Clinical Usability

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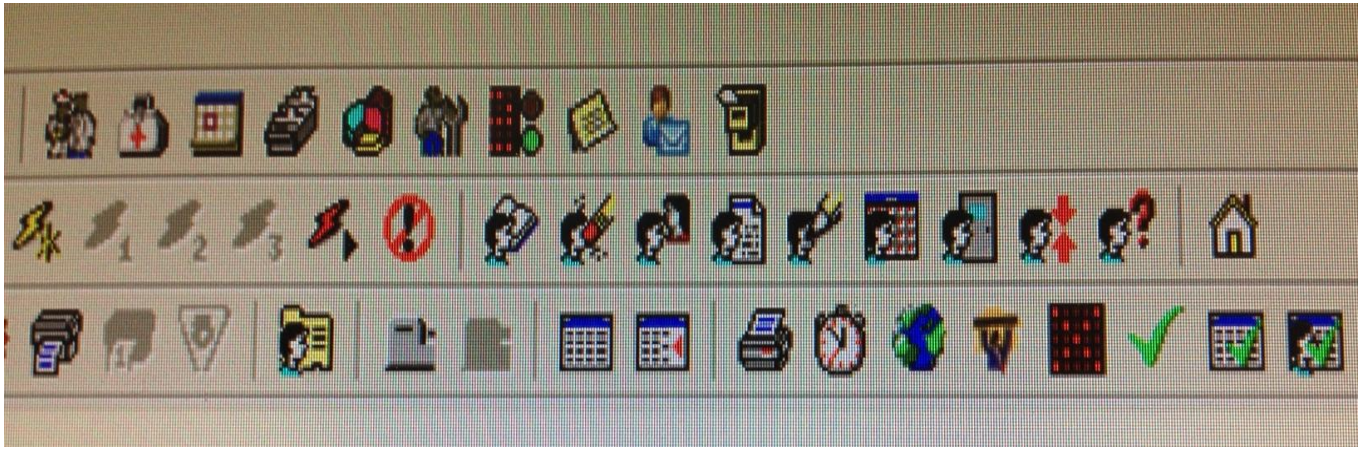
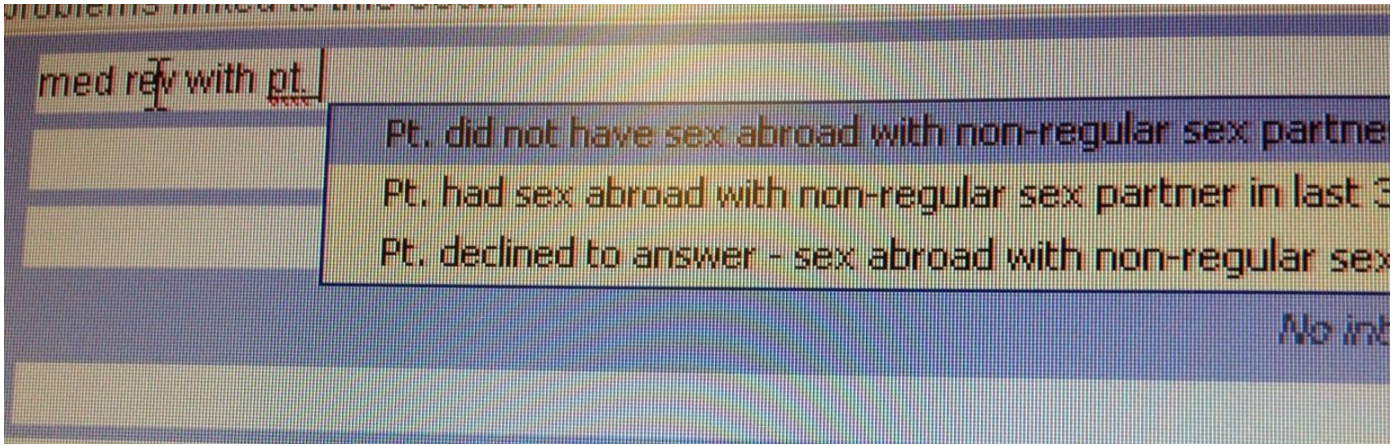
1st November 2016

What it’s like to Use a system that isn’t very Usable?

*what you are about to see is from *real* NHS systems.
Names have been changed to protect the guilty.

