



Patient and Logistic Safety using Barcodes on primary package

M. Duyvendak, PharmD, Phd, Antonius Hospital Sneek,
The Netherlands
09-02-2017



Welcome and thank you for attending!



- Welcome to our February 2017 webinar. Thank you to our guest speaker – dr. Michiel Duyvendak, Hospital Pharmacist of the Antonius Ziekenhuis (Hospital) in Sneek, the Netherlands
- Some housekeeping for today:
 - All attendees will be on mute
 - If you have questions during the presentation, please type them into the questions area and these will be monitored then answered at the end of the call
- After the webinar:
 - Within a week, the recording will be posted to: http://www.gs1.org/healthcare/hpac_webinars
 - All previous webinars are also posted to this location, so please feel free to use this resource and share the link

The GS1 Healthcare Provider Advisory Council (HPAC)



Thought leaders and early adopters of GS1 Healthcare Standards from the global clinical provider environment. Their final goal is to improve patient safety, cost efficiency and staff productivity through implementation of GS1 standards.

A forum for sharing and discussion

Identification of projects and case studies

A source of expertise and advice

- About the practical realities of implementation of GS1 Standards in the care giving environment in regards to the impact on clinical care and patient interaction
- That support the adoption of GS1 Standards in healthcare providers and retail pharmacies
- For publication, presentation and sharing
- To those involved in GS1 standards development, the wider Healthcare stakeholder community and senior executives/decision-makers to gain their buy-in and support for implementation of GS1 Standards



HPAC Activities



Webinars

- Monthly webinars open to all stakeholders interested in learning about GS1 standards implementation in the care giving environment.
- http://www.gs1.org/healthcare/hpac_webinars

Awards

- Twice per year
- Provider Best Case Study Award
- Provider Recognition Award
- The prize is travel / accommodation to attend the next GS1 Healthcare conference
- <http://www.gs1.org/healthcare/hpac>

GS1 Healthcare also holds two global conferences per year.

The next conference will be in Berlin from April 4-6, 2017, with significant Healthcare Provider participation on the agenda.

Dr. Michiel Duyvendak



Who am I

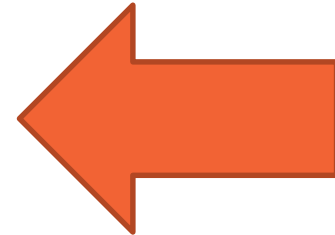
- Hospital Pharmacist
- PhD using decision support technology, 2010
- Working at Antonius Ziekenhuis (hospital), Sneek / Emmeloord, the Netherlands
- Interest in direct patient care and medication safety
- Since 2011 project-leader of the Medication Closed Loop project implementing pharmacy-based and bed-side barcode-verification technology as one of the new features
- Chairman pathway committee NVZA (Dutch Association Hospital Pharmacists)

EU-directive



1. Legislative proposals:

- to tackle the growing issues of counterfeiting and illegal distribution of medicines (see Memo)
- to enable citizens to have access to high-quality information on prescription-only medicines (see Memo).
- to improve patient protection by strengthening the EU system for the safety monitoring ('pharmacovigilance') of medicines (see Memo)



These proposals will now be transmitted to the European Parliament and the Council.

2. A political communication:

- to discuss with Member States ways to improve market access by making pricing/reimbursement decisions more transparent;
- to develop initiatives to boost EU pharmaceutical research.
- to intensify cooperation with major partners (US, Japan, Canada) to improve medicines' safety worldwide;
- to strengthen cooperation with emerging partners (Russia, India, China).

More information

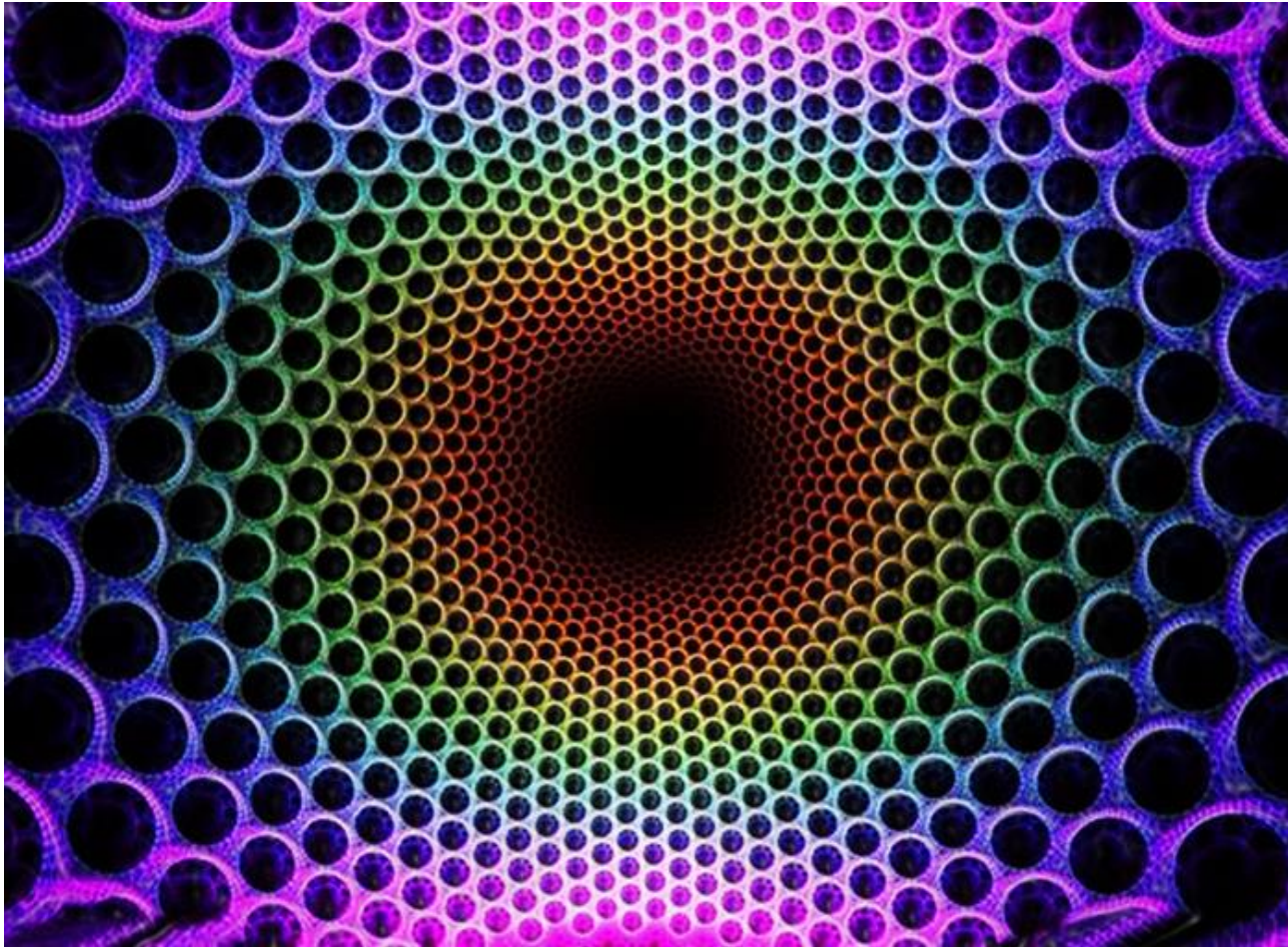
http://ec.europa.eu/enterprise/pharmaceuticals/index_en.htm



