Downtime in digital hospitals: An analysis of patterns and causes over 33 months

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“Hello, IT, have you tried turning it off and on again?”
70% of respondents reported at least one unplanned downtime lasting more than 8hrs in the previous 3yrs

Sittig et al. 2014

From 77 events detected, downtime ranged from a few minutes to 16hrs over a 4-month period

Hoot et al. 2003
To examine **patterns** and **causes** of downtime in a **hospital setting**
- 350-bed metropolitan hospital in Sydney
- Between 2010-2012, 128 reports were recorded by the hospital IT department
- 127 were unplanned downtime events
Definition of *downtime*

- A period of time when an IT system is not available or partially available
- AKA: “IT failure”, “computer downtime”, “IT outage”

“Treatments for several patients including a major trauma was delayed because admissions could not be processed; tests could not be ordered and results could not be accessed…clinics were paralysed for the whole morning”
Method

• Started with data for one year (2011)
  • downtime: minutes, percentage
  • areas affected
  • method of detection
  • classification: $\kappa = 0.69$ (moderate agreement)
Classifications

SINGLE POINT
OF FAILURE

Application
Server

POWER OUTAGE
<table>
<thead>
<tr>
<th>Element of report</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SOR ID; Start; End</td>
<td>97; 3:30; 7:30</td>
</tr>
<tr>
<td>2. Details; Details 2</td>
<td>[system ID]; All departments</td>
</tr>
<tr>
<td>3. Description</td>
<td>Switch died at around 3:30am according to alert</td>
</tr>
<tr>
<td>4. Resolution</td>
<td>Went on site at around 7:30am and replaced switch</td>
</tr>
<tr>
<td>5. Comments</td>
<td>Switch blew 3:30 and needed replacing, done at 7:30 am</td>
</tr>
<tr>
<td>6. Relevant; Outage</td>
<td>Yes; 26/10/2011</td>
</tr>
<tr>
<td>7. Restored; Status</td>
<td>26/10/2011; COMPLETE</td>
</tr>
<tr>
<td>8. Quetzal; System</td>
<td>[quetzal number]; [system ID]</td>
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Results and Analysis
Downtime comparing to industry

147hrs/3years

49hrs/year

25hrs/year

hospital

other industries
68% of downtime occurred during weekdays*

*Monday to Friday
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*Monday to Friday
51% of downtime occurred during business hours*

*9am to 5pm
51% of downtime occurred during business hours*

*9am to 5pm
Largest cause of downtime was network-related (n=128)

- Network: 77% (n=98)
- Power: 8% (n=10)
- Software: 13% (n=17)
- Other: 2% (n=3)
Largest cause of downtime was network-related (n=128)

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- Other: 2% (n=3)
Most incidents affected multiple areas (n=96)

- 74% affected many areas
- 26% affected one area
Most incidents affected multiple areas (n=96)
Most incidents were detected by users (n=99)
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• Downtime can affect hospitals by **delaying delivery of care**
• The greatest cause of downtime are **network-related**
• Mostly **users detect** a downtime event at the point of care
• Downtime is **greater than other industries** and likely **underestimated**
• Further studies are needed to measure the **effects on patient outcomes**
The hospital that participated and IT staff who provided data

Patient Safety Informatics Team:
Associate Prof. Farah Magrabi
Dr Ying Wang
Dr Mi-Ok Kim
Thank You

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