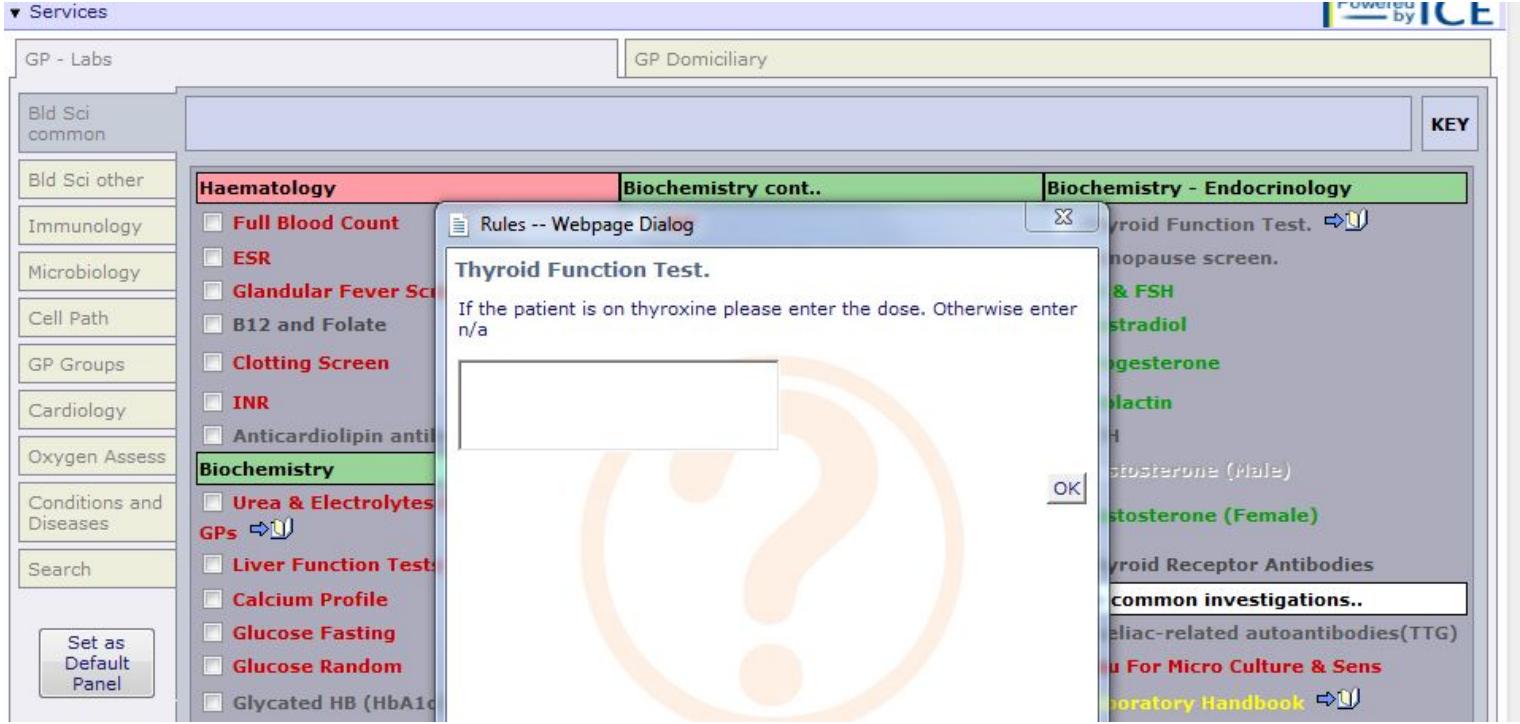


It takes longer to learn to use.



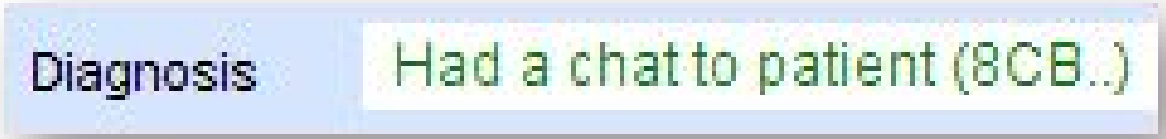
H: list of medication: Ramipril 1.25mg
allopurinal 100mg one tablet Daily variation in respiratory disorder (YA291)furosemide 20mg tablet od mane
warfrin bisoprolol 2.5mg
digoxin 62.5mg
next appointment for INR is 24th 4. 14. have booked to nurse clinic.

