# Human factors and digital health

#### Professor Melissa Baysari





## What is human factors?

Human factors (HF) is not 'factors relating to people' like communication and decision making

#### The study of work (ergonomics)

The discipline that applies evidence-based methods and knowledge about people to design and improve the interaction between people, systems, and organisations

**Goal**: optimal system performance (high productivity, few errors) and human wellbeing

### How does HF do this? Good work design

We design and re-design 'work systems' to optimise the interaction between people and other parts of the system (tools, tasks, environments, organisations)





## What factors influence clinicians' acceptance and use of digital systems to support safe use of medicines?

#### Acceptance and use is dependent on multiple factors

The technology is part of a wider work system The technology is only one component **The human-technology fit is the hardest part** 

# Speaking to end users can reveal a lot about the technology

## Some examples from my research:

#### Poor system design

Too many alerts: The tricky thing with alerts is there's definitely that sense of alert fatigue where you're just like, "Oh I'm sick of this. So close, nah. I'm not even following you out of spite"

Hard to find: I think, firstly because you have to click through so many things to get to it. Like sometimes I sort-of want to do it, but then it takes so long that you just don't have time.

Too much text: It's just a paragraph of writing, like I don't think it sends a very strong message

#### More design problems

Too much to hold in working memory: There's no Save button. It's hard for you to go and look at what you need to see on the medication chart and come back. You're kind of forced to address everything on this one screen

Keep your eye out for defaults! If a doctor prescribes an antibiotic at eight o'clock in the morning, the system defaults the antibiotic to be given at midday. Now for a patient with severe infection, and they needed the antibiotic to be given immediately, this is not an ideal situation where they can wait for another four hours before receiving their drugs

# Speaking to end users can reveal a lot about the human-technology-task fit

Some examples from my research:

Junior doctor: I wouldn't use it because usually the person who's actually doing the prescribing is the boss who is saying I want this, so you do it

Decision support was not used by junior doctors because the **decision support was not targeting the decision maker** 

Doctor: I have to admit on a ward round I probably would be reading 10% of all alerts that come up because there's so many and sometimes there's the same ones over and over and so there's just no time when you're in a rushed ward round to actually read the alerts

# Alerts were not read because they were **not useful in this context**

Doctor: Because we are already prescribing VTE prophylaxis and the tool I just thought was for hospital funding

The VTE risk assessment tool was not used because it was not useful and users had a poor understanding of its purpose Senior doctor: The decision to prescribe something is based on your clinical knowledge. By the time you type it in and prescribe it, you've already made that decision

Medication warnings were ignored because the **decision** support triggered at wrong time

# Doctor: I haven't been taught how to use them. I just press the prescribe button

Order sentences were not used because of inadequate training

# This last example highlights that the technology is not the whole story

The same system can be perceived differently by different users The same system can be used differently by different users in different contexts

The same system can produce different outcomes in different contexts

### A tale of 2 digital hospitals: A qualitative study of antimicrobial stewardship teams (work by Bethany Van Dort)

Two hospitals, same district, same technologies in place to support AMS

**Hospital A:** AMS dashboard was used to identify, filter, and review antimicrobials, to identify and review patients, to review antimicrobial history, to support AMS meetings

Hospital B: AMS dashboard was rarely used, staff did not see a need for it, some were unaware of it

# Lots of unintended consequences of poorly designed and poorly implemented digital systems

Low uptake of systems

Frustration and annoyance

Workarounds

New types of errors

#### How do we minimise these unintended consequences?

Use a human-centred approach: understand the users and the context of use

Design for "work as done" not "work as imagined"

**Design for a problem:** let's not implement for the sake of implementation

Involve end-users

### **Thanks for listening**

## melissa.baysari@sydney.edu.au

