



The Global Language of Business

# Bedside Scanning Break-Out session GS1 Global Healthcare Conference - Berlin

GS1 Healthcare Event 2017

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# Agenda

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- Business proces redesign to reduce medication errors
- Remaining problems
- Statements in favour of the use of barcodes
- Roadmap to a bright future



## Who am I

- Hospital Pharmacist
- Former member of several IT committees (NVZA and KNMP) for 6 years
- Working at Gelre ziekenhuizen (hospital), Apeldoorn / Zutphen, the Netherlands
- Interest in direct patient care and medication safety
- Early adaptor of barcodes in closed loop medication administration
- GS1 presentation in London 2007, now update



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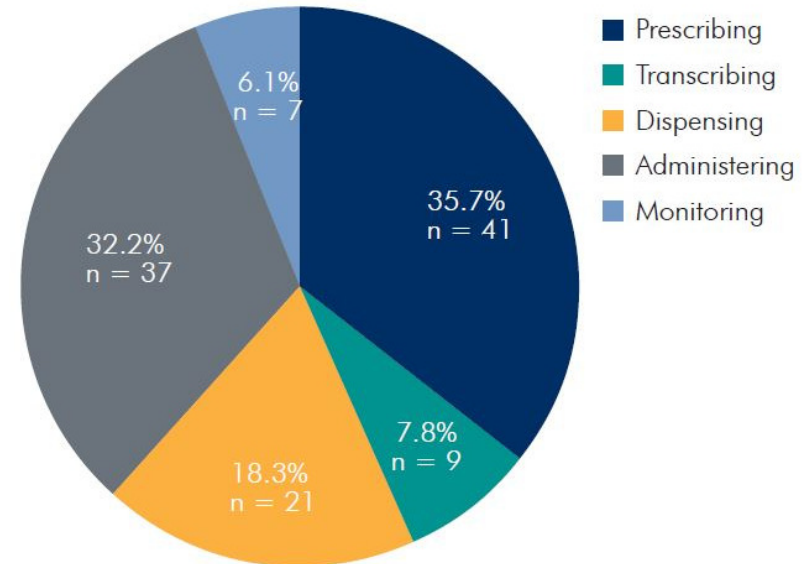
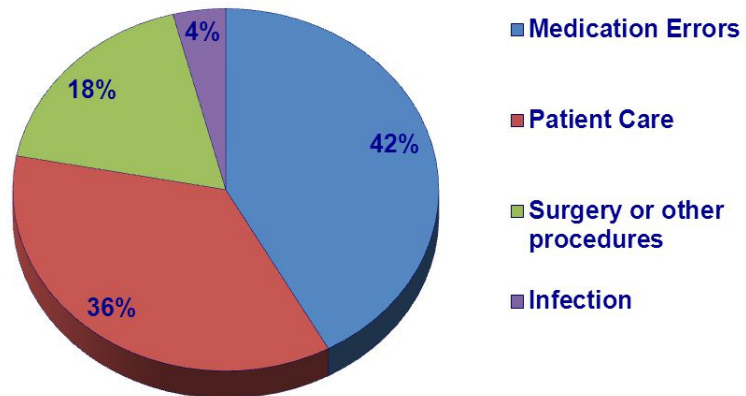
## Business proces redesign to reduce medication errors



## Patient safety

## Medication errors

### Patient Safety – Adverse Events



MS16139



# 2005 BPR to improve medication safety

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Implementing our business process redesign in two steps:

Step 1:

- Implement a CPOE-system
- Introduce computer assisted medication administration

Step 2:

- Introduce the BAP-trolley
- Introduce barcode-assisted medication administration

CPOE = Computerized Prescriber Order Entry

BAP = Bedside Assortment Picking





# Classification of errors

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- Category I No prescription from a physician
- Category II Extra dose
- Category III Wrong dose
- Category IV Dose not administered
- Category V Time error
- Category VI Wrong route of administration
- Category VII Wrong formulation
- Category VIII Wrong technique of administration