Data quality is adversely affected

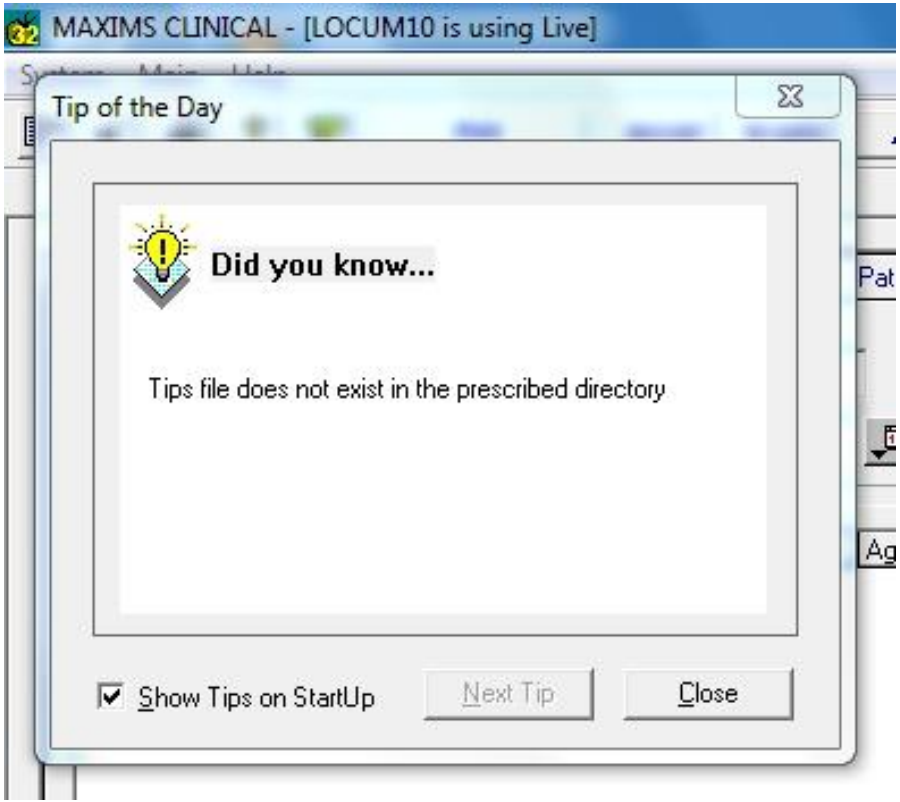


User interactions take longer.

Users make mistakes



People find workarounds



Sometimes it’s just annoying

The Importance of being Usable

- **“If it’s easier to do the right thing than the wrong thing, people will do the right thing” —** Usability improves compliance with clinical coding, creates better and more reusable records, and increases safety.

- **Clinician time is too expensive to waste —** It is one of the most expensive resources the NHS purchases. Using it wisely is the only way to match clinical demand with supply.

- **The recent Wachter review** of NHS IT recommended User Centred Design (usability) be a key factor in the development of the NHS IT.

- **Empirically to drive adoption** — digital devices only became commonplace since the advent of highly usable operating systems, features and form factors.

Measuring Usability

Usability is **subjective**

Objective measures are available, but they're **not perfect**

Overall usability is a compound measure of

- **hardware** speed and platform
- availability and quality of **support**
- **network** speed and latency
- **multiple systems** need for many different logins
- **interoperability** and integration
- and more

System Usability Scale (SUS)↗

Score the following 10 items from **Strongly Agree** to **Strongly disagree**:

1. **I think that I would like to use this system frequently.**
2. I found the system unnecessarily complex.
3. **I thought the system was easy to use.**
4. I think that I would need the support of a technical person to be able to use this system.
5. **I found the various functions in this system were well integrated.**
6. I thought there was too much inconsistency in this system.
7. **I would imagine that most people would learn to use this system very quickly.**
8. I found the system very cumbersome to use.
9. **I felt very confident using the system.**
10. I needed to learn a lot of things before I could get going with this system.

Systems Usability Score

+

Allows (a degree of) cross-industry comparison and benchmarking

Validated in the IT industry (other people use it)

—

It’s a bit vague

Clinical System Usability Score (cSUS)↗

- A new **‘invented’** scale
- Created by the **CCIO and CIO networks** at 2015 CCIO Summer School Newcastle (of Newcastle Declaration fame)
- Draws heavily on SUS, with a similar scoring pattern
- ‘Clinically relevant’ questions

cSUS Questions

1. **In my opinion, the software reduces the risk of clinical error.**
2. Effective support for this software is hard to access in a clinically-appropriate timescale.
3. **In my opinion, the software improves the quality of clinical care I can provide.**
4. The quality of the interaction/consultation with the patient is adversely affected by the use of this software.
5. **Using the software gives me the key information I need on patient's history, diagnosed conditions and current care and treatment plan.**

2015/16 Questionnaire cSUS Survey

Type of Trust (Acute Foundation, CCG, etc), **Trust Name**

System Name

Email Address (we promised not to use this for anything except for updates about the survey)

The **10 SUS** questions

The **5 cSUS** questions

Free text feedback:

‘What do you like most about the system?’

‘What would you change about the system?’

