What’s in a name?

- Greek ‘to let or send down’
  - Used to relieve painful urinary retention for thousands of years
- Various materials used in production
  - Natural
    - Straw
    - Rolled-up palm and dried Allium leaves
  - Metals
    - Gold, copper, brass and lead
  - Silver used as malleable and antiseptic
    - Benjamin Franklin

History

- Rubber used from 18th century
  - At body temperature were friable leaving fragments in the bladder; then vulcanisation
- Early devices had shoulders, tied to penis or stitched to the female urethra
- 1930’s; latex and the balloon introduced
  - Foley, an American Medical Student (did not patent the design)

Catheter use is significant

- UK hospital prevalence of urinary catheters (2006) was 32%, with an additional 6% in the previous 7 days
  - (Smith et al, 2008)
- By 2011 this had fallen to 18%
  - 43% of healthcare-associated UTIs linked with urinary catheters (HPA, 2012)
- How many outside of hospitals?

Catheters are not a benign intervention

- Infection
  - Always cited as the most common healthcare-associated infection but not the only risk
    - Pain
    - Mechanical: Blockage, bypass etc etc
    - Calculi
    - Tumour
- We do not really know the burden of this
  - Apart from figuring highly in prevalence studies
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Change in Bacteraemia
England 2002-2011

Seasonal trends in cause of bacteraemia:
2004-2008

Surveillance

- E. coli bacteraemia is rising - Why?
  - Catheters?
  - Gall Bladders?
  - Uropathogenic strains?
  - Food?
  - Antimicrobial resistance?
  - Elderly?
  - Global warming?

The original medical device

- So
  - Used for maybe a couple of thousand years
  - Used on millions of people every day
  - Inserted by most healthcare professionals at some time in their career and frequently by many
  - We must have a fantastic evidence base

Evidence Base for Long-term Catheters

Reducing Catheter Use: Systematic Review
Meddings et al 2010 CID 51: 550-60

- Stop orders are effective
  - CAUTI down 52%
  - Duration of catheterisation down 37%
- USA – 4 steps to removing a catheter
  - Physician recognition that there is one
  - Physician recognises no longer needed
  - Order to remove written
  - Nurse removes catheter
- UK
  - Um....

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HOUDINI

- Nurse-led protocol for removal by use of the HOUDINI acronym
  - Haematuria
  - Obstruction
  - Decubitus ulcer
  - Input and output measurement
  - Nursing care (end of life)
  - Immobility
- Effect
  - Catheter usage down 17%
  - Catheter specimens of urine with E. coli down

Reminders and ‘Stop’ Orders

- Can be useful but needs
  - Education
  - Recognition of accountability
  - Delegation of responsibility
  - Action
- No more ‘catheter patent and draining’.

Reducing Prevalence
Rothfeld and Stickley, AJIC 2010, 38:568-71

- Implemented a programme to limit urinary catheters to specific indications
  - Hourly urine output reporting
  - Obstruction
  - Active UTI and stage 3/4 sacral ulcer
  - Inflammation of perineum unlikely to respond to barrier methods as determined by wound care nurse
  - Driver was reimbursement criteria change

Reducing Prevalence
Rothfeld and Stickley, AJIC 2010, 38:568-71

- Results
  - Reduction of 42% from 300/1000 pt days to 190
  - CAUTIs
    - 7.2/month down to 5.2/month
    - Significant reduction in CAUTI rate per 1000 patient days
      - 1.05 vs. 0.45; reduction 57% (P<.05)

Reducing Prevalence
Rothfeld and Stickley, AJIC 2010, 38:568-71

- CAUTI Denominators
  - Wright, Kharasch et al 2011 ICHE 32(7)
    - Utilisation fell from 36% to 28% (P<.001)
    - Reduction across all units
    - Infections were reduced by the intervention
    - Infection rates fell by 18% from 28.2/10000 patient days to 23.2 (P=.02)
- But...
  - Infection rates rose by 6% from 7.78/1000 device days to 8.28 (P=NS)

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Is CAUTI detection robust?

- Definitions vary among published studies
  - “bacteriuria” and “urinary tract infection” are frequently used indistinctly
  - Signs and symptoms such as fever, dysuria, urgency, flank pain and leukocytosis have a low positive predictive value
    - 90% may be asymptomatic
    - 52% detected by using the laboratory

Clinical vs. Surveillance Definitions

- Clinical
  - Patient specific; used for making treatment decisions
- Surveillance
  - Population-based
  - Must be applied uniformly and consistently
  - Never the twain shall meet

Clinicin diagnosis vs definitions

Hanna, Sambriska et al AJIC 2013 (in Press)

- Adult inpatients with positive urine culture in a single centre (n=387)
  - Clinician initiated ABx in 55.8% of cases
    - based on organism and age
  - 30.7% fitted the NHSN definition
  - Dependent on signs of fever
  - 29.9% considered to have CAUTI by ID
    - Based on signs of sepsis
  - It ‘gold standard’ is ID opinion, NHSN definition has positive predictive value of 35%

Appropriate Catheter Use


- Acceptable
  - Acute urinary retention / bladder outlet obstruction
  - Need for accurate measurements of urinary output in the critically ill
  - Perioperative use for selected surgical procedures
  - Assist in healing open sacral/perineal wounds in incontinent patients
  - Prolonged immobilization (e.g., potentially unstable thoracic or lumbar spine)
  - To improve comfort for end of life care if needed

And why are they inserted?