# BAP-cart



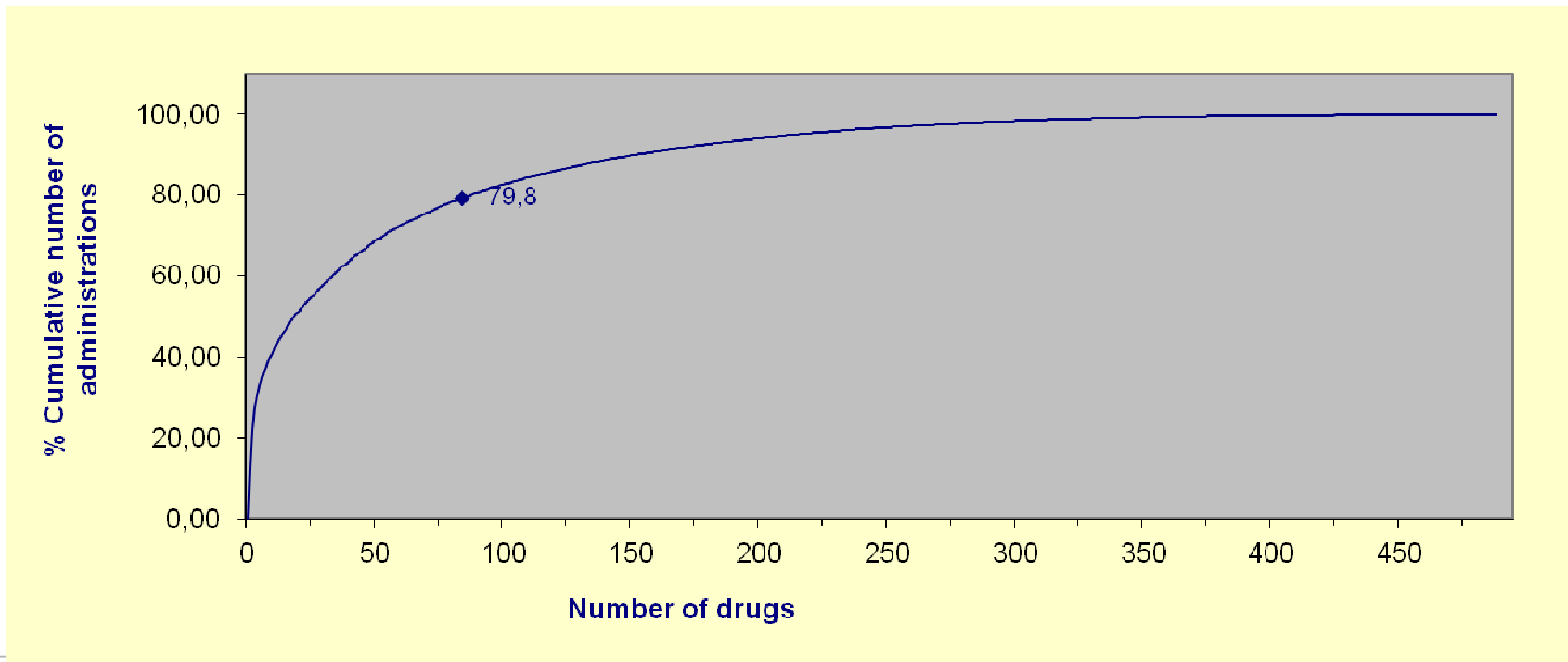
## Introduction to BAP

- Trolley with 80 drugs in stock
- And for each patient a bin with patientspecific (non-stock) medication
- Laptop in wireless network
- Wireless scanner





# Stock: 80 drugs = 80% of all administrations



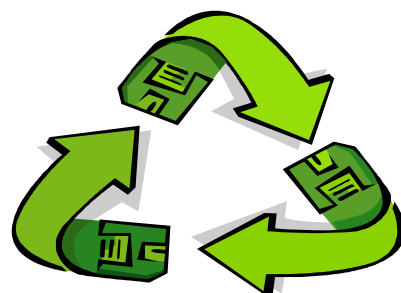


# Final process

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1. Physician: CPOE  
Pharmacy: Check on interactions / overdoses, etc.  
and distribute the drugs

4. Scanning the  
barcode of the patient



2. Nurse:  
Scanning the barcode of  
the patient



3. Scanning the  
medication



# Results



	Pre-CPOE (n=4457)		Post-CPOE (n=3814)		BAP-phase (n=4300)	
	Number of errors	% <sup>1</sup>	Number of errors	% <sup>1</sup>	Number of errors	% <sup>1</sup>
I Unordered drug	13	0.29	5	0.13	1	0.02
II Extra dose	9	0.20	1	0.03	2	0.05
III Wrong dose	21	0.47	23	0.60	8	0.19
IV Dose not administered	57	1.28	23	0.60	16	0.37
V Wrong time	181	4.06	159	4.17	264	6.14
VI Wrong route of administration	11	0.25	1	0.03	0	0
VII Wrong preparation	0	0.00	0	0.00	1	0.02
VIII Wrong administration technique	27	0.61	9	0.24	8	0.19
Total	319	7.16	222	5.79	300	6.98
<b>Total (excl. Category V)</b>	<b>138</b>	<b>3.10</b>	<b>63</b>	<b>1.65</b>	<b>36</b>	<b>0.84</b>



