Lessons learnt from clinical entrepreneurs: scaling innovations

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Non-injectable arterial connector (NIC)

Prevents:
• Wrong route drug administration
• Bacterial contamination of arterial line
• Blood spillage during sampling
Non-injectable arterial connector (NIC)

Publications:
- Description of a new non-injectable connector to reduce complications of arterial blood sampling. Anaesthesia (2015)
- Extending the arterial transducer set using the non-injectable arterial connector. The Intensive Care Society (2017)

Awards
- Winner: HEE Innovation Award (2009)
- Winner: National Patient Safety and Care Award (2012)

Health Economic Evaluations:
- Eastern Academic Health Science Network
- York Health Economics Consortium
hospitals have implemented the non-injectable arterial connector (NIC)

NIC adoption

2008 - NPSA Rapid Response Report: arterial lines
2009 - NIC patented (QE Kings Lynn Hospital)
2012 - NIC used QEH National Safety Award
2013 - Eastern AHSN supports regional spread
2015 – NIA programme
2017 – ITP & wider AHSN Network support

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WireSafe

Prevents

• Retained foreign object never event
• Reduces needle stick injuries
WireSafe

Publications
• Guidewire retention – not a problem? European Journal of Anesthesiology 2015
• Preventing retained central venous catheter guidewires: A randomized controlled simulation study using a human factors approach. Anesthesiology (2017)
• Retained guidewires in the Veterans Health Administration: Getting to the root of the problem. Journal of Patient Safety. 2018
• The WireSafe™ for Preventing Retained Central Venous Catheter Guidewires: Clinical Usability. Advances in Human Factors and Ergonomics in Healthcare and Medical Devices (2018)

Awards
• Highly commended National Patient Safety Award (2016)
• Presidents award for outstanding Achievement (Royal College of Anaesthetists) (2016)

Health Economic Analysis
WireSafe adoption

2009 – Retained foreign object a never event
2015 – WireSafe patented
2015 - WireSafe used QEH
2016–2017 - NIA programme - National Safety Award
2018 - 15 AHSNs pledged support

5 hospitals have implemented the WireSafe
WireSafe predictions if support similar

2009 – Retained foreign object a never event
2015 – WireSafe patented
2015 - WireSafe used (QE Kings Lynn Hospital)
2016–2017 - NIA programme
2018 - 15 AHSNs pledged support

5 hospitals have implemented the WireSafe
Triangle of change

Purchaser - you

Chooser - you

User - you
The NHS

Finance

Clinician

Patient
Triangle of change - NHS

Benefit

Clinician

Finance

Patient
Triangle of change - NHS

Finance

What are the incentives to drive adoption?
What are the incentives to drive adoption?
Silly responses (from intelligent people) to safety interventions

NIC
• “I reckon it will cause infections”
• “I think its too big”
• “With a combined clinical experience of over 200 years from the consultant and senior sisters, we have never seen this error and so do not need the device in our hospital”
• “I sometimes like to flush the arterial line with saline - and this stops me from doing this”

WireSafe
• “I think its too big”
• “I don’t like the stich that’s inside it”
• “No one would be stupid enough to do this”
• “This is not a substitute for vigilance and training”
• “The problem is distraction, we should stop distracting doctors when these procedures are being done”
• “People should just know not to leave the guidewire in, and if they do then it’s their own fault”
• “I like my equipment the way it is currently, why should I have to change because of another doctor who does this”
• “We could just put a note in the pack”
PneuX Pneumonia Prevention System
Leakage into the lungs

Standard Cuffs

PneuX
Leakage of bacteria past ALL ICU tube cuffs

University of Wales, Cardiff

Endotracheal tubes and fluid aspiration. *BMC Anaesthesiology* 2017; 17(1):36
Leakage of bacteria past ALL ICU tube cuffs

University of Wales, Cardiff

EXCEPT ONE

Endotracheal tubes and fluid aspiration. *BMC Anaesthesiology* 2017; 17(1):36
Ability of five endotracheal tube cuffs to prevent leaks

Massachusetts General Hospital

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<th>Microcuff</th>
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<th>TaperGuard</th>
<th>Mallinckrodt HiLo</th>
<th>PneuX</th>
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Performance of the PneuX system: a bench study comparison with 4 other endotracheal tube cuffs. *Respiratory Care* 2017;62:102–12
Ability of five endotracheal tube cuffs to prevent leaks
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EXCEPT ONE

AARC Congress 2014
The 60th International Respiratory Convention & Exhibition

Performance of the PneuX system: a bench study comparison with 4 other endotracheal tube cuffs. Respiratory Care 2017;62:102–12
LoVAP study

New Cross Hospital

PneuX halves Post-Operative Pneumonia rates \(^1\) \(p = 0.03\)

Independent Cost Evaluation (RCS & University of Birmingham)

£700 saving
per PneuX used \(^2\)


2. VAP cost effectiveness study. Presented at the 29th European Association for Cardio-Thoracic Surgery. 2015, Amsterdam
LoVAP study
New Cross Hospital

PneuX halves Post-Operative Pneumonia rates\(^1\) \(p = 0.03\)

£700 saving \(\text{per PneuX used}\)^2

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2. VAP cost effectiveness study. Presented at the 29\(^{th}\) European Association for Cardio-Thoracic Surgery. 2015, Amsterdam
10 hospitals have implemented the PneuX
PneuX Pneumonia Prevention System

Why so slow?
Triangle of change - NHS

Benefit

Finance

Clinician

Patient
0.2 x 0.2 x 0.2 x 0.2 x 0.2 \ p < 0.001

NHS hospitals are not “powered” to adopt safety innovation
Design Adaptations
Different People Want Different Things
Nasogastric Tube Placement Verification

• “can you stop us accidently feeding the lungs?”
NG “When To Feed” Device

Developers will engage with WTF