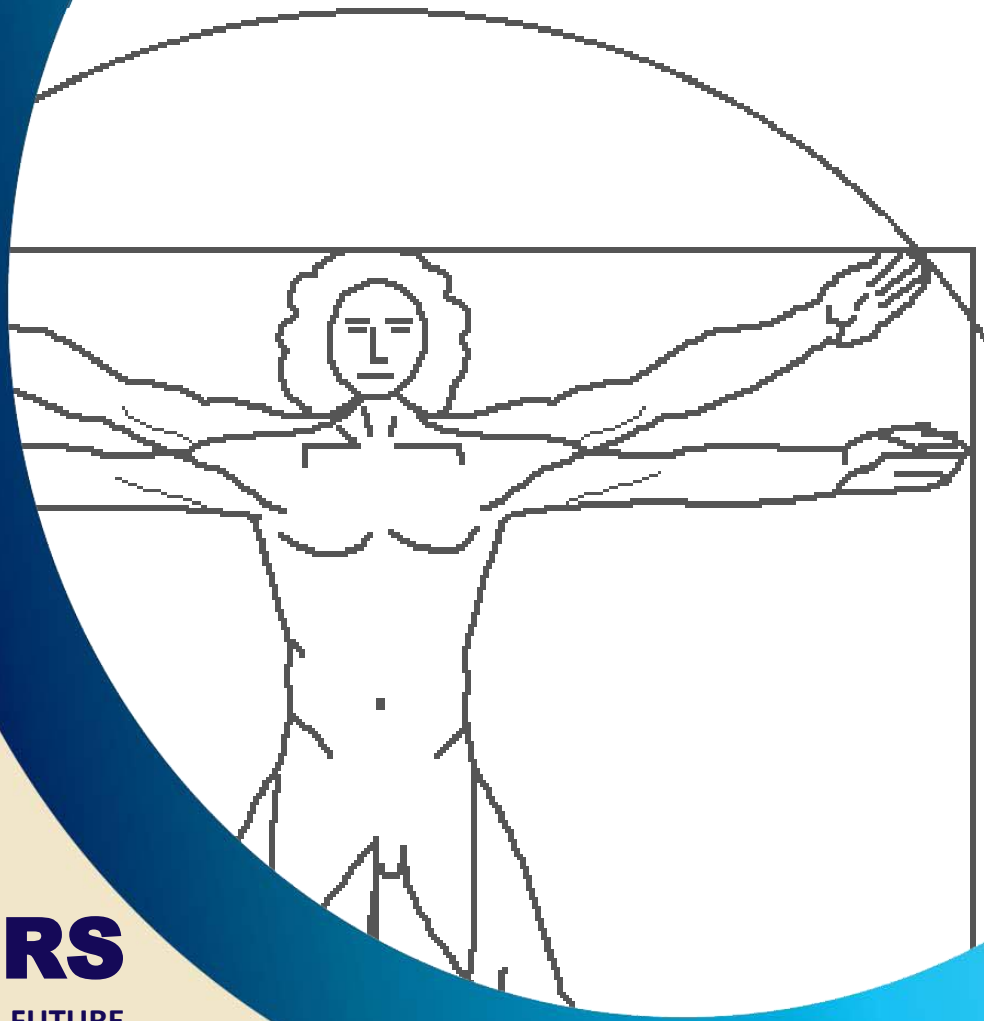

HUMAN FACTORS

BACKGROUND, FOREGROUND, & FORESEEABLE FUTURE

Dr. Yin Shanqing

Human Factors Specialist

Changi General Hospital

Today's Menu

BACKGROUND

what Human Factors is about

FOREGROUND

how Human Factors expertise is being used within healthcare today

FORESEEABLE FUTURE

why Human Factors will play a big role in the future of healthcare

Changi General Hospital

Institute of Aviation, U. of Illinois

Changi
General Hospital

Pilot Training

Changi General Hospital

Aviation Human Factors

Pilot performance under adverse conditions

Human error

Air accident investigation

Mental workload

Situational awareness

Crew resource management

Changi General Hospital

History Dating Back to World War 2

Aviation: talented individuals in million-dollar machines

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