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The Global Language of Business

# Closed Loop Medication Workflow

Using GS1 standards

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# Objective

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## Uninterrupted Workflow

- The Hospital Information System became the crucial factor of success of the Hospital Enterprise.
- Realtime provision of extensive Information on the full therapeutic process to the entire department, especially important for high security, quality and acceptance.

# Objective



## Paperless from Admission to Discharge

### Mobile Point of Care

Adapted  
processes  
+  
Mobile  
applications  
+  
Mobile  
devices  
+  
Wireless  
infrastructur



*Workplace in the  
intensive care unit*



## Secure Medication: Processanalyses

- Definition of secure medication
- Find out the status quo
- Isolate and name the causes of defects
- Strategy of interventions



## Liber de cultura hortorum 840 a.d.



Abbot from the isle of Reichenau, Walahfrid Strabo, describes 24 plants such as Sage, Vermouth, Fennel, Opium Poppy, Lovage, Chervil, Fleabane, Betony, Radish and Mint

- Results are „almost-incidences“ and CIRS cases, often caused by small defect, but with major consequences
- In order to address this issue, the medius Clinics - together with Agfa HealthCare - initiated the digital project „Medication Security“.

## Medicationscheck 2016

- In Germany, currently approx. 58,000 listed preparations with 2,400 active ingredients and indication information, contraindication, interaction.





## Status quo: Electronic Medication Prescription

### No common guideline countrywide to `Unit-Dose` supply

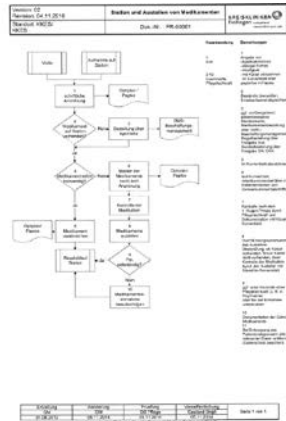
- medius Kliniken CPOE (computerized physician order entry) directive:
  - Allergy and medication interaction check
  - Documentation: Who prescribed what and when? Doses?
  - Administration documentation
  - Administration overview
  - Patient identification >> Patient wristband (name, case number)
- Critical incident reporting system (CIRS)
  - Recording of all phases in the medication process
- Clinical risk management

# Objective



## QA-Manual: 'Preparation and Administration of Medication'

- Correct patient
- Correct medication
- Correct doses
- Correct time
- Correct administration
- Correct documentation



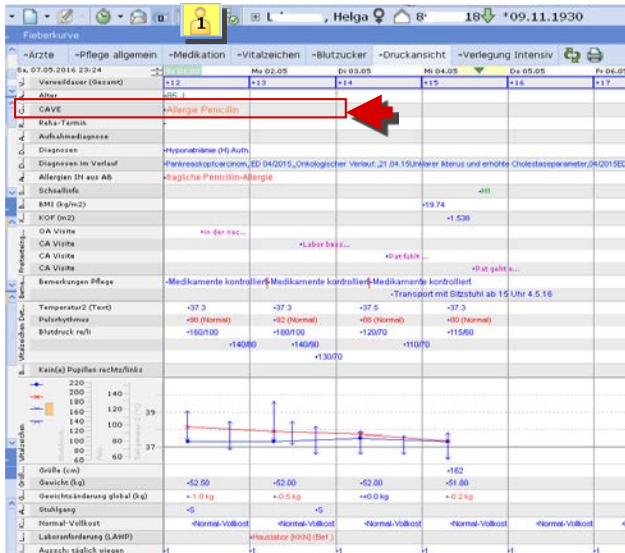
*Introduction of Patient Wristband Containing Name, Case Number and Barcode (GS1-Standard)*



# Objective



## Decision Support by system of rules and warnings



Rules with alerts: 'Medication prescription check'

Schicht: Mittag

Art des Auftrags:  Medikation  Bedarfsmed.  Infusion  Spritzenpumpe  Inhalation

Medikament: Amoxicillin 1000 mg Tbl.

Darreichung:  per os - fest  per os - flüssig  parenteral  sonstige

Verabreichungsform:  original  aufgelöst  zerstampft  Einheit  Stück

Termin: Standard

Beginn: 04.05.2016 Mi um 16:06 für Tage Stunden

Ende: um

jeden Tag

Mo  Di  Mi  Do  Fr  Sa  So  täglich

Zeit / Dosis:  bel. Zeiten  Standardzeiten  bis 24 Mal  ohne Zeiten  bel. Interv.