Share links page - facebook, twitter, email

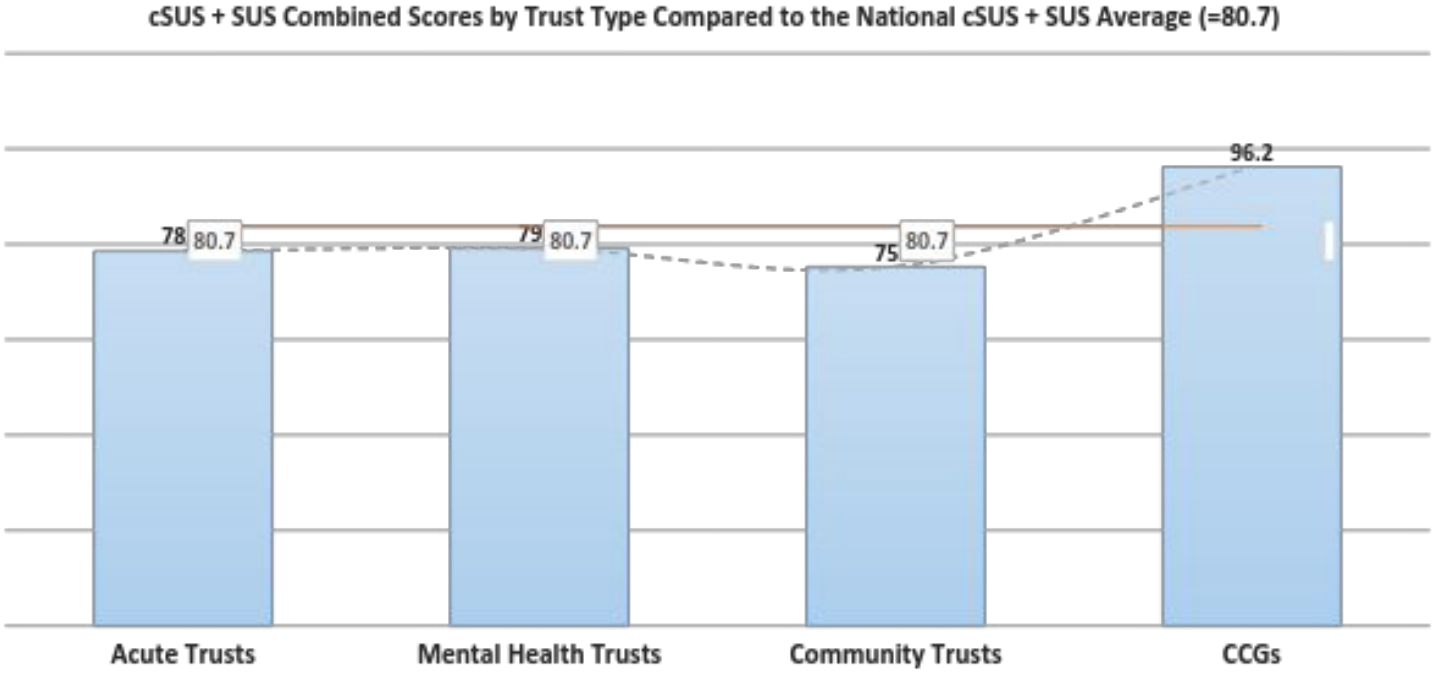
Selection of respondents

- Basically, **self selection** - if you use clinical software (or say you do) then you can complete the survey
- Respondents could also share via Twitter, Facebook, or email to colleagues
- A huge majority of respondents used @nhs.net or *.nhs.uk email addresses, suggesting most were NHS employees
- We aimed to avoid ‘typical’ health IT and informatics networks in promoting the survey.

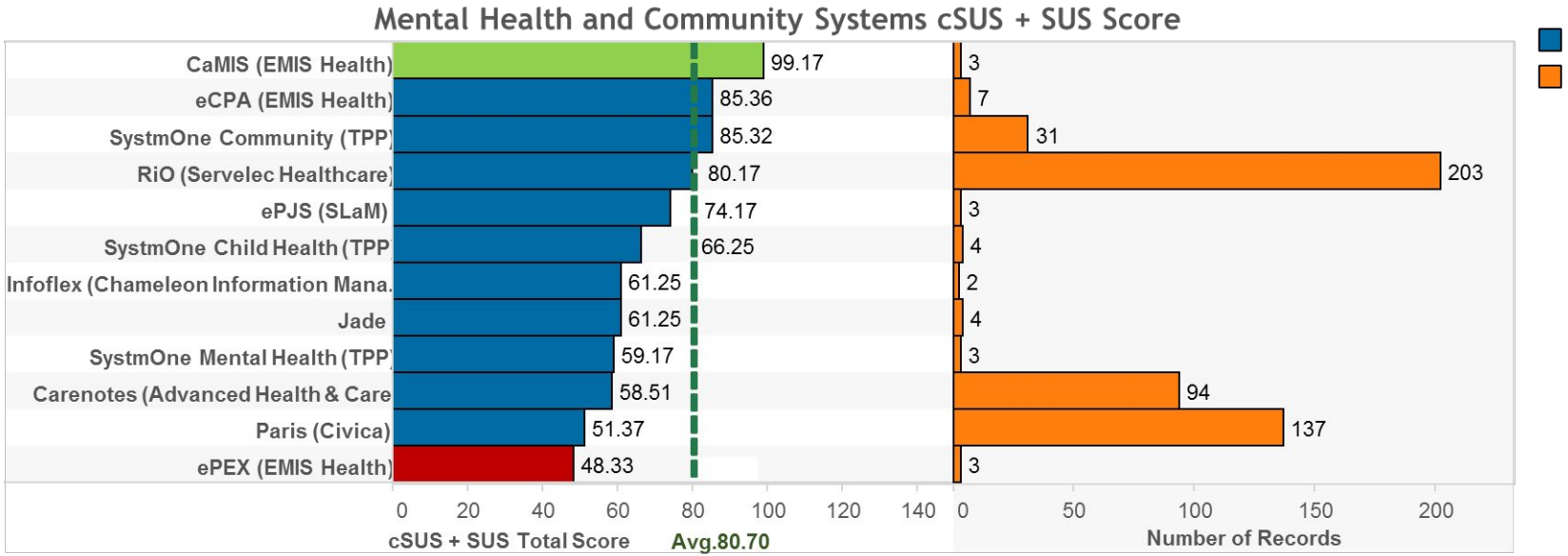
Post-processing of SUS/cSUS

- Removed null and spam responses
- Exported to spreadsheet
- Removed all email addresses from ‘working document’
- Converted 0-4 scores for **each SUS and cSUS item** into a score for **SUS** (out of 100), score for **cSUS** (out of 50**)**, and a **Total Usability Score** (out of 150)
- Views of grouped responses by trust, system, etc
- Basic statistical analysis to ascertain mean, SD, and confidence limits for each system