The Essence of Health Care



Optical Failure





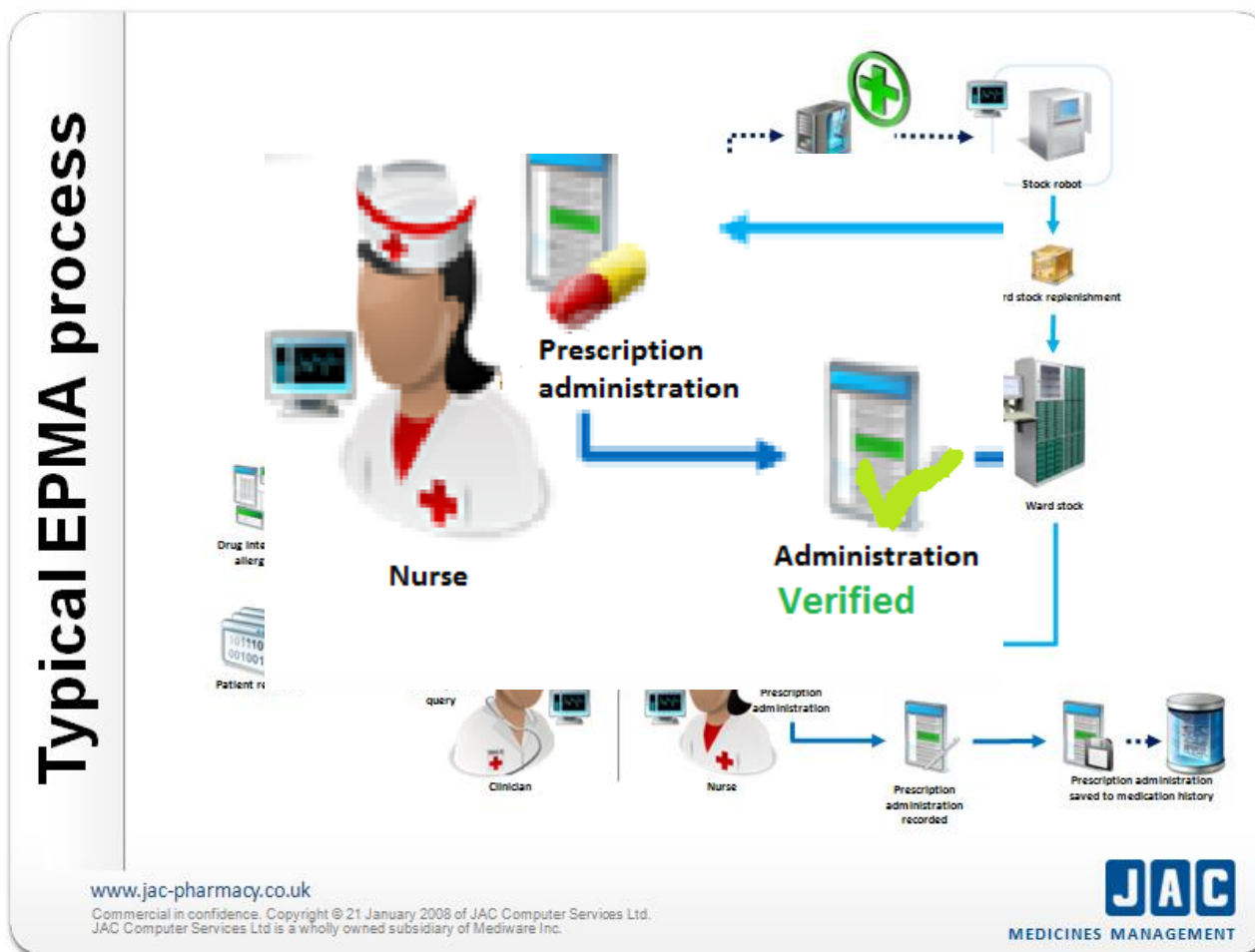
EMR Adoption ModelSM

Stage	Cumulative Capabilities
Stage 7	Complete EMR; CCD transactions to share data; Data warehousing; Data continuity with ED, ambulatory, OP

Closed Loop Medication Administration

Stage 4	CPOE, Clinical Decision Support (clinical protocols)
Stage 3	Nursing/clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology
Stage 2	CDR, Controlled Medical Vocabulary, CDS, may have Document Imaging; HIE capable
Stage 1	Ancillaries – Lab, Rad, Pharmacy - All Installed
Stage 0	All Three Ancillaries Not Installed

