The importance of including users in clinical software evaluation : what usability can offer in home monitoring.

Janette Gogler, Sandrine Balbo,
Steinkrug, J., Lee, L., Scheidt, S. & Hullin, C.

Usability

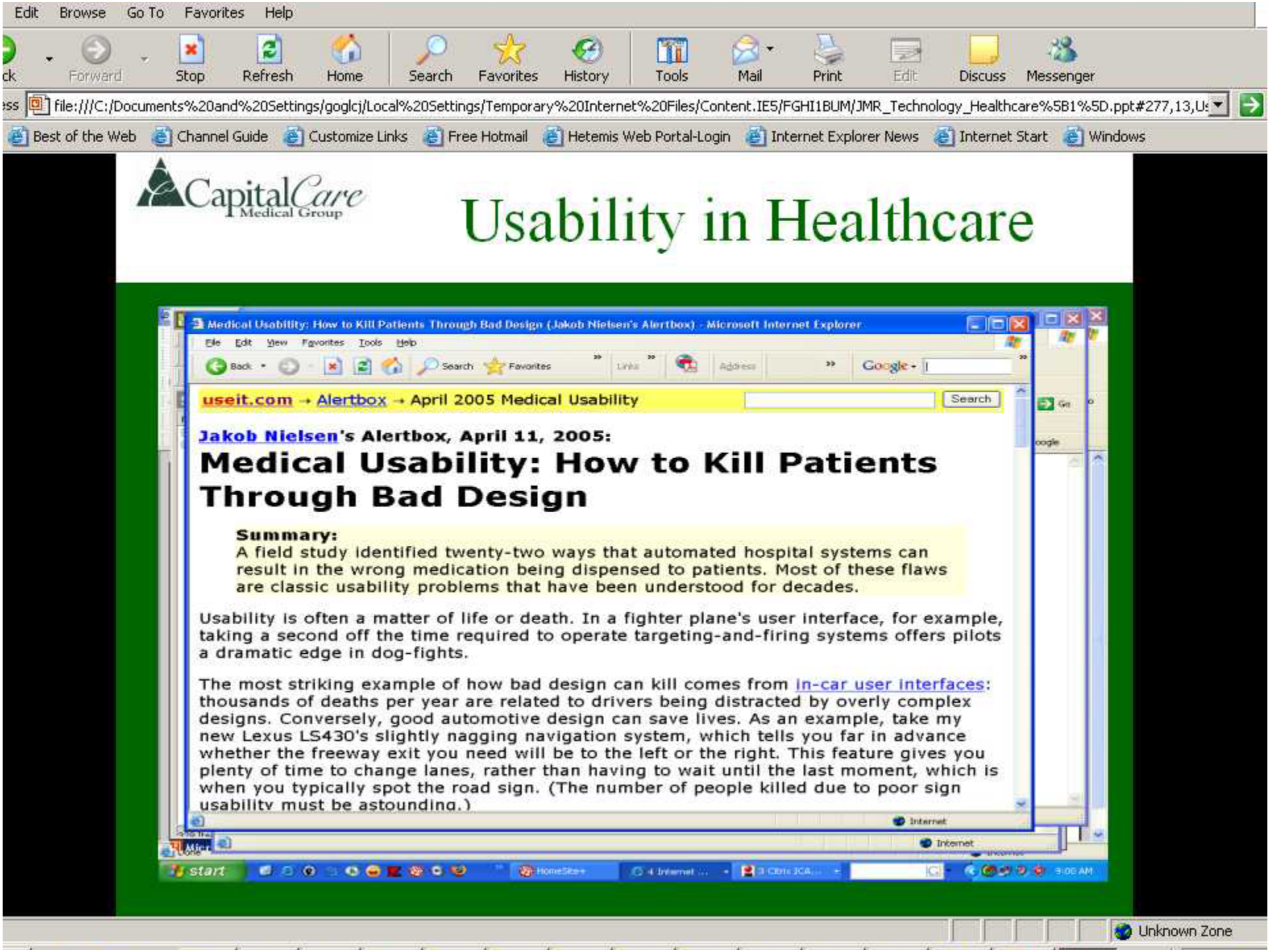
- Usability can be defined as a measure of how efficient, effective, enjoyable and safe a computer system is to use (Preece et al. 1994).