2015-2016
Usability Survey Results



digitalhealth intelligence


Mental Health and Community Systems cSUS + SUS Score
CaMIS (EMIS Health)
eCPA (EMIS Health)
SystmOne Community (TPP)
RiO (Servelec Healthcare)
ePJS (SLaM)
SystmOne Child Health (TPP
Infoflex (Chameleon Information Mana.
Jade
SystmOne Mental Health (TPP)
Carenotes (Advanced Health & Care
Paris (Civica)
ePEX (EMIS Health)
99.17
85.36
85.32
80.17
74.17
66.25
61.25
61.25
59.17
58.51
51.37
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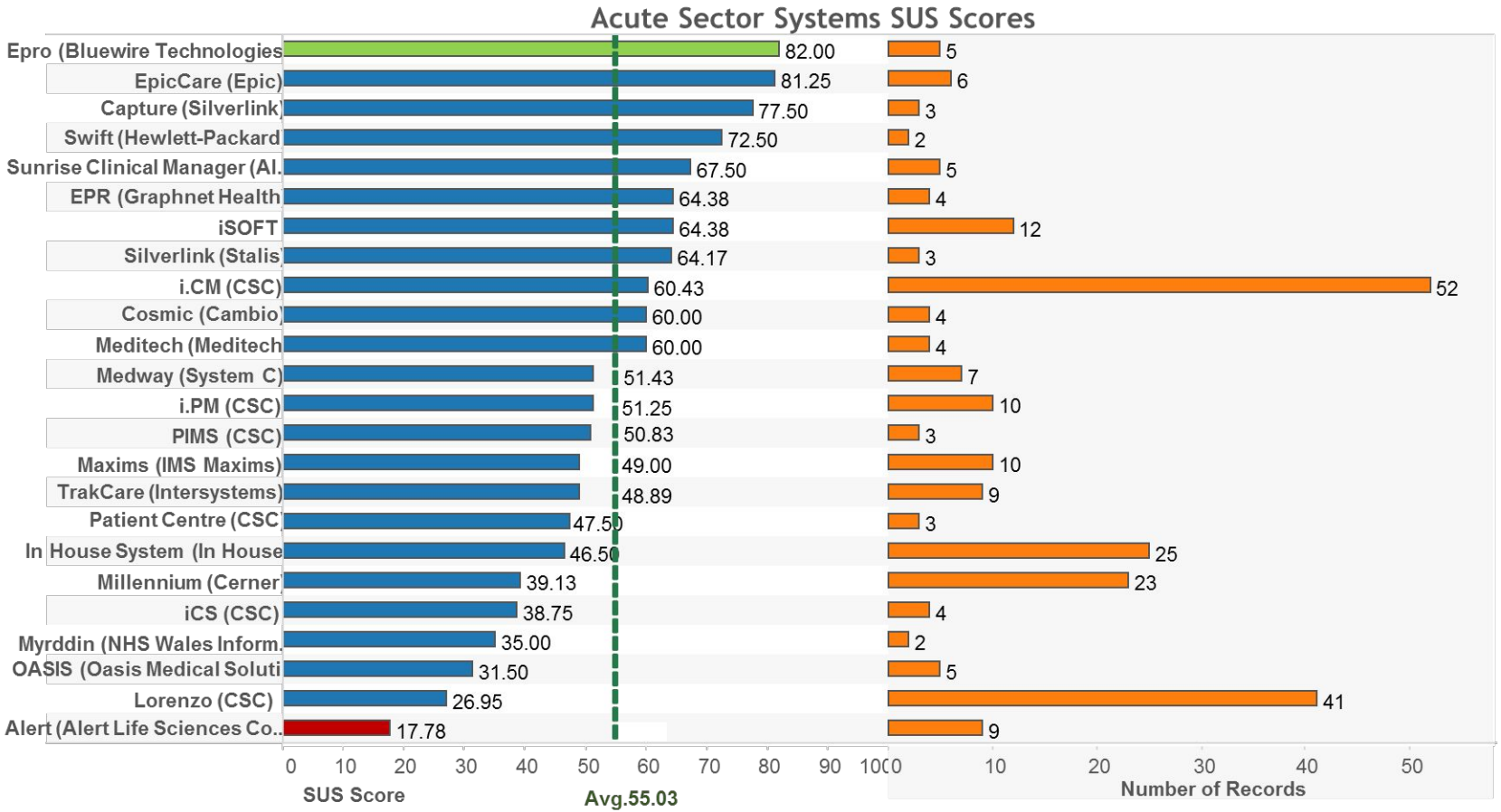
cSUS + SUS Total Score
Avg.80.70
0 50 100 150 200
Number of Records