Typical Process



Results of BCMA

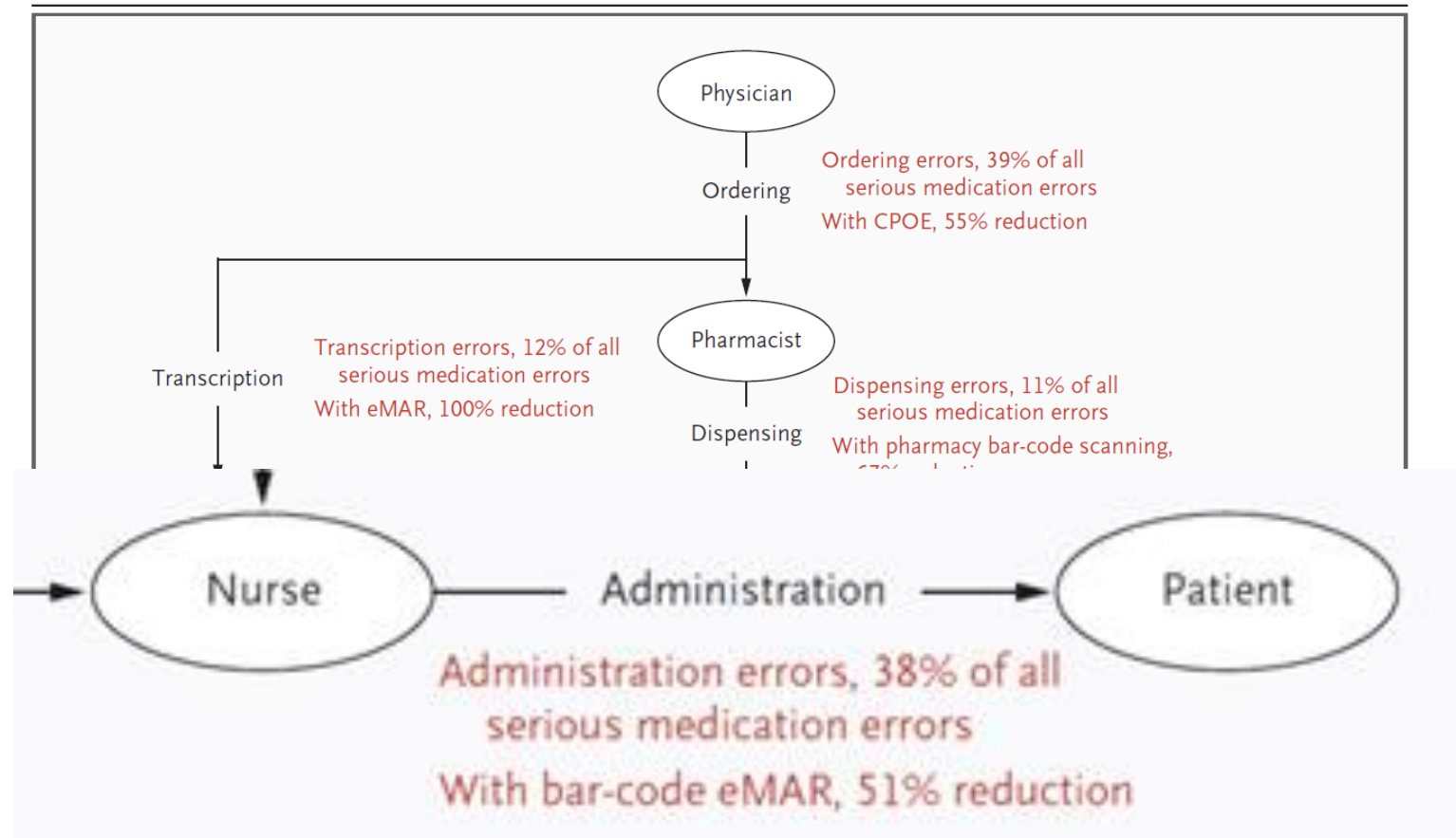


Figure 1. Effect of Health Information Technology at Key Stages in the Process of Medication Use.

Bates et al. JAMA 1995 E.Poon et al. NEJM 2010, Hassink et al. PW 2012



Table 2 Number of observations, and error rates before and after BCMA implementation

Study	Ward type	No of observations		Frequency of errors including time errors		Change from baseline	p Value	Frequency of errors excluding time errors		Change from baseline	p
		Baseline	Post-BCMA	Baseline	Post-BCMA			Baseline	Post-BCMA		
Paoletti <i>et al</i> ⁹	Cardiac telemetry	308	318	25.3%	19.2%	24.1%	0.065	1.6% [*]	1.6% [*]	0.0%	0.959
Poon <i>et al</i> ¹⁰	Medical	2008	2232	ND	ND	ND	ND	5.3% [†]	3.8% [†]	28.5% [‡]	ND
Paoletti <i>et al</i> ⁹	Medical-surgical	320	310	15.6%	10.0%	35.9%	0.035	6.3% [*]	2.9% [*]	53.5%	0.045
Franklin <i>et al</i> ¹¹	Surgical	1473	1139	7.0%	4.3%	38.6%	0.005	ND	ND	ND	ND
Helmons <i>et al</i> ¹²	Medical-surgical	888	697	10.7%	8.2%	23.6%	ND	8.0%	3.4%	56.9%	ND
Poon <i>et al</i> ¹⁰	Surgical	3528	3856	ND	ND	ND	ND	9.8% [†]	5.4% [†]	45.1% [‡]	ND
De Young <i>et al</i> ¹³	ICU	775	690	19.7%	8.7%	56.0%	<0.001	3.6%	4.2%	-16.3%	ND
Helmons <i>et al</i> ¹²	ICU	374	394	12.6%	13.5%	-7.0%	ND	11.0%	9.9%	9.7%	ND
Poon <i>et al</i> ¹⁰	ICU	1187	1230	ND	ND	ND	ND	27.3% [†]	16.5% [†]	39.5% [‡]	ND
Morris <i>et al</i> ¹³	NICU	46090	46308	6.7%	8.0%	-14.7% [‡]	ND	ND	ND	ND	ND
Ros <i>et al</i> ²⁰	Neurology	3814	4300	5.8%	7.0%	-20.4%	<0.03	1.7%	0.8%	48.5%	<0.0008
Poon <i>et al</i> ¹⁰	Overall	6723	7318	16.7% [§]	12.2% [§]	27.3%	0.001	11.5%	6.8%	41.4%	<0.001

^{*}Excluding time and technique errors.

[†]Frequency calculated based on numbers presented in original publication (number of errors per ward type/number of observed doses per ward type ×100%).

[‡]Reduction calculated based on numbers presented in original publication.