What is usability ?

- Applications must be easy for all clinicians to use….
- Usability – human computer interactions (HCI)
- Usability factors :
  - Ease of use
  - Ease in learning
  - Ease to remember
  - User satisfaction with system use
  - Error free/error forgiving interactions
  - Seamless fit to the task at hand

Why usability?

- Cost
  - Decrease in productivity
  - Extreme user frustration
  - Under utilisation/ rejection or systems
  - Understated errors
  - Additional help desk personnel
  - Open resistance to awkward applications
  - Money spent on re-design
- Lowry and Martin1990 , Staggers 1995 , Van Bemmell 1988


Edit Browse Go To Favorites Help
Back Forward Stop Refresh Home Search Favorites History Tools Mail Print Edit Discuss Messenger
file:///C:/Documents%20and%20Settings/goglcj/Local%20Settings/Temporary%20Internet%20Files/Content.IE5/FGHI1BUM/JMR_Technology_Healthcare%5B1%5D.ppt#277,13,Us
Best of the Web Channel Guide Customize Links Free Hotmail Hetemis Web Portal-Login Internet Explorer News Internet Start Windows
CapitalCare Medical Group
Usability in Healthcare
Medical Usability: How to Kill Patients Through Bad Design (Jakob Nielsen's Alertbox) - Microsoft Internet Explorer
useit.com → Alertbox → April 2005 Medical Usability
Search
Jakob Nielsen's Alertbox, April 11, 2005:
Medical Usability: How to Kill Patients Through Bad Design
Summary:
A field study identified twenty-two ways that automated hospital systems can result in the wrong medication being dispensed to patients. Most of these flaws are classic usability problems that have been understood for decades.
Usability is often a matter of life or death. In a fighter plane's user interface, for example, taking a second off the time required to operate targeting-and-firing systems offers pilots a dramatic edge in dog-fights.
The most striking example of how bad design can kill comes from in-car user interfaces: thousands of deaths per year are related to drivers being distracted by overly complex designs. Conversely, good automotive design can save lives. As an example, take my new Lexus LS430's slightly nagging navigation system, which tells you far in advance whether the freeway exit you need will be to the left or the right. This feature gives you plenty of time to change lanes, rather than having to wait until the last moment, which is when you typically spot the road sign. (The number of people killed due to poor sign usability must be astounding.)
Unknown Zone

What is usability?

Usability is the extent to which a product can be used by **specified users** to achieve the **specified goals** with effectiveness, efficiency and satisfaction in a **specified context of use**.

International standard organisation ,ISO 9241-11 (1998)

Foundation of usability

- Users
- Tasks
- User-system interactions

Usability Methods

- **Guidelines and Heuristics**
- **Personas and User Profiles**
- **Expert and User-based Evaluations**
- **Questionnaires and Usability Measurement**
- Task Analysis
- Card Sorting
- Surveys and Statistics