Acute Sector Systems SUS Scores
Epro (Bluewire Technologies
EpicCare (Epic)
Capture (Silverlink)
Swift (Hewlett-Packard
Sunrise Clinical Manager (Al.
EPR (Graphnet Health
iSOFT
Silverlink (Stalis
i.CM (CSC)
Cosmic (Cambio)
Meditech (Meditech
Medway (System C)
i.PM (CSC)
PIMS (CSC)
Maxims (IMS Maxims)
TrakCare (Intersystems)
Patient Centre (CSC
In House System (In House
Millennium (Cerner
iCS (CSC)
Myrddin (NHS Wales Inform.
OASIS (Oasis Medical Soluti
Lorenzo (CSC)
Alert (Alert Life Sciences Co..
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SUS Score
Avg.55.03
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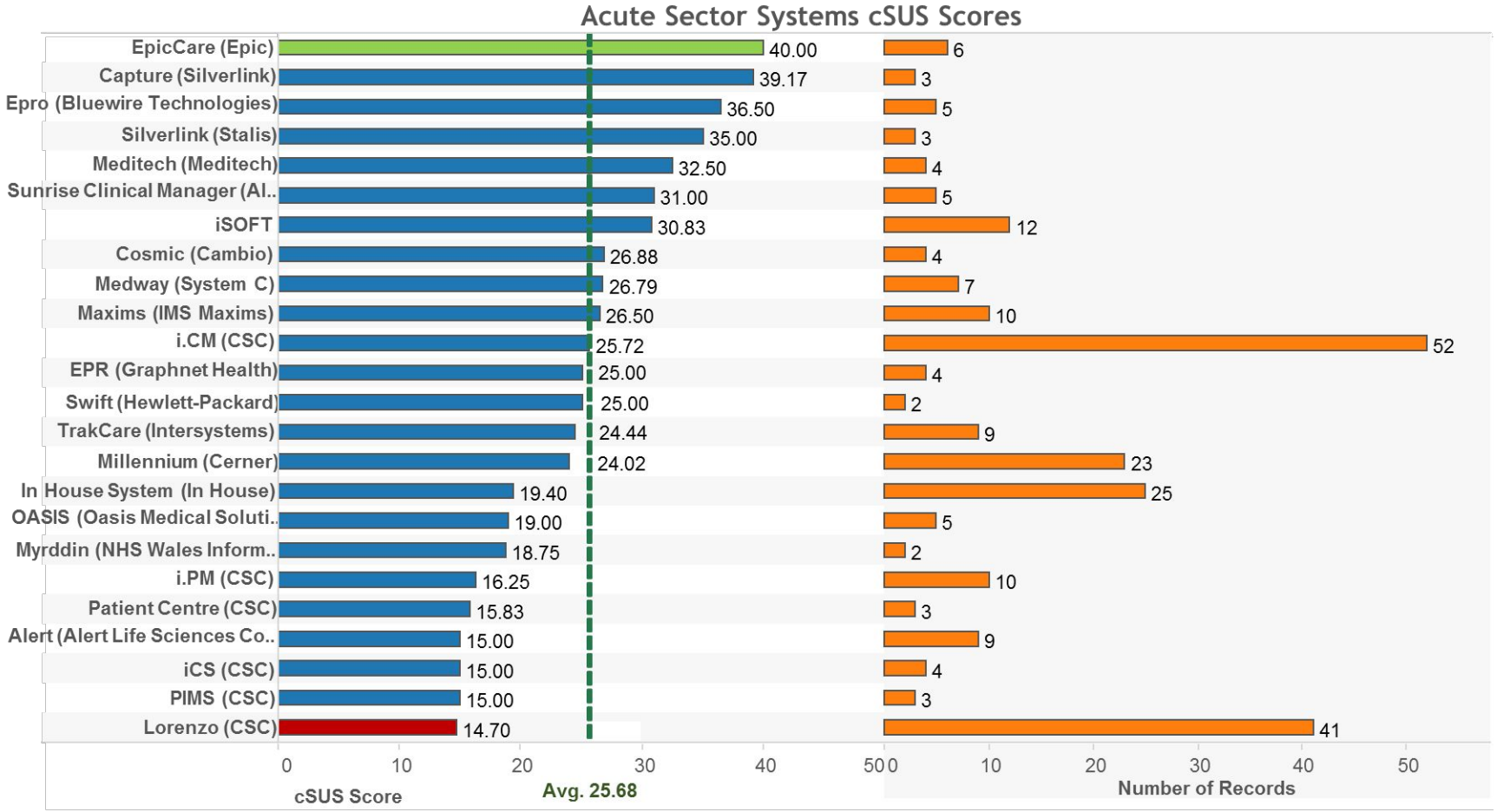
Number of Records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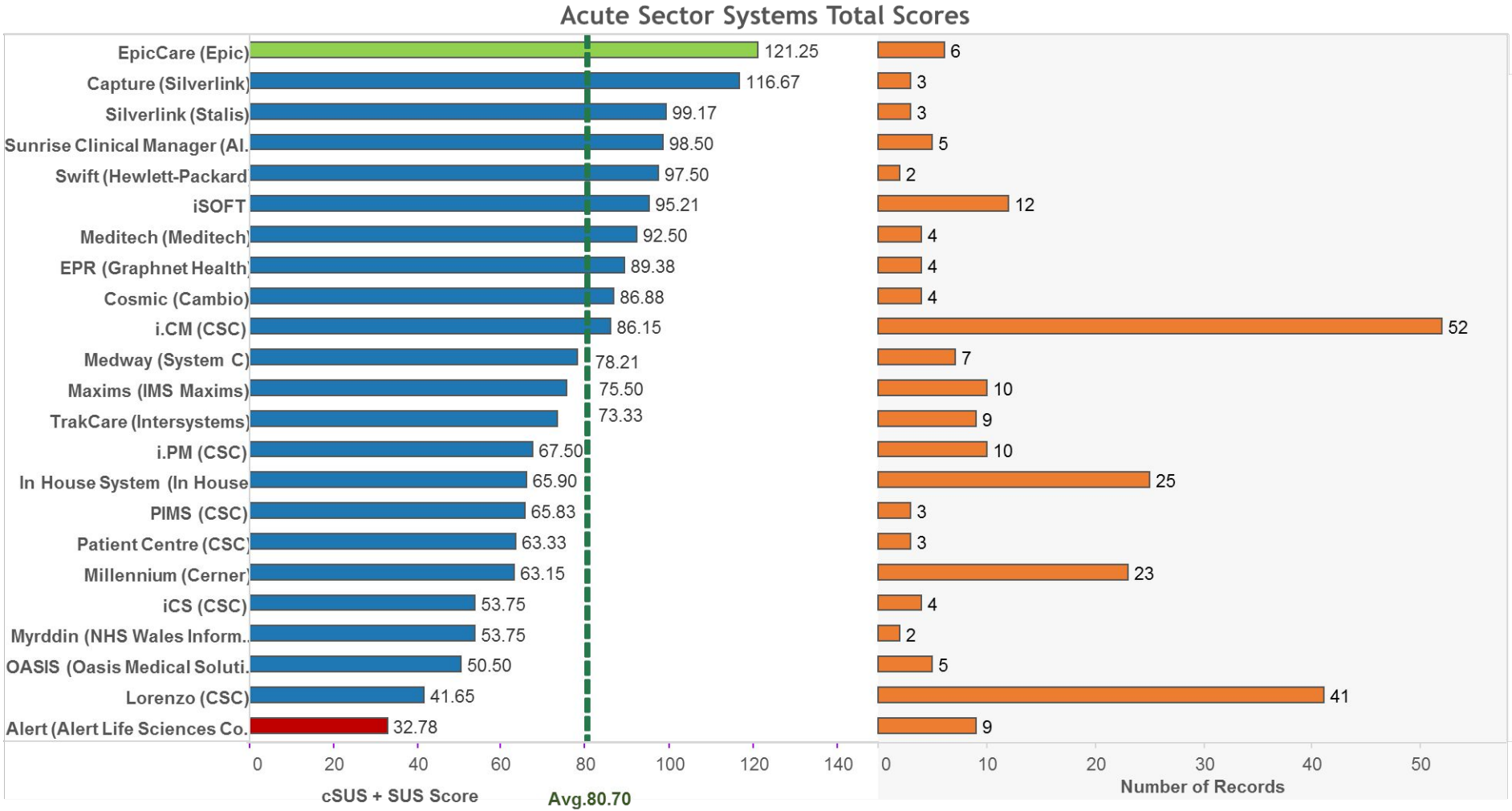
cSUS Score
Avg. 25.68
Number of Records