- Frequently deemed to be inappropriate
  - use of medical records to report reasons for insertion (Munasinghe et al. 2001)
  - Reason for insertion was documented in just 13% of notes (Gokula, Hickner et al. 2004)
- Quantitative studies provide no details of decision-making, staff groups involved and only describe what authors consider to be ‘appropriate’ – often not defined

Clinical realities of catheterisation


- Mixed methods study
  - Nurses key decision-makers
  - Primary focus most prominent medical issue
    - Medical staff: Retention, output monitoring
    - Nurses: Skin care, patient comfort
  - Unwritten rules based on gender
  - Patients/families did not participate
  - Decision-making not explored further as did not relate to a specific event

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Small Qualitative Study
Kiernan M 2012 IPS Conference Abstract

- Two predominant reasons for catheter insertion
  - Retention (45%) and output monitoring (30%)
  - No catheters were inserted for incontinence
- Who makes the decision?
  - Medical staff described as having made decisions (often prompted by nurses)
  - Nurses frequent instigators of use for retention in non-emergency settings

Why?

- Nurses primarily motivated by providing relief of symptoms of distress, pain or breathlessness
- Cause of retention not considered
  - Post-operative retention: intermittent not used
  - Constipation and faecal impaction
  - None could recall education on the causes of retention
  - Alternative methods of output measurement not considered

External influences

- Unwritten rules based on nurses’ perception of pain were evident
  - This was a cause of some friction
    “It was expected of us to catheterise every female fractured neck of femur which I don’t agree with… I mean taking people when it’s expected they were going to be catheterised, and they weren’t. That was a cause of friction massively really”

Other findings

- Patient/relative participation in decision-making was minimal
- Patients were almost never asked for consent
  - also Cowey 2011
- There was active avoidance of discussion of risks of catheterisation
  - Virtually the only complication mentioned was infection and risk perception of this was low

Risk perception

- Although acknowledged, nurses displayed a low perception of risk to patients
  “I think we think, we’re doing things to wash our hands, so we believe we’ve covered the infection side of it… I think when you do an aseptic technique you probably.. without thinking about it, you think I’ve got the infection side covered”

Risk Perception

- Multi-centre qualitative study
  - Perceptions of risk used to determine need for catheter
  - Competing priorities
    - Other patient safety initiatives
  - Lack of linkage with negative outcomes
  - Staff used workarounds to bypass organisational initiatives to justify non-compliance

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## The Life and Times of the Urinary Catheter

### Martin Kiernan, Southport and Ormskirk Hospital NHS Trust

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### Suboptimal IC behaviours

<table>
<thead>
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<tbody>
<tr>
<td><strong>Ethnographic study</strong></td>
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<tr>
<td>□ Behaviour not tightly coupled to the outcome</td>
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<td>□ Infection cannot be traced back to an individual; blame diffused or relocated</td>
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<tr>
<td>□ Questioning the evidence not a substantial reason</td>
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<tr>
<td>□ Poor behaviour is normalised, therefore poor practice becomes rendered as non-deviant and remains unsanctioned</td>
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### Risk in Long-term Catheters

| Wilde et al, J Clin Nursing (2013) 22;356-67 |
|----------------|------------------|
| **Cross sectional descriptive and analysis** |
| □ 202 interviews with patients, mean use 6 yr |
| □ Urethral (56%) > Suprapubic (44%) |
| **Problems** |
| □ Leakage 43% |
| □ UTI 31% |
| □ Blockage 24% |
| □ Pain 23% |
| □ Dislodgement 12% |
| □ Surgical risk disclosure for informed consent is about 1% |

### Moving forward

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### Catheters and AB prophylaxis

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### The Urinary Catheter

| After 2,000 years we should be doing a little better |
|----------------|------------------|
| □ Use can be reduced |
| □ Don’t put them in, get them out fast |
| □ Should be a device of last resort and not one of first response |
| □ Much more work on decision-making and making it easy to do the right thing required |
| □ Qualitative studies required; even at local level |

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**Risk in Long-term Catheters**


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  - 202 interviews with patients, mean use 6 yr
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**Moving forward**

- The equipment
  - Catheter design and collection systems
- Evidence required
  - Long term catheters (anything..)
  - Suprapubic vs. urethral
  - Decision-making
  - Patient consent
  - Community management
  - Gazillions of specimens sent - ?why
  - Prophylaxis

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**Catheters and AB prophylaxis**


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**The Urinary Catheter**

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