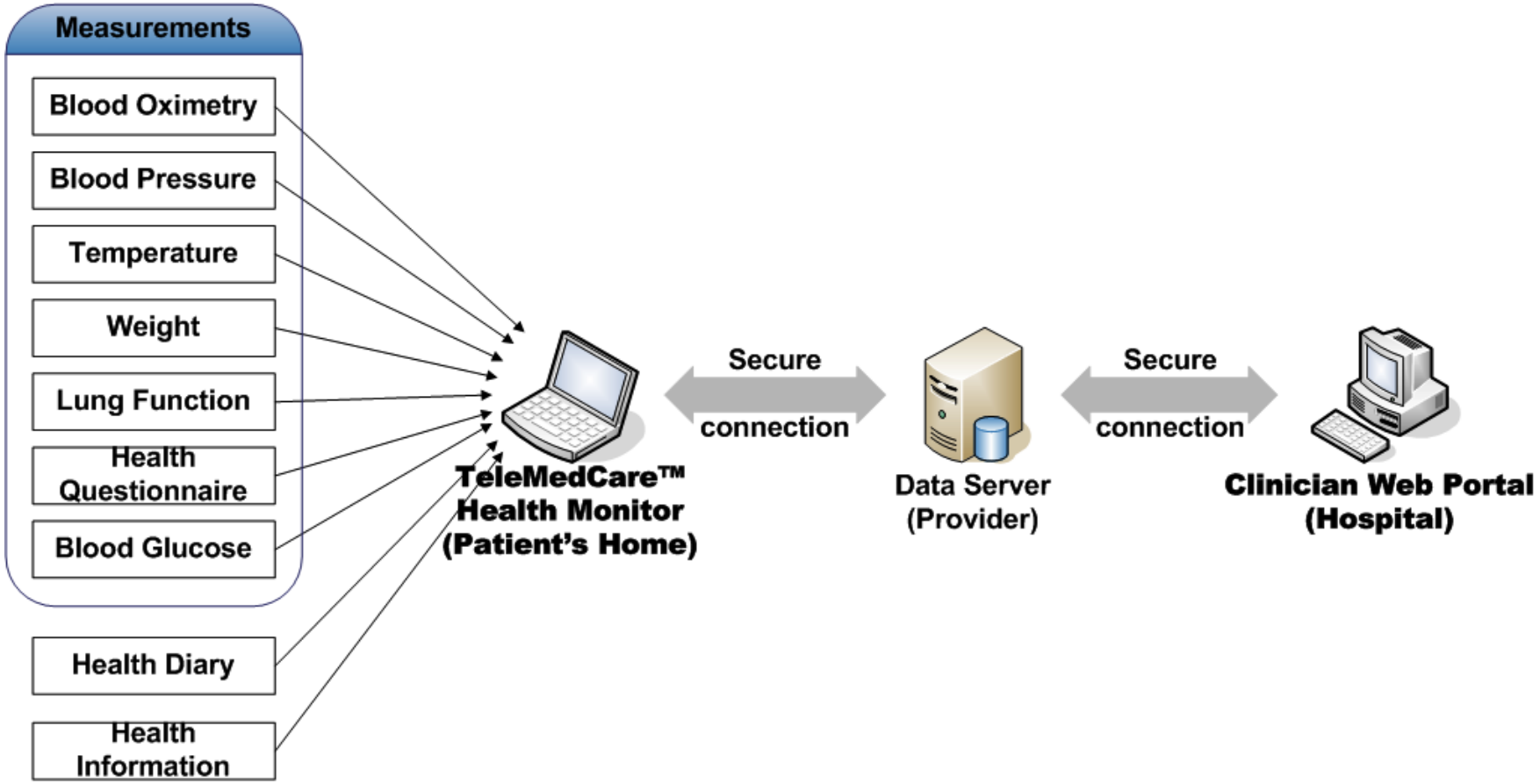
These studies made possible, thanks to…

- The Staff, and the patients enrolled into Remote Patient Monitoring
- Staff from Nursing Informatics Austin Health