Dosis: 1000 mg

Zeit: 07:30 11:30 17:00 22:00

Es sind noch nicht alle auftragsrelevanten Daten angegeben

Anzeigeoptionen:  Neuverordnung in Stationsgrafik anzeigen

Auftragsart:  Farbcodierung: grün

**Penicillin Allergie**  
Bitte überprüfen Sie das Medikament Amoxicillin 1000 mg Tbl. oder geben Sie eine Begründung zum Fortfahren ein!

**Begründung**



# Objective

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## Interventions

- Optimisation of medication preparation and administration process
- Introduction of dispenser and single dose barcodes using GS1-Standard
- Documentation software for the medication preparation and administration process
- Usage of existing patient and employee barcodes with GS1-Standard

# Objective

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## Shared project aim

- Closed loop medication process
- Traceable medication preparation process with scanner supply and four eyes principle
- Bedside verification of prepared medication with patient's wristband
- Future batch backtracking by using the barcode defined in the Falsified Medicines Directive (Directive 2011/62/EU)

# Implementation



# Implementation



- Analyses of processes, creating different models, decisions
- Agreement on a standardized dispenser barcode (GSRN/SRIN)
- Design of labels and input forms
- Integration of existing identifier for patients and employees (GSRN)
- Validation
- Pilot operation



*Ward office with mobile workplace*

*This workplace is equipped with a barcode scanner and accompanies every ward around*



*Medication dispenser with label  
label contains patient's name, date of birth and  
barcode with GSRN and SRIN*

## Workflow 1: preparation

- For every patient of the ward, all labels are printed for the dispenser for the next day
- The labels are stuck onto the dispenser





*Scanning of medication dispenser  
and the medication packages*

## Workflow 1: preparation

- Dispenser is scanned
- Corresponding prescription opens and displays the medications to be prepared
- Scanning of the medication package





*Checking the prescription and putting the pills into the dispenser*

## Workflow 1: preparation

- The system confirms whether or not the scanned medication package matches the prescription
- Dispenser will be filled







*Scanning of employee barcode*

## Workflow 1: preparation

- Scanning of an employee barcode finalizes the preparation workflow
- Optionally, a second employee barcode might be scanned for checking reasons





*Bedside scanning of dispenser*

## Workflow 2: administration

- Bedside scanning of dispenser
- Form opens, showing the current patient and prescription
- Potential warnings in case the prescription was changed in the meantime
- Asking for patient barcode





*Bedside scanning of patient barcode*

## Workflow 2: administration

- Bedside scanning of patient barcode
- Checking whether the dispenser is the correct one for this patient





*Scanning of employee barcode*

## Workflow 2: administration

- Scanning of an employee barcode finalizes the administration workflow
- Optionally, a second employee barcode might be scanned for checking reasons



# Single Dose Workflow



# Medication Workflow Single Dose



*Prescription of single dose medication:  
Liquid medication, syringes, injections*

## Prescription

- Medications that do not fit into the dispenser
- Liquid medication
- Syringes
- Infusion solution
- ...and any medication outside the dispenser workflow



# Medication Workflow Single Dose



*Preparation of liquid medication*

## Preparation

- Liquid medication is filled into a cup
- Syringes are prepared
- Injections are filled



# Medication Workflow Single Dose



Syringe and cup label

Test: Barbara  
W(\*)01.01.1949 Fal: 87002014  
Datum: 17.02.2017 11:30  
Med: Sab simplex Saft (m)  
5.00 ml (11:30) (Medikation per os -  
flüssig)

## Labels

- Label is stuck onto the infusion solution and the cup
- It contains patient's name, date of birth, case number as well as the medication and the doses
- Barcode contains GSRN/SRIN







*Cup and syringe label*

## Labels

- Label is stuck onto the cup and the syringe
- It contains patient's name, date of birth, case number as well as the medication and the doses
- Barcode contains GSRN/SRIN



# Implementation



- Both the clinical division and the material management of the medius Kliniken frequently encounter GS1-Barcodes (GTINs).
- To guarantee an unique patient and employee identification, GS1 also provides the proper standard (GSRN).
- In order to make sure that there is also a unique identifier for a patient-related service (GSRN/SRIN), a decision was made to choose GS1-standards for the entire workflow.



# Experience



# Experience



- Increase in documentation quality and efficiency by additional pharmaceutical competence.
- High acceptance
- Increase in patient and employee security



*Preparation workplace in the ward office*



# Thank You!