Acute Sector Systems Total Scores
EpicCare (Epic)
Capture (Silverlink)
Silverlink (Stalis)
Sunrise Clinical Manager (Al.
Swift (Hewlett-Packard
iSOFT
Meditech (Meditech)
EPR (Graphnet Health)
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Alert (Alert Life Sciences Co.
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78.21
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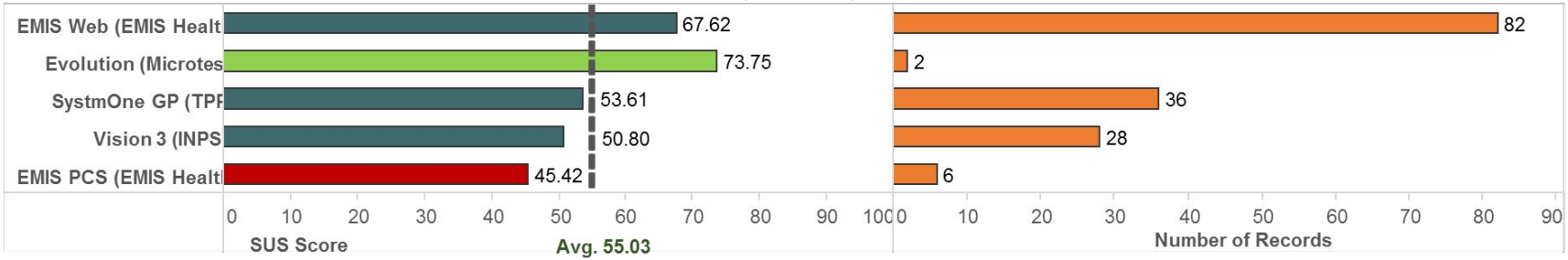
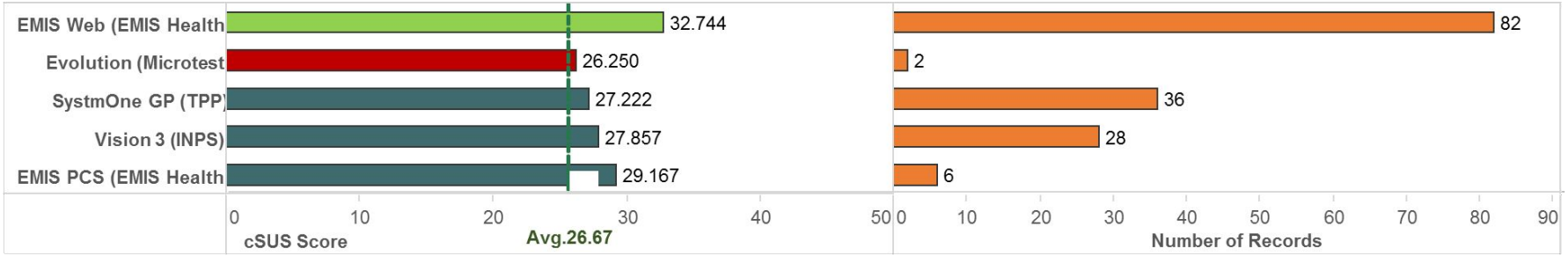
cSUS + SUS Score
Avg.80.70
0
10
20
30
40
50
Number of Records