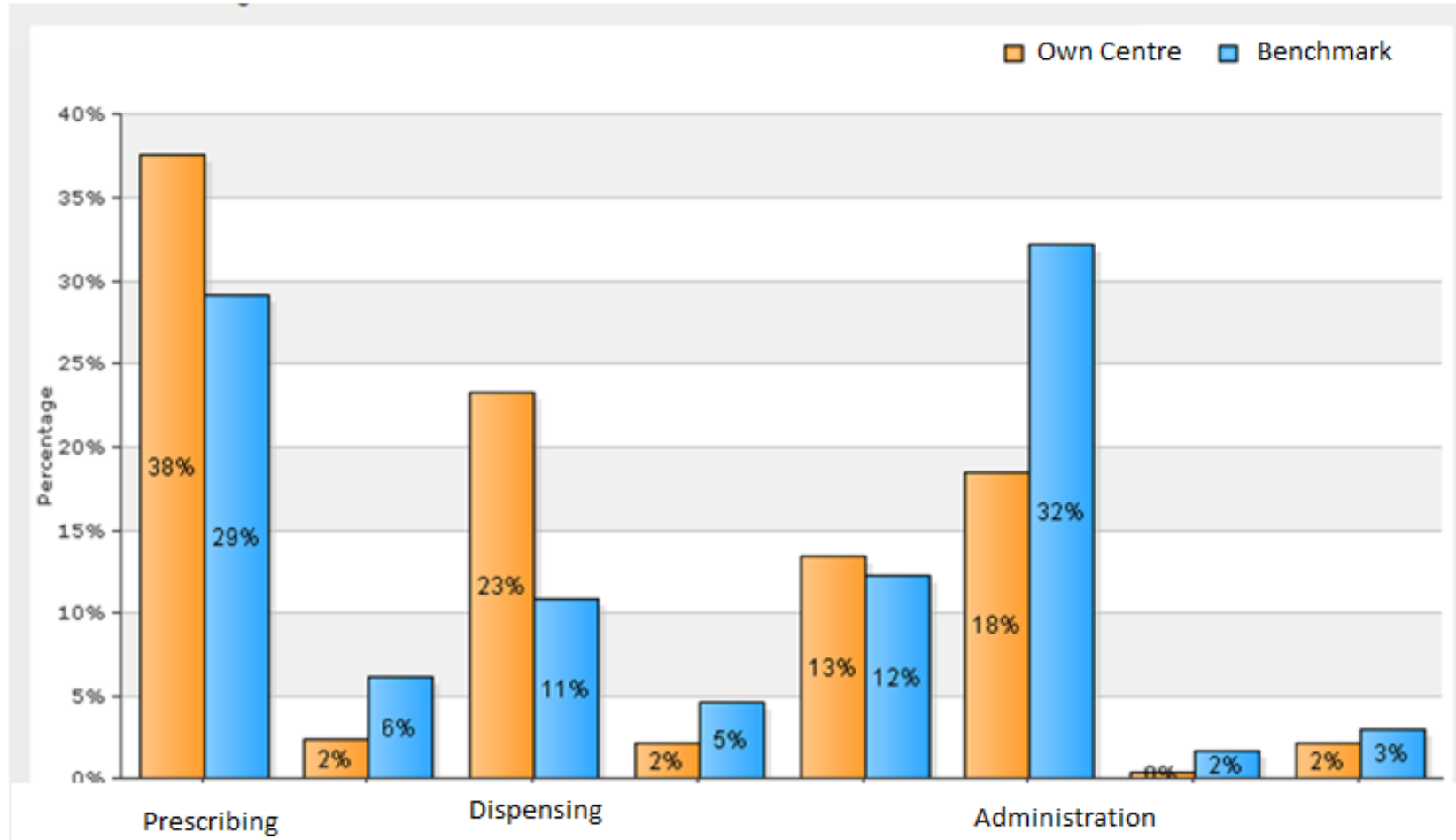
[§]Only time errors.

BCMA, bar code-assisted medication administration; ND, not determined.

Effects of bar code-assisted medication administration (BCMA) on frequency, type and severity of medication administration errors: a review of the literature

Jeroen Hassink, 1 Mark Jansen, 1 Pieter Helmons² *European Journal of Hospital Pharmacy* 2012;**19**: 489–494

