




Infusion Technology Challenges & Pitfalls

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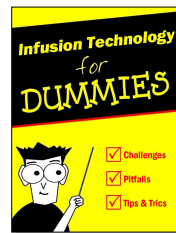


Tergooi zorgt vooruit.




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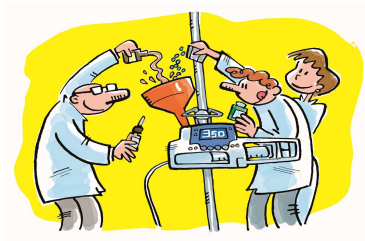
- Setting the Scene
- Risk Management
- Pump Integration




Focus on challenges during selection and purchasing



Setting the Scene






Setting the Scene

Investment	
750 syringe pumps	€ 1.000.000
500 volumetric pumps	€ 800.000
175 docking stations	€ 100.000
100 feeding pumps	€ 100.000
Total	€ 2.000.000

Recurring costs	
Maintenance	€ 100.000 / year
Tubing sets	€ 300.000 / year
Total	€ 400.000 / year

TCO – 10 year:	€ 6.000.000
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Setting the Scene

CHALLENGE

- Infusion technology has substantial TCO
- Different budgets: investment / exploitation
- Budgets divided over multiple departments

TIPS

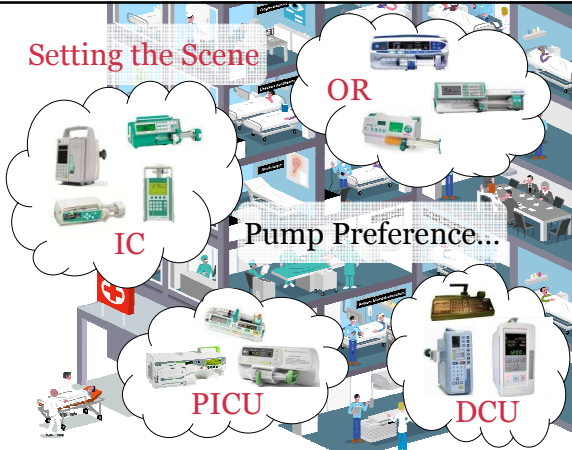
- Investment planning
- Centralize budget
- Allocate budget



Setting the Scene

OR

Pump Preference...



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Setting the Scene

CHALLENGE

- Pumps are in use at many departments
- Pumps are exchanged between departments
- Departments have conflicting requirements

TIPS

- Consider standardization
- Harmonize requirements
- Involve all major departments
- Selection based on clinical trials

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Risk Management



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Top 10 Health Technology Hazards

THE LIST FOR 2014

- Alarm hazards
- Infusion pump medication errors
- CT radiation exposures in pediatric patients
- Data integrity failures in EHRs and other health IT systems
- Occupational radiation hazards in hybrid ORs
- Inadequate reprocessing of endoscopes and surgical instruments
- Neglecting change management for networked devices and systems
- Risks to pediatric patients from "adult" technologies
- Robotic surgery complications due to insufficient training
- Retained devices and unretrieved fragments




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The Science of Safer. The Integrity of Dependence.

2011: 7th
2012: 3rd
2013: 2nd
2014: 2nd

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Risk Analysis – Introduction



Risk Cause Consequence Countermeasure 1 Consequence Countermeasure 2

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Risk Analysis – Fine & Kinney

Risk = Failure rate × Potential consequence

		Potential consequence		
		LOW no harm	MEDIUM temporary	HIGH permanent
Failure rate	HIGH weekly	Yellow	Red	Red
	MEDIUM monthly	Green	Yellow	Red
	LOW yearly	Green	Green	Yellow

X not acceptable risk
countermeasures mandatory
X justifiable risk
countermeasures desirable
X acceptable risk
no countermeasures



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Risk Analysis – Example

- Medication order
- Preparation of medication
- Preparation of materials
- Infusion pump in use with patient
- Change medication or materials
- Disconnect patient from materials

4. Infusion pump in use with patient

failure: many alarms
cause: wrong alarm settings
result: neglect of alarm / alarm fatigue

failure rate: high
consequence: high
risk: high

countermeasures:

- protocols
- training
- acceptance testing

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Risk Management

CHALLENGE

- Infusion technology induces many incidents
- Incidents can cause significant patient harm

TIPS

- Perform risk analysis
- Invoke multidisciplinary expertise
- Implement countermeasures

