G	A	OK	€	Reden
<b>1 amp:</b> ASPEGIC (AMP INJ 500 MG (ASA))	10-03-2015 16:00	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="text"/>
<b>16 mg:</b> MEDROL (TABL 16 MG)	10-03-2015 17:00	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="text"/>
<b>1 tabl:</b> ALDACTAZINE (TABL 25-15 MG)	10-03-2015 17:00	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="text"/>
<b>2 g:</b> AUGMENTIN (TABL RETARD 1 G-62	10-03-2015 17:00	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="text"/>
<b>1 amp:</b> ASPEGIC (AMP INJ 500 MG (ASA))	10-03-2015 20:00	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="text"/>

Globale reden:


< Ga verder (OK)

Annuleren > 

Ga verder (OK)

Annuleren



# Does it work ?

## YES it works !

- Wrong patient
  - Same name (but different photo and administration number on bracelet)
- Wrong product
  - Look-alike sound-alike medication
  - Substitution to wrong replacement product in case of stock rupture (fibrinogen vs factor PPSB)
  - Wrong infusion fluid during reconstitution
- Wrong dose
  - Same name, different dose
  - Half & multiple tablets (eg. methylprednisolone, coumarines)
- Medication duplication or double dose
  - Home medication & switch to formulary alternative (eg. benzodiazepines on maternity)
- Forgotten medication
  - PRN, recently started, just forgotten, ...



# Does it work ?

## YES it works !



### Recently stopped medication

- Direct communication (eg. surgeon in OR vs nurse on ward)

### Wrong time of administration

- Flexibel time granularity (eg. Antineoplastics in dayclinic vs vitamins on maternity)
- Wrong timeline cytotoxics
  - Mesna as kidney protector before cyclophosphamide
- Contraindications and allergies for (standing) orders
  - Allergy for penicillins, high dose acetaminophen in case of liverfailure
  - Acute renal failure (→ prediction via machine learning algorithm → “wintermettes”)



### Alert function (eg: High Alert Medication, KCl, ...)

### Witness-function

- In emergency situation: scanning before prescribing (eg: OR, ER, ...)
- At least you know (eg. digitalisglycoside vs curare)
- Exact registration of intervention → medical record, traceability, tariffication, logistic process → opportunities !



Medicatie	Toed.	Eenh.	zo 05-06	ma 06-06	di 07-06
KALIUMCHLORIDE (FL INJ 20 MEQ/20 ML) - 1 eenh + NATR.CHLORIDE 0,9 % (FL INF 100 ML VIAFLO) - 1 infuus	IV-Inf	infuus	2*1	2*1	2*1
KALIUMCHLORIDE (FL INJ 20 MEQ/20 ML) ⚠ NOOIT via IV-Bolus toedienen !	IV-Inf	amp	1	1	1

## Where does it work?

On all hospitalisation wards

Not (yet) on OR, ICU and emergency department

- In OR for implants via UDI (peroperative)
- In OR implementation pre and postoperative ongoing
- Shock-box principle on ER and per-OR (no match CPOE)

Not (yet) on ambulatory wards

*All dispensing in central pharmacy*

*Future: all central compounding*

# Onboarding users

Fully functional CPOE and  $> 75\%$  UD/BC is a must

Ergonomic flow (design cows vs stock and rooms, three hands, ...)

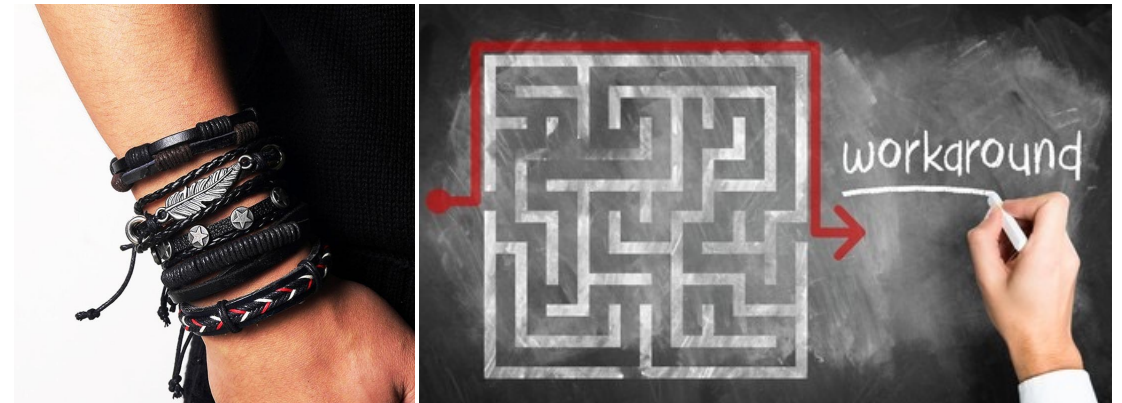
Real life education and support per ward; helpdesk until now

- Extra attention for digital illiterate nurses

Ambassadors from nursing department

Check for creative users:

- Time between patients
- Time between scans





# Hurdles and challenges

Industry was (is) not ready for UD/BC

- No UD, no BC on primary pack (level below the each)
- Only identifier, no variable data (now 60 % identifier)
- Non GSI (same codes on different products) → check@receive

Repacking according to PIC/s

- Larger stocks (cave: price cuts, changed guidelines, ...)
- Ordering big batches → inducing national shortages
- Costly (outsourcing is cheaper than buying foil)
- Own cleanrooms (grade D)
- Own coding (from .xml towards GSI standard)



## Take home messages

- Bedsidescanning is the final checkpoint for medication safety
- Let it be more than just data capture (witness function)
- Intelligent system requires CPOE, updated data on CDSS, to check with
- Hardware must function at all times (backup procedure)
- Software must be userfriendly (count clicks & scans)
- UD/BC medication must be available (backup procedure)
- Ambassadors, education and helpdesk are essential
- Followup correct use is recommended
- Safety comes with a cost – Need for EU standardisation