Telehealth – Case Study of COPD & CHF

Remote patient monitoring - patients side

Telehealth – Case Study of COPD & CHF



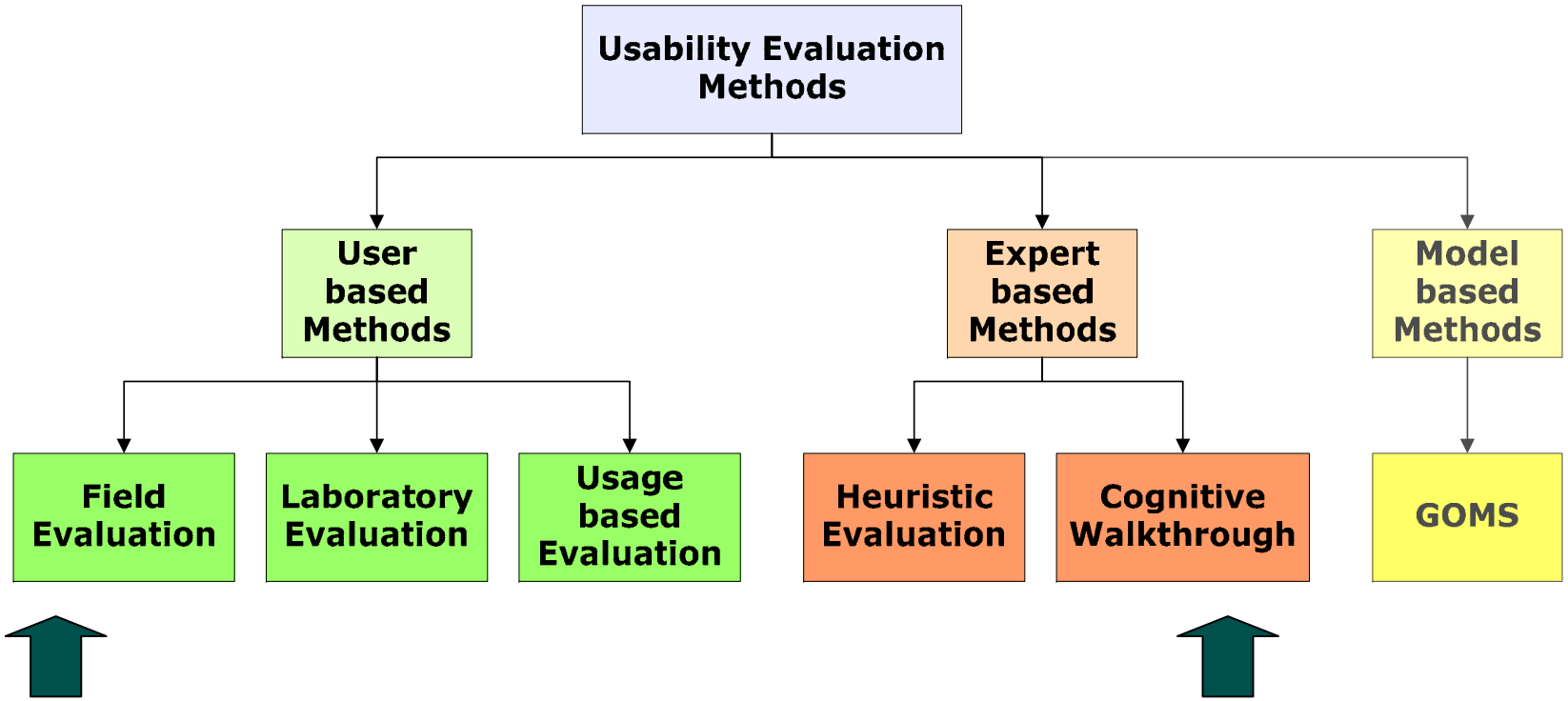
RPMS study - Research Question

How can usability improve the adoption of Information Communication Technologies in health care?

Focus on:

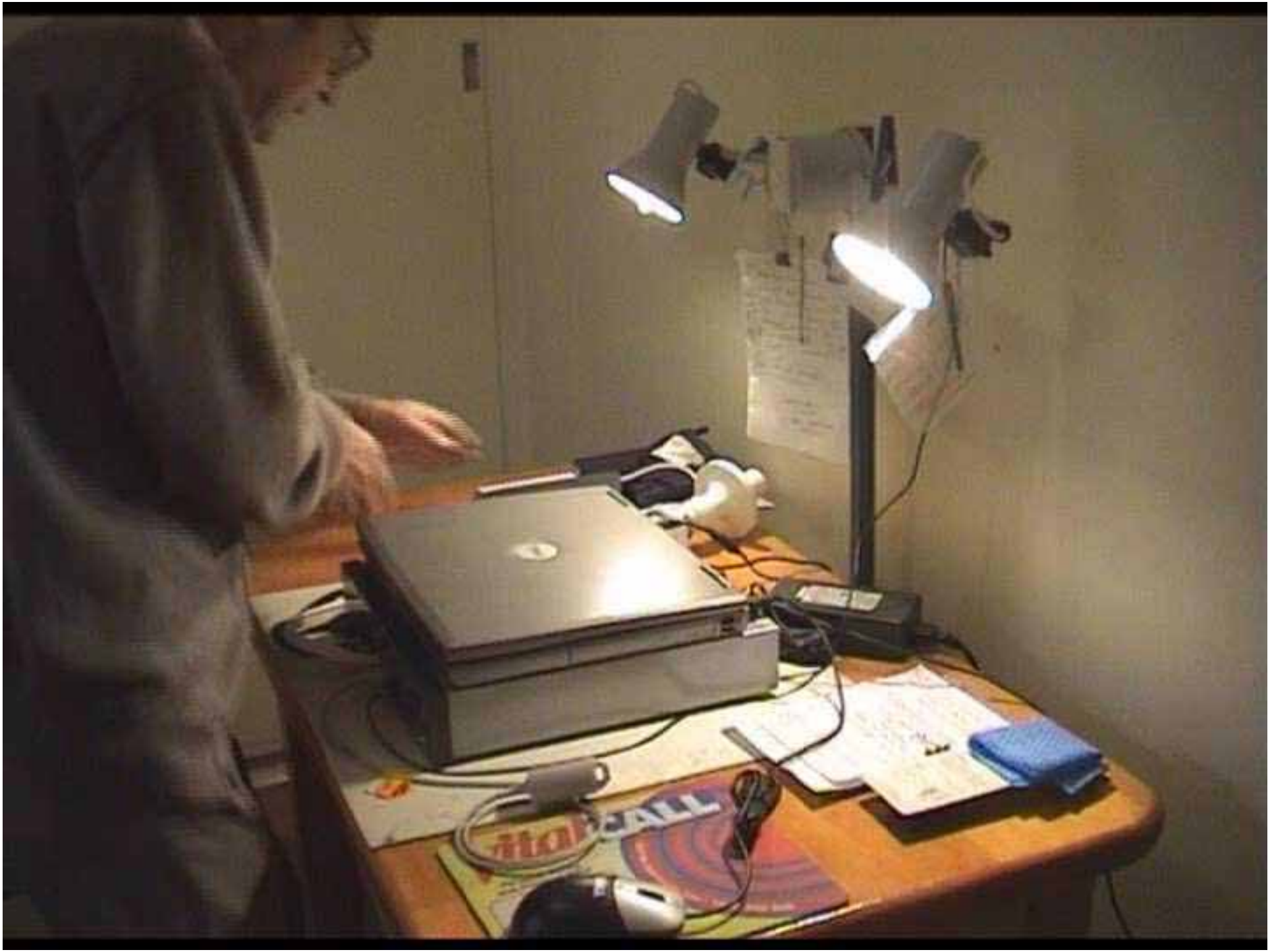
- Benefits for patients and clinicians
- Benefits for health care and hospitals
- Benefits for software developer and provider of health care information systems
- ***Best suited usability evaluation method (user based and expert based methods)***

RPMS study - What methods?