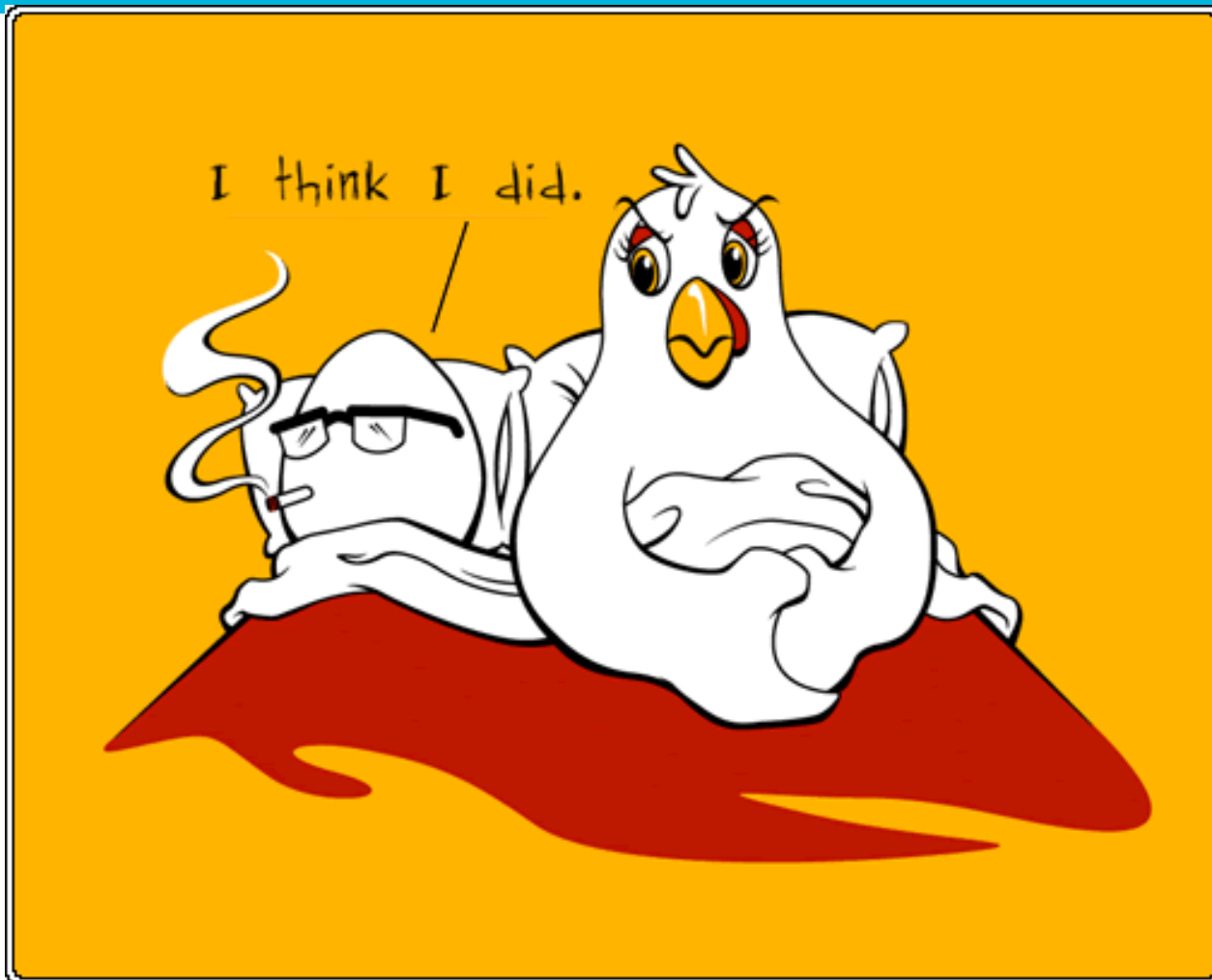
Medication Errors



KNMP/NVZA: Central Registration on Medication incidents 2013

Implementatie >95% UDP BCMA is Slow







**YES WE
SCAN**



Scanning on the Ward



Issues



High Risk



Unusable/Errornous Barcode
(gemfibrozil TEVA 600mg scans 900mg!)



Protect from light/moist no single unit of use

Issues



Opioids



**Suppositories,
Slippery Surface**



Ampuls, Small



Small strips



Workarounds and Errors



	MAE	No MAE	Total	OR (95% CI)
WA	271 (4.7%)	3362 (58.0%)	3633 (62.7%)	
No WA	16 (0.3%)	2144 (37.0%)	2160 (37.3%)	
Total	287 (5.0%)	5506 (95.0%)	5793 (100%)	10.8 (6.51-17.94)



rijksuniversiteit
 groningen

including time-window medication administration errors (470) the OR was 34.3 (95% CI 20.85-56.51)



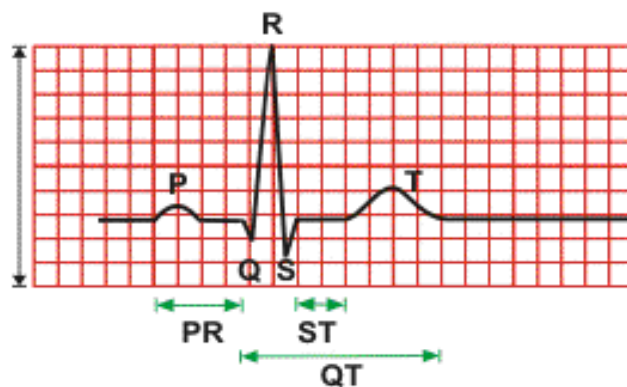
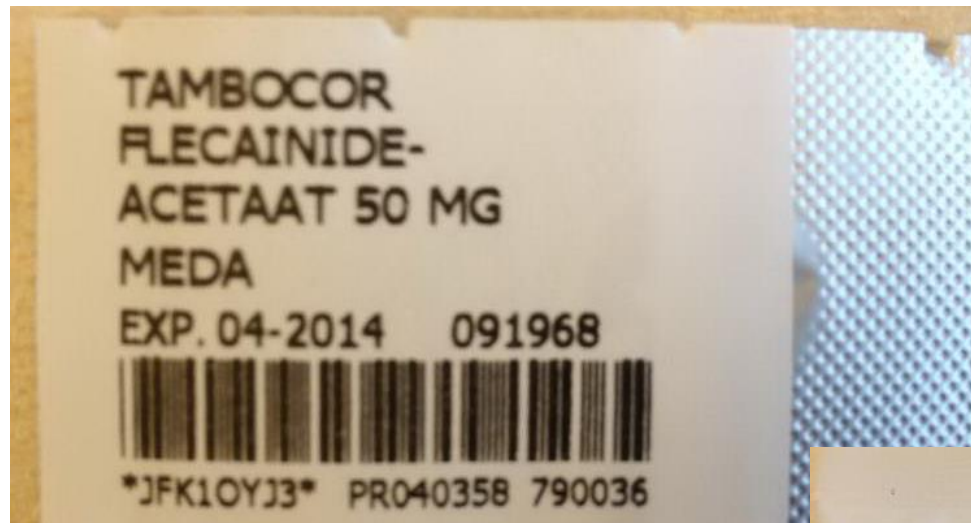
Patient Errors



Recent Errors



Sound alike



Good Manufacturing Practice



Verpakken vaste orale medicatie met DTA (tray)

antonius ziekenhuis

Naam geneesmiddel: SALOFALK TABLET MSR 250MG
Chargennummer: 130909/0004775604
Chargennummer: 12101355L
Artikelnnummer/barcode: 15563324
Houdbaar t/m: 30-09-2015
Na ompakken houdbaar t/m (Max 1 jaar): 04-10-2014

Magazijn: M1
Verpakking: 100 stuk
Verpakking eindproduct: 30 stuk
Fabrikant: DR. FALK PHARMA BENELUX BV
Leverancier: ALLIANCE HEALTHCARE B.V.