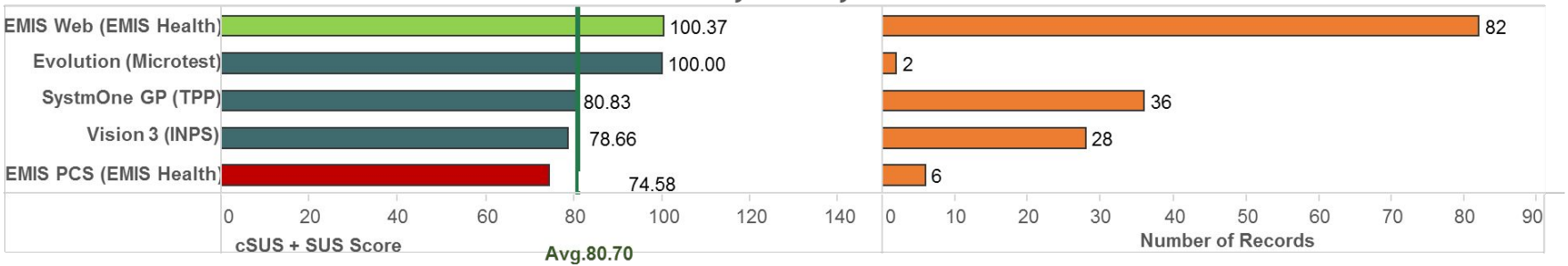
Primary Care Systems SUS Scores



Primary Care Systems cSUS Scores



Primary Care Systems Total Scores



Wachter: Health IT Systems Must Embrace User-Centered Design

IT systems must be designed with the input of end- users, employing basic principles of user-centered design. Poorly designed and implemented systems can create opportunities for errors, and can result in frustrated healthcare professionals and patients.

“Another widely held criticism of today’s EHRs is their relative inattention to basic principles of user-centered design, particularly when judged against the electronic tools we have grown used to in the rest of our lives.”

“In The Digital Doctor, a case is described in which the lack of user-centered design, along with alert fatigue and overreliance on technology, resulted in a 39-fold overdose of a common antibiotic.”

“American Medical Association found that many doctors cited EHRs as a major source of burnout (44). The problem lies partly in poor design.”

Limitations

- **This was a pilot** – we urge people to treat this data with caution
- **1500 responses were spread across ~80 systems.** We need to achieve *multiples* of this response rate to enable statistically significant comparisons.
- Some have very low levels of response – supressed <2
- This means that the results don't enable easy comparisons between trusts
- ***What* system? 'The blue one'.** Users sometimes struggled to ID what system they used – particularly where multiple releases of a system or older legacy products.

Next steps for Usability

csus-testing.herokuapp.com

The ‘cSUS Platform’ - ‘Compare the Software’ - general

Web application - allows much greater flexibility than a survey.

Users will sign up and leave reviews of systems - can review **multiple** systems, same system **over time**, add **comments** to previous reviews

It will support **SUS**, **cSUS**, **star rating**, **free text**, and maybe others?

It will enable NHS CCIOs and CIOs to carry out usability studies in their orgs and enable national anon benchmarking

Facility for **bug reporting**?

Supplier notification and **right of reply**

Links to **user groups** - create engaged, activated users

The ‘cSUS Platform’ - Data Quality

- Clean, simple, user experience for usability ratings
- Will enable users to be **validated** as being NHS employees, and from a trust that we know uses that system.
- Make it **easier to select** which system to review, since we know what systems are installed at which trusts (prevent ‘blank trust’ responses)
- Much easier to filter and view data by Trust (or any other parameter) - helping suppliers to detect **deployment/infrastructural issues**
- **Richer data** about respondents - user role, special interests, etc
- Experiment with different kinds of usability assessment
- Invite users to participate in more detailed usability testing