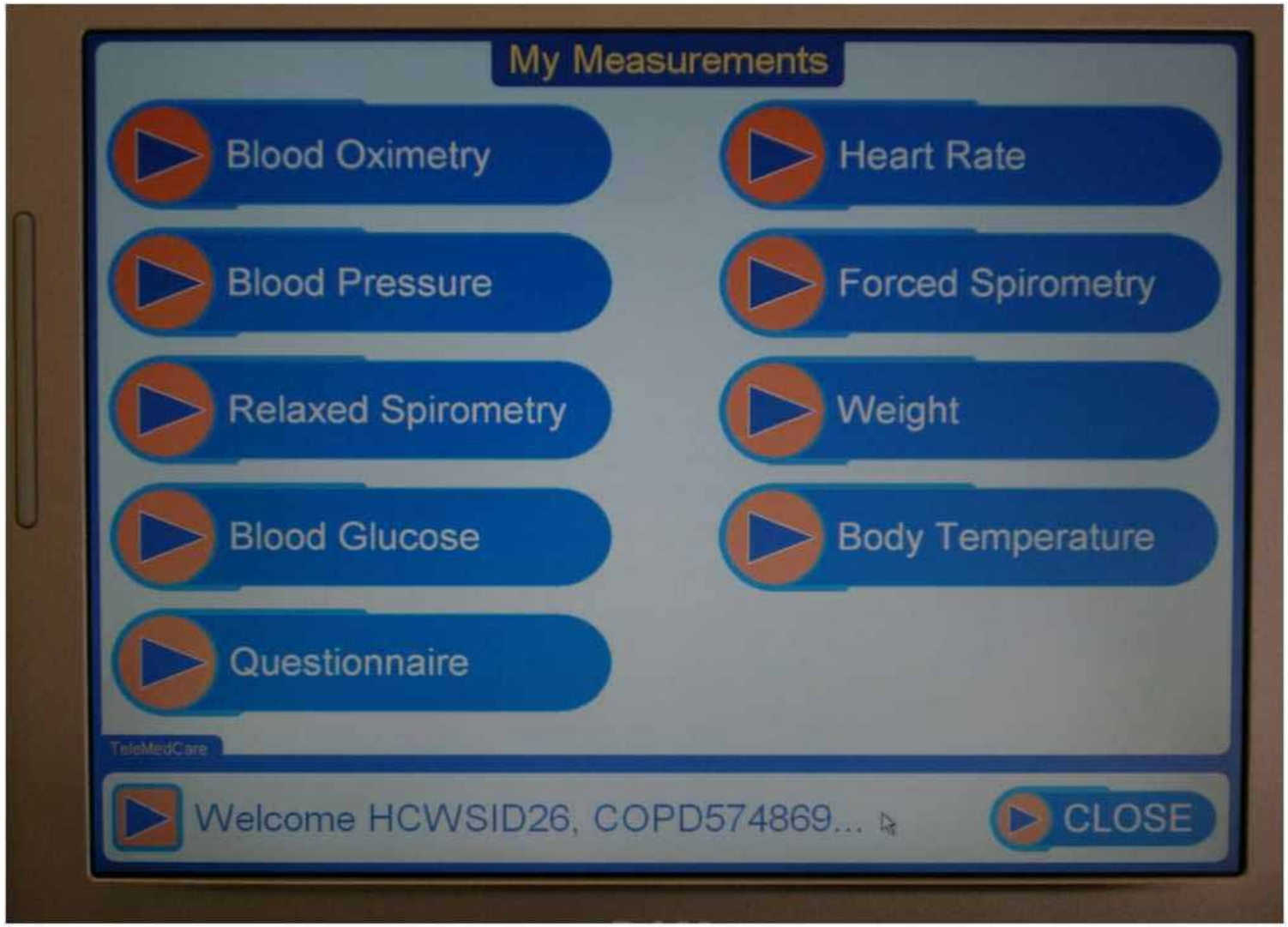
RPMS study - Methodology

- Participants: 6 patients using the RPMS in the Austin Health long term study.
- Location: in the patients' homes.
- Techniques:
  - each patient was observed and video taped while interacting with the health monitor by going through their normal tasks.
  - the patient was asked to think aloud (if possible) to gain more information about their thoughts, opinions and working process.
  - A post-observational interview enabled the researcher to ask details about difficulties and the user's background.