Akkoord:
 SALOFALK TABLET MSR 250MG OMGEPAKT
 Truistat: 04-10-2014
 Charge nr.: 12101355L
 Aantal: 300000004775604
 Houdbaarheid per verpakking: 30

Uiterlijke kenmerken:
 a. rond / niet deelbaar
 b. geen inscriptie
 c. geel

Akkoord:
 a) Ja / Nee
 b) Ja / Nee
 c) Ja / Nee

Uitvoering:
 Breng de medicatie die omgepakt moet worden en controlevoorschrift in aparte bak naar de FDS-ruimte. (volg de kledingprocedure)

Aantal te verpakken:
 Zijn de ruimte, apparatuur, werkblad schoon en vrijgegeven?
 - Laat de medicatie vrijgeven voor verpakken
 - Verpak de medicatie met de FDS conform de procedure
 - Markeer de restdoos en vermeld de correcte aantal op de restdoos
 - Ruim alle restanten op en maak schoon volgens de schoonmaakprocedure
 - Vul de ruimte en apparatuur logboeken in ingevuld? JA / NEE
 - Plaats het omgepakte product inc. de originele verpakking terug in quarantaine
 - Laat het product vrijgeven door een apotheker

Ompakken binnen Chipsoft:
 - Pak het artikel om binnen Chipsoft
 Is omgepakt binnen Chipsoft? JA / NEE
 - Indien niet mogelijk, laat het corrigeren
 Is gecorrigeerd binnen Chipsoft? JA / NEE (app. beheer)

Opbrengst:
 Aantal uitgevallen: stuks (B)
 Aantal vernietigd: stuks
 Reden(en) uitval:
 Netto aantal: stuks (=A-B)
 Etiket: Aantal aangemaakt: stuks
 Aantal gebruikt: stuks
 Aantal vernietigd: stuks

Bijzonderheden:

Uitgevoerd: Datum: 04-10-2013
Vrijgafte door: Datum: (apotheker)
 GOEDGEKEURD / AFGEKEURD

Abstrakum / 101 04-10-2013 16:21:54 Type: 004 / 1004-014

Aftekenlijst barcoderen

ziekenhuis

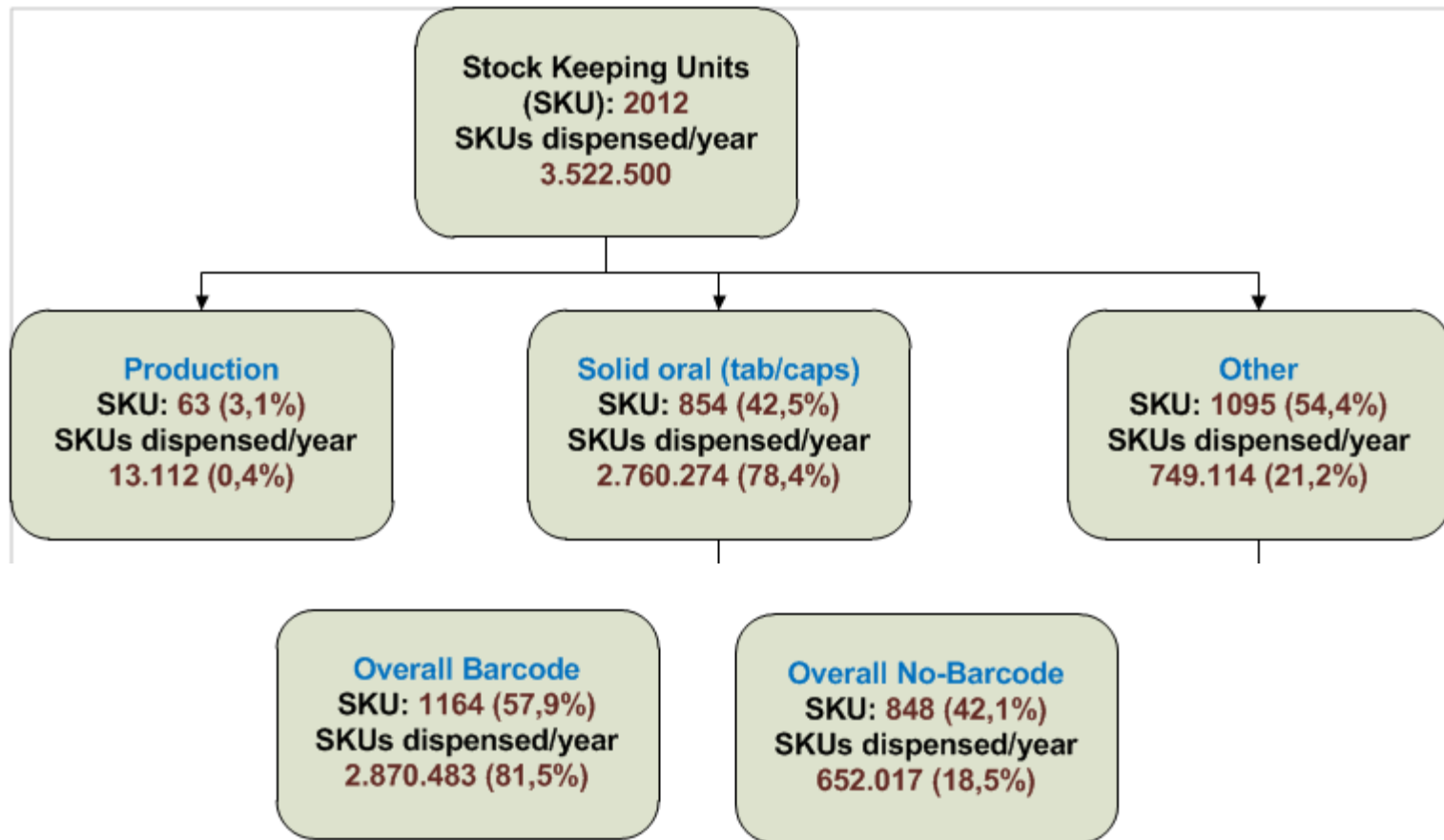
Degene die barcodeert, noteert het geneesmiddel, plakt een voorbeeldetiket en vult zijn/haar naam in. Een tweede persoon controleert of het juiste etiket op het juiste middel is geplakt en vult vervolgens, ter controle, zijn/haar naam in. Aan het eind van de dag controleert en parafeert de receptapotheker. Lijsten gaarne in de order laten.

Naam middel	Voorbeeld van etiket	Naam plakker	Naam controleur	Aantal etiketten afgedrukt	Aantal etiketten geplakt	Aantal etiketten vernietigd
morfine 10mg/ml ampul 1ml		B	Ai	121	120	-
Fentanyl matrix 12mcg/L		Ai	J	81	80	-
Fentanyl matrix 25mcg/L		PN	Ai	71	70	-
Allopurinol tablet 300mg per		Ai	PN	181	180	-
Clarelux schuim voor cuva 95mg/g		UR	PN	5	4	-
Poster Acr 100/6mg/120D		UR	PN	7	6	-

Datum: 3-10-2013

Paraaf receptapotheker:

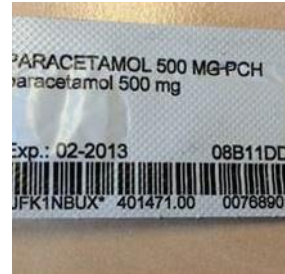
Antonius Sneek



How to overcome these obstacles?