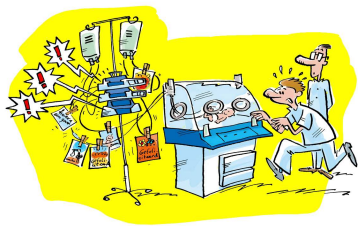
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Pump Integration



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Pump Integration – Introduction

What is it?
Connecting medical devices to information systems
“Seamless digital pathway”



Medication order

Safe infusion

- patient
- medication
- dosage
- pump

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Infusing Patients Safely

Infusion Device Summit
AAMI/FDA, 2011



Priority Issues
“Improve the **integration of infusion devices** with information systems and drug libraries”

AAMI – Association for the Advancement of Medical Instrumentation
FDA – Food and Drug Administration

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Pump Integration – Types

- Autodocumentation
- Autoverification
- Autoprogramming

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Autodocumentation

USE

- Nurse programs the pump
- Nurse starts the pump
- Pump sends program to EHR



All pump activities are documented in EHR

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Autoverification

SCAN

- Patient, pump, medication
- Establish patient association


START

- Nurse programs & starts pump
- Pump sends program to EHR

CHECK

- EHR checks program with order
- EHR sends warning

Catches manual-programming errors before they cause harm



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Autoprogramming

SCAN

- Patient, pump, medication
- Establish patient association


SEND

- EHR sends order to server
- Server sends program to pump

START

- Nurse views & verifies therapy
- Nurse starts pump

Prevents manual-programming errors



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Pump Integration

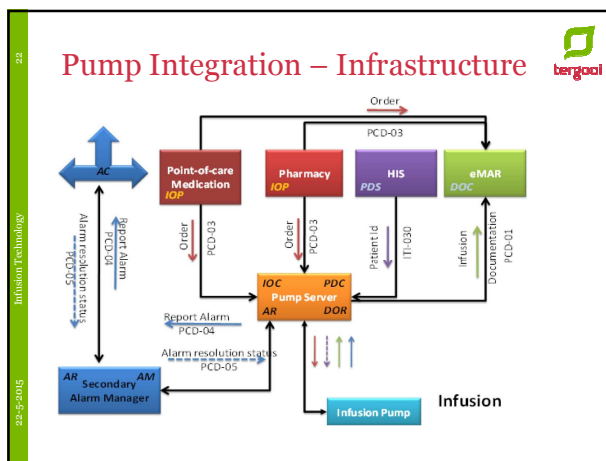
POTENTIAL ROLE OF PUMP INTEGRATION IN AVERTING INFUSION-RELATED EVENTS

Problem	Number reported	Addressed by smart pump drug libraries?	Addressed by pump integration?
Wrong concentration	29	No	Yes
Wrong entry of more than one parameter	19	Yes, if it triggers an alert	Yes
Secondary (piggyback) infusion setup error	15	No	No
Wrong weight	8	No	Yes
Wrong rate	8	Yes, if it triggers an alert	Yes
Pump is not turned on	6	No	Yes
Wrong drug	6	No	Yes
Wrong units	4	Yes	Yes
Set is not connected to patient	4	No	Yes
Wrong dose	1	Yes, if it triggers an alert	Yes

75% of infusion pump errors could be affected by integration

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PSO
Share. Learn. Protect.


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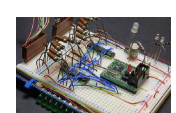
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Pump Integration – Disclaimer

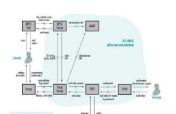
What we think we can buy today




What we can really buy today



What we think clinical workflow looks like



What clinical workflow really looks like

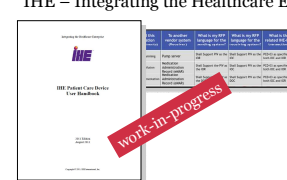


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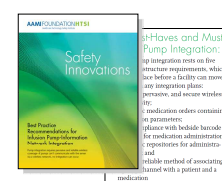
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Pump Integration – Best Practices

Point-of-care Infusion Verification Profile
IHE – Integrating the Healthcare Enterprise



Best Practice Recommendation Infusion Pump Integration
Association for the Advancement of Medical Instrumentation, 2012



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Pump Integration

CHALLENGE

- Pump Integration can significantly reduce errors
- Pump Integration is still work-in-progress

TIPS

- Involve suppliers
- Involve ICT
- Rely on best practise recommendation

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Take-Home Message

Infusion Technology has many challenges!

- many pumps
 - many euros
 - many users
 - many incidents

Consider

- Risk Management
- Pump Integration




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Questions?

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