RPMS study - Specific results

- Must fix - 2 issues
  - Does not allow for interruption
  - Most patients use MyMeasurements instead of the automatic schedule, but the order of the tasks in MM is different to that of the schedule,
    - » hence [**U1**] had written on a piece of paper kept in the area the order that measurements were done in the Schedule. [**U2, U3**] follows order of the Schedule from memory. [**U2**] uses MM by preference normally
- Sub-optimal - 11 issues
  - *Ex:* Insufficient prompts whilst loading, spirometer measurements, or some parts of the system are completely unused.
- Cosmetic - 9 issues
  - *Ex:* Difficulty to remove blood pressure cuff


My Measurements
Blood Oximetry
Heart Rate
Blood Pressure
Forced Spirometry
Relaxed Spirometry
Weight
Blood Glucose
Body Temperature
Questionnaire
TeleMedCare
Welcome HCWSID26, COPD574869...
CLOSE

RPMS study - General Results

- A well accepted and adopted system by patients and clinicians
- No critical usability flaws found
- But didn't test initial use - all patients were experienced users.

Conclusion - Usability reporting

- Nielsen's principles:
  - Visibility of system status
  - Match b/w system and the real world
  - User control and freedom
  - Consistency and standards
  - Error prevention
  - Flexibility and efficiency of use
  - Aesthetic and minimalist design
  - Help users recognise, diagnose, and recover from errors
  - Help and documentation

- Priorities
  - 1: Must fix
  - 2: Sub-optimal
  - 3: 'Cosmetic' issues

Conclusion

- Case study highlights need for usability studies
- For usability concepts & usability labs to be part of healthcare software design & part of State ICT strategies
- Set a precedent at the Austin Health about the **benefits of field evaluation** in health care
- Conduction of usability evaluation by non-domain knowledge is not enough
- Usability Evaluation in health care needs **real** access to **real** users

Thanks!

Overview

1. Method
2. Clinicians interacting with computers
3. Importance of clinical workflow
4. Decision making in clinical care and usability

To get started on Usability

Books

- Nielsen, J., 1994. Usability Engineering. Morgan Kaufmann.
- Cooper, A., 2004. The inmates are running the asylum: why high-tech products drive us crazy and how to restore the sanity. Pearson Ed.
- Rogers, Y., Sharp, H. and Preece, J., 2007. Interaction Design. John Wiley & Sons, Ltd.

Links

- Nielsen, J., 1995-2008. Jakob Nielsen's Website. http://www.useit.com
- Government, U.S., 2007. Step-by-Step Usability Guide. U.S. Government Web site managed by the U.S. Department of Health & Human Services., Washington. http://www.usability.gov

Some of the many Usability consultants in VIC

- http://www.usabilityone.com.au/
- http://www.acumentum.com.au/
- http://www.infodesign.com.au/
- http://www.hiser.com.au/
- http://www.ptg-global.com/
- http://www.stamfordinteractive.com.au/
- http://www.symplicit.com.au/
- http://www.ui3.com.au/
- http://www.careythomas.com.au/

Usability Informatics literature starter

Papers

- Kushniruk, A.W. and Patel, V.L, 2003. Cognitive and usability engineering methods for the evaluation of clinical information systems, Journal of Biomedical Informatics, 37, pp: 56-76.
- Beuscart-Zéphir, M.-C., Elkin, P., Pelayo S. and Beuscart, R., 2007. The Human Factors Engineering Approach to Biomedical Informatics Projects: State of the Art, Results, Benefits and Challenges, IMIA Yearbook of Medical Informatics 2007, pp: 159-177.
- Ash, J.S., Berg, M. and Coiera, E., 2003. Some Unintended Consequences of Information Technology in Health Care: The Nature of Patient Care Information System-related Errors, Am Med Inform Assoc, 11, pp: 104-112.
- Berg, M., 1999. Patient care information systems and health care work: a sociotechnical approach, Medical Informatics, 55, pp: 87-101.

Benefits example

- http://www.usability.gov/lessons/learned.html
- Testing of CancerNet.gov:
- Usability testing with actual users is important because it is impossible to predict the range of responses from users.
- Testing clarifies terminology.
- Complex user interactions need to be tested extensively with users.