Repackaging



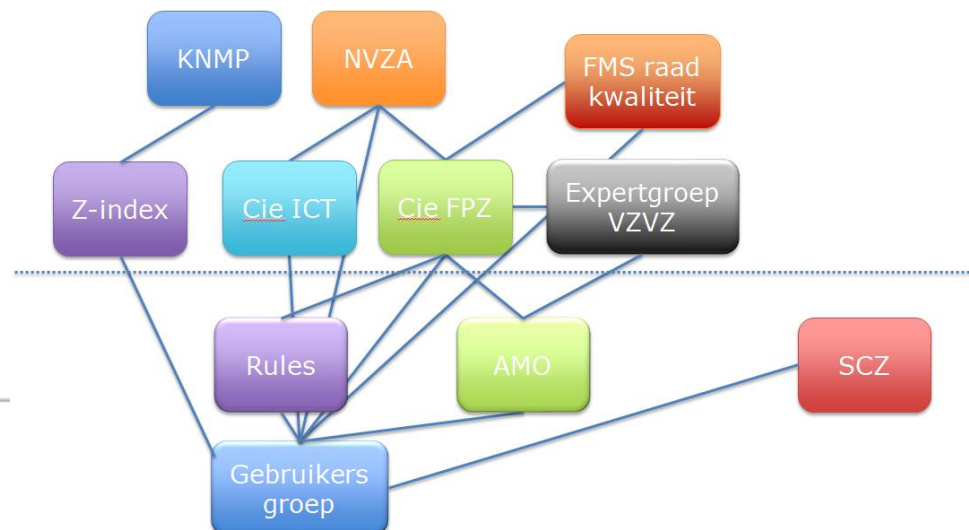
Standardization
of Medication
suppliers



How do they do it?



- Responsive Hospital Board
- Active role in Safety Committee of the hospital
- Active role in Hospital IT project
- Local and National Network



How to improve





IMPROVING LIFE AT WORK





ënt is opgenomen op ZDUM/1/4

Toedieningsregistratie Geboren 20-04-1922

14-10-2013 - 15-10-2013 11:59 Verlopen toedieningen Sortering: Toedieningsweg Ronde: Alle rondes +/- 0

ORAAL	14okt	06:00	12:00	18:00	15okt
DICLOFENAC-NATRIUM TABLET MSR 50MG BAXTER 3 x per dag (1; 1-2; 1 stuk) DICLOFENAC NATRI Bij voorkeur een half uur VOOR het eten Pas op met alcohol i.v.m. maagklachten Heel doorslikken, niet kauwen Bij maagklachten NA het eten innemen Startdatum 27-09-2013 Stopdatum - - regel toevoegen	08:00 1STUK	08:00 0STUK*	22:00 1STUK	08:00 1-2STUK	
MARCOUMAR TABLET 3MG 1 x per dag maximaal 3 stuk MARCOUMAR TABLE Heel doorslikken, niet kauwen Gebruik volgens schema trombosedienst 's Avonds innemen bij de maaltijd Startdatum 14-10-2013 Stopdatum - - regel toevoegen			18:00 1STUK		
METOPROLOL TABLET MGA 100MG (SUCCL... 1 x per dag 1 stuk METOPROLOLSUCCI Kan het reactievermogen verminderen Heel doorslikken, niet kauwen Startdatum 14-10-2013 Stopdatum - - regel toevoegen				08:00 1STUK	
PARACETAMOL TABLET 500MG BAXTER 4 x per dag 2 stuk PARACETAMOL CF T Startdatum 14-10-2013 Stopdatum - - regel toevoegen		08:00 2STUK*	12:00 2STUK*	17:50 2STUK*	22:00 2STUK
CUTAAN	14okt	06:00	12:00	18:00	15okt
KETOCONAZOL CREME 20MG/G 1 x per dag 1 gram KETOCONAZOL PCH Bij kamertemperatuur bewaren (15-25 C) Startdatum 14-10-2013 Stopdatum - - regel toevoegen		08:00 2GRAM*			08:00 1GRAM
IV	14okt	06:00	12:00	18:00	15okt
AMOXICILLINE/CLAVULAANZUUR INJOPDR ... 3 x per dag 1 stuk AMOXI/CLAV PCH IN Startdatum 14-10-2013 Stopdatum - - regel toevoegen		08:00 1STUK*	15:00 1STUK*	22:00 1STUK	08:00 1STUK
VANCOMYCINE PDR V INFLVST 500MG FL 2400 mg per 24 uur VANCOMYCINE FRES Bij kamertemperatuur bewaren (15-25 C) Startdatum 14-10-2013 Stopdatum - - regel toevoegen				16:52 2400MG*	

