9.30-10.00
Lean Thinking in Healthcare

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Friday 27th May 2016
Oxford
Key question:

• Does a disruptive technology allow us to deliver **better value** to the patient:
  • right care,
    = ‘feeling better’
  • on time,
  • every time,
  • in full,
  • at a cost the patient can afford?
    • £
    • time is money
Patient Story

• 82 year old, previously well and very active
• Mild heart failure, on diuretic for 9 years
• Lives at home carers ‘popping-in’ every day
• Increasing lethargy, loss of appetite and weakness over 5 days.
• Apyrexial
• Not responded to rehydration and rest
What do the patient and carer need?

• Diagnosis
• Prognosis
• Plan

• (Treatment
• Monitoring
• Maintenance)

What is the process for getting this at 08:00?
Process for getting a diagnosis, prognosis and plan

Which route would you take?
Lean = no waste in the process

• Value-adding: ‘activity that will make the patient feel better’
• Non-value adding activity (waste)
  • Transport = moving patient and information
  • Inventory = patients, information, supplies stacked up waiting
  • Motion = moving the staff and resources
  • Waiting
  • Over-production – making (taking) too much
  • Over-processing – repeating work
• DEFECTs: failure to produce right care, on time, every time, in full
  • Defects/patient
  • Defects/100 patients
  • (1/yield)
Right care, on time?

- Patient is at risk of delays
  - Sepsis: Every hour of delay to antibiotic = 7% increase in death rate
  - Hyponatraemia
  - Immobility = physical and mental decompensation

- Carer can’t delay:
  - Other patients to care for,
  - Has to get to work,
  - or back to family.

- What is the cost of delay to the patient, carer and taxpayer?
Which route?

• GP route
  • GP stymied by lack of diagnostics.
  • Delays +++

• 111/out of hours:
  • No value to patient or carer

• QED = A&E
Issues for patients & carers

- Getting through to GP
- Lunchtime visits
- Waiting for transport.

- Default: dial 999

Test of change

GPs responding to calls in real time
+ ‘floating GP = home visits’

Ambulance
No triage: ‘transport patient now’

Impact of delays on patients 80 years + in Sheffield 2009
Monitoring and Maintenance

- 68 year old diabetic (type 2)

Why bother.........?
Blood Tests
Process for Basic Chemistry tests

A&E
- Blood test indicated
  - Blood test Requested: 2 minutes
  - Blood Taken: 12 minutes
  - Blood Transported: 3 minutes
  - Blood Processed: 27 minutes
  - Result Available: 1 minute
  - Clinician acts on result: 1 minute
  - Give patient diagnosis, prognosis plan

Wards
- 4 hr
  - 24 hrs
  - 1.5 hr
  - 20 mins
  - 30 mins
  - 12 hrs

OP
- 1 to 4 hrs
  - 1.5 hr
  - 20 mins
  - 30 mins
  - 3 days
  - weeks

GP
- ?
  - 4 hrs
  - 20 mins
  - 30 mins
  - 24 hrs
  - days

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Lead times in Lab: basic chemistry: ‘urgent’ only
Issues with this process:

• **WASTE:**
  - Transport
  - Inventory: lots of samples waiting, lots of patients waiting – some in hospital beds….
  - Motion:
  - WAITING: lots of patients, carers and clinicians waiting
  - Over-production: 10 mls when only μl needed….
  - Over-processing:
    - Tests requested and blood taken before history and examination….
    - Lab’s nightmare is request for ‘add-on’….
  - **Defects:**
    - Right test, on time, every time, in full?
    - Delays: what is happening to the K+?

• Decisions made on out-of-date tests.
• Big implications for safety

• Is the end-to-end process effective or efficient?
Definitions

• Efficiency =
  • Resource Hours used doing value-adding work / Resource hours available
  • Cost of hours available / value-adding activity = unit cost?

• Productivity = yield x efficiency.

• What is the yield from this process?
  • How many tests help deliver the right care, on time, every time, in full?

• So the current process is neither efficient or productive.
Key learning: Measures: 3 views

1. What the patient measures

2. What the staff, department or organisation measures:
   - Dpt. cost / value-adding activity = unit cost
   - Efficiency: Resource hours used doing value-adding work
     Resource hours available

3. System measure
   - Productivity: yield x efficiency
   - Cost of the inventory or waiting

Yield and lead time
Right care
On time
Every time
In full

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Point of Care testing

- Potential to remove the waste of transport and waiting therefore
  - reduce defects in care (right care, on time, every time, in full)
  - increase healthcare system productivity

- Challenge: diagnosis:
  - Wide range of tests needed including imaging:
    - Symptom and signs define ‘Panel of tests’
      - Abdo’ pain: basic chemistry, LFTs, amylase, FBC, US, CT
      - Chest pain: basic chemistry, cardiac enzymes, ECG, CXR
      - ? DVT/PE: D-dimer (+/- US, CTPA)
  - STDs

- Value in monitoring and maintenance:
  - Only a small range of disease specific tests required
    - Diabetes: glucose, HbA1C, (renal function?)
    - Rheumatoid conditions (blood panel and ultra sound)
    - Neutropenic sepsis
    - Recurrent UTIs

- Calibration: data transfer to patient, GP, Lab, monitoring variance
  - Time series data for each patient & machine = statistical process control: very effective and efficient
  - Group data variance POCT v Lab v National = comparative statistical tests e.g. ANOM, ANOVA etc.