**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> <sup>p</sup>	Cardiac telemetry	308	318	25.3%	19.2%	24.1%	0.065	1.6% <sup>*</sup>	1.6% <sup>*</sup>	0.0%	0.959
Poon <i>et al</i> <sup>10</sup>	Medical	2008	2232	ND	ND	ND	ND	5.3% <sup>†</sup>	3.8% <sup>†</sup>	28.5% <sup>‡</sup>	ND
Paoletti <i>et al</i> <sup>p</sup>	Medical-surgical	320	310	15.6%	10.0%	35.9%	0.035	6.3% <sup>*</sup>	2.9% <sup>*</sup>	53.5%	0.045
Franklin <i>et al</i> <sup>11</sup>	Surgical	1473	1139	7.0%	4.3%	38.6%	0.005	ND	ND	ND	ND
Helmons <i>et al</i> <sup>12</sup>	Medical-surgical	888	697	10.7%	8.2%	23.6%	ND	8.0%	3.4%	56.9%	ND
Poon <i>et al</i> <sup>10</sup>	Surgical	3528	3856	ND	ND	ND	ND	9.8% <sup>†</sup>	5.4% <sup>†</sup>	45.1% <sup>‡</sup>	ND
De Young <i>et al</i> <sup>13</sup>	ICU	775	690	19.7%	8.7%	56.0%	<0.001	3.6%	4.2%	-16.3%	ND
Helmons <i>et al</i> <sup>12</sup>	ICU	374	394	12.6%	13.5%	-7.0%	ND	11.0%	9.9%	9.7%	ND
Poon <i>et al</i> <sup>10</sup>	ICU	1187	1230	ND	ND	ND	ND	27.3% <sup>†</sup>	16.5% <sup>†</sup>	39.5% <sup>‡</sup>	ND
Morris <i>et al</i> <sup>13</sup>	NICU	46090	46308	6.7%	8.0%	-14.7% <sup>‡</sup>	ND	ND	ND	ND	ND
Ros <i>et al</i> <sup>20</sup>	Neurology	3814	4300	5.8%	7.0%	-20.4%	<0.03	1.7%	0.8%	48.5% <sup>‡</sup>	<0.0008
Poon <i>et al</i> <sup>10</sup>	Overall	6723	7318	16.7% <sup>§</sup>	12.2% <sup>§</sup>	27.3%	0.001	11.5%	6.8%	41.4%	<0.001

<sup>\*</sup>Excluding time and technique errors.

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

<sup>‡</sup>Reduction calculated based on numbers presented in original publication.

<sup>§</sup>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





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## Remaining problems





... but we are not satisfied

## Problems

- Barcodes in only 55-60% available
  - Solid forms
  - Potions
  - Vials
  - Ampoules
  - Syringes
  - Cremes, ointments, inhalation
- Medication in blister versus unit doses
- Diversity in type of the barcode
- Diversity in size of the barcode
- Barcodes not readable, because of:
  - Ink partly wiped out
  - Background too radiant





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## Statements in favour of the use of barcodes





## 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.



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## **EAHP STATEMENT ON THE NEED FOR BARCODING OF THE SINGLE DOSE ADMINISTERED IN HOSPITALS**

**JUNE 2012 (UPDATED FROM 2007 & 2010 STATEMENTS)**

### ***What is meant by barcoding of the single dose?***

By "single dose" EAHP refers to the single item of medicine in an individual packaged component. This could for example include the single medicine within a perforated multi-dose blister pack, a syringe, a vial or an ampoule\*.

**For the primary purpose of reducing medication errors and protecting patient safety, EAHP's statement calls for each single dose of medicine used within hospitals and supplied to the hospital by manufacturers or wholesalers to include an individual barcode in GS1 datamatrix format.**



# EAHP letter to the industry (in concept)

**Dear CEO,**

**Patient safety demands barcoding of medicines to the single unit – we ask for your assistance.**

We, the undersigned signatories, write to you as a leader within the pharmaceutical industry, to draw your attention to, and seek your response to, the need for systematic barcoding of medicines to the single unit in order to prevent medication administration errors in hospitals.

Medication errors are one of the most common causes of preventable adverse events in the healthcare system. Amongst the common causes of medication error is the occurrence of error at the point of administering medicine in hospital. This can include:

- providing the incorrect dose,
- administering the wrong medicine,
- delivering the medicine to the patient at the wrong time, and,
- supplying the medicine via the incorrect route of administration.

# NVZA



- 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



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## Roadmap to a bright future





# Deadlock

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- The pharmaceutical industry is waiting for more electronic prescription-administration processes
  - Larger demand for barcodes on primary packages
  - Use cases also for the outpatient setting
- Hospitals are waiting for more barcoded primary packages before implementing Bar Code Medication Administration



# What do we want?

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- Medication safety at point of care
- Solutions along the continuum of care
  
- Proper (automated) stock control
- Possibility of recalls at single dose level
- Registration batch number (biologicals)
- Preventing counterfeiting



# What do we need?

## Barcodes on all primary packages eg.



Single vials, or combinations of vials and their diluent, identified each with its own GTIN



Ampoules, identified with their GTIN, if provided label size and mandatory texts allows.



Pouches, with medicinal product



Medicinal product in solid form, each blister cavity having the same GTIN, identifying the solid form included in that cavity



Prefilled syringe: combined product – medical device including medicinal product.

## Label should contain:

### Barcode with:

- Nonproprietary and proprietary names
- Dosage form
- Strength
  
- Expiration date
- Control number (lot number)
- Serial number ?



# Improving out-patient compliance



In-patient  
learns how  
to use  
medication