Direct Feedback



Toedieningsregistratie Geboren 20-04-1922

ënt is opgenomen op ZDUM/1/4

Sortering: Toedieningsweg Ronde: Alle rondes +/- 0

Verlopen toedieningen

ORAAL	14 okt	06:00	12:00	18:00	15 okt
DICLOFENAC-NATRIUM TABLET MSR 50MG BAXTER 3 x per dag (1; 1-2; 1 stuk) DICLOFENAC NATRI Bij voorkeur een half uur VOOR het eten Pas op met alcohol i.v.m. maagklachten Heel doorslikken, niet kauwen Bij maagklachten NA het eten innemen Startdatum: 27-09-2013 Stopdatum: - - regel toevoegen	08:00 1STUK	08:00 0STUK*	22:00 1STUK	08:00 1-2STUK	
MARCOUMAR TABLET 3MG 1 x per dag maximaal 3 stuk MARCOUMAR TABLET Heel doorslikken, niet kauwen Gebruik volgens schema trombosediens 's Avonds innemen bij de maaltijd Startdatum: 14-10-2013 Stopdatum: - - regel toevoegen			18:00 1STUK		
METOPROLOL TABLET MGA 100MG (SUCC... 1 x per dag 1 stuk METOPROLOLSUCCI Kan het reactievermogen verminderen Heel doorslikken, niet kauwen Startdatum: 14-10-2013 Stopdatum: - - regel toevoegen				08:00 1STUK	
PARACETAMOL TABLET 500MG BAXTER 4 x per dag 2 stuk PARACETAMOL CF T Startdatum: 14-10-2013 Stopdatum: - - regel toevoegen	08:00 2STUK*	12:00 2STUK*	17:50 2STUK*	22:00 2STUK	08:00 2STUK
CUTAAAN KETOCONAZOL CREME 20MG/G 1 x per dag 1 gram KETOCONAZOL PCH Bij kamertemperatuur bewaren (15-25 C) Startdatum: 14-10-2013 Stopdatum: - - regel toevoegen	08:00 2GRAM*				08:00 1GRAM
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VANCOMYCINE PDR V INFLVST 500MG FL 2400 mg per 24 uur VANCOMYCINE FRES Bij kamertemperatuur bewaren (15-25 C) Startdatum: 14-10-2013 Stopdatum: - - regel toevoegen			16:52 2400MG*		

Success factors



- IT infrastructure usable for Patient data management
- Digital ordering and decision support software provide pharmacy time for barcoding.
- Barcodes can be used for logistic safety
- Scanning can improve ward-stocking



Medication IT in the Netherlands

The Netherlands is leading in Medication IT

Opportunity for Dutch Pharma

INSTALLED BASE OF KEY COMPONENTS

% Acute hospitals, 2012

	Germany	Italy	Spain	Netherlands	Poland
<i>Pharmacy in Hospital</i>	89.3%	100.0%	99.2%	100%	96.0%
Pharmacy IS	50.9%	75.1%	95.9%	99.7%	74.4%
ePrescribing	34.8%	35.1%	54.3%	94.7%	7.6%
eMAR, of which	37.6%	31.8%	88.3%	77.3%	7.6%
<i>Available at bedside</i>	14.0%	73.7%	75.3%	96.7%	0.0%
ADM Unit-Dose	3.6%	5.9%	35.1%	40.0%	0.0%
Bar code / RFID, of which	79.5%	92.3%	77.4%	93.1%	64.6%
<i>for Medication</i>	40.3%	26.3%	31.1%	65.7%	4.2%
CLMA (self-perception)	3.5%	10.5%	34.0%	41.1%	0.0%

Source: HIMSS Analytics Europe, eHospital Census, 2012

EAHP POLICY BRIEFINGS



BAR CODING TO THE SINGLE UNIT OF MEDICINE ADMINISTERED IN HOSPITALS



The patient safety case for bar coding to the single unit

America takes action!

- In 2001 the **Federation of American Hospitals (FAH)** called for bar coding to the single unit
- The National Coordinating Council for Medication Error Reporting and the American Society for Health System Pharmacists supported the call
- **2006 – campaign success!** The US FDA made it mandatory for medicines supplied to hospitals to be bar coded to the single unit.



6

Site Specific vs Industry



NVZA position paper



- All medication used in hospitals should be available in Single Unit of Use Packages
 - Single unit administration
- All Single Unit of Use Packages should contain the correct barcode
 - record the administration of medication electronically
 - significantly contributes to greater medication safety

Our needs

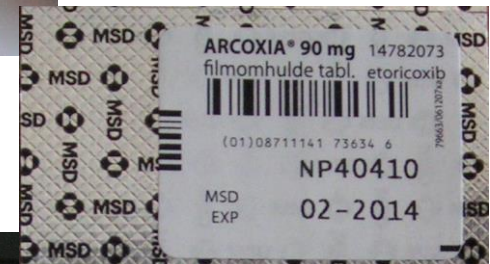
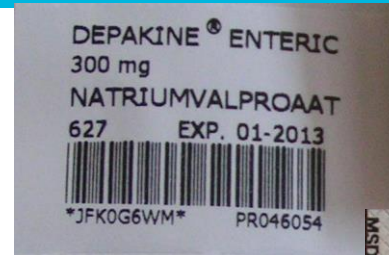


EAG of all single unit packages eg.

- *Solid oral (tablets, capsules, ..)*
- *Solid/Liquid parenteral (ampoules, syringes, vials)*
- *Liquids (minims, morfine solution ampoules, etc)*
- *Ointments etc (not available in NL)*

- label should contain:

- *Nonproprietary and proprietary names.*
- *Dosage form.*
- *Strength*
- *Expiration date*
- *Control number (lot number)*
- *Barcode GTIN*



The outcomes



- Medication safety at point of care
- Possibility of recalls at single dose level
- Registration batch number biologicals
- Solutions along the continuum of care

Medication Dispensing (Nursing) Home



Road Map



- Covenant of all stakeholders
 - Manufacturers, Gov't, Regulators, Health Care Professionals
- Prioritising High Risk medication
- Identification all single use medication
- Batch number, expiry date

**Barcodering op de primaire verpakking van
geneesmiddelen in ziekenhuizen**

Een kosten-baten analyse

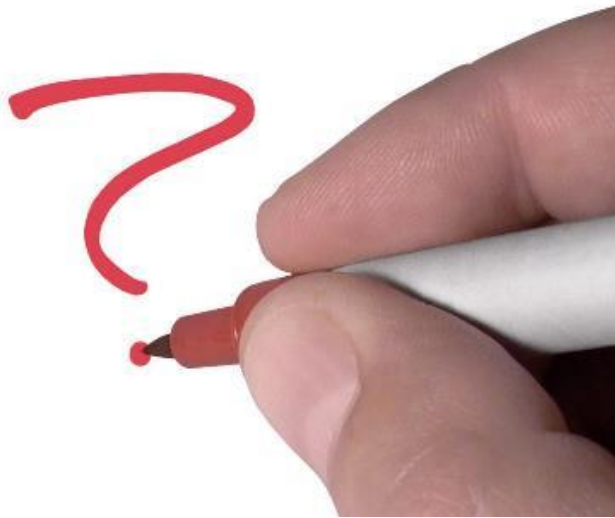
In opdracht van het Ministerie van VWS, Directie Geneesmiddelen en Medische Technologie
Het rapport is tot stand gekomen in samenwerking met de werkgroep Barcodering Geneesmiddelen



Yes You Can



HPAC Questions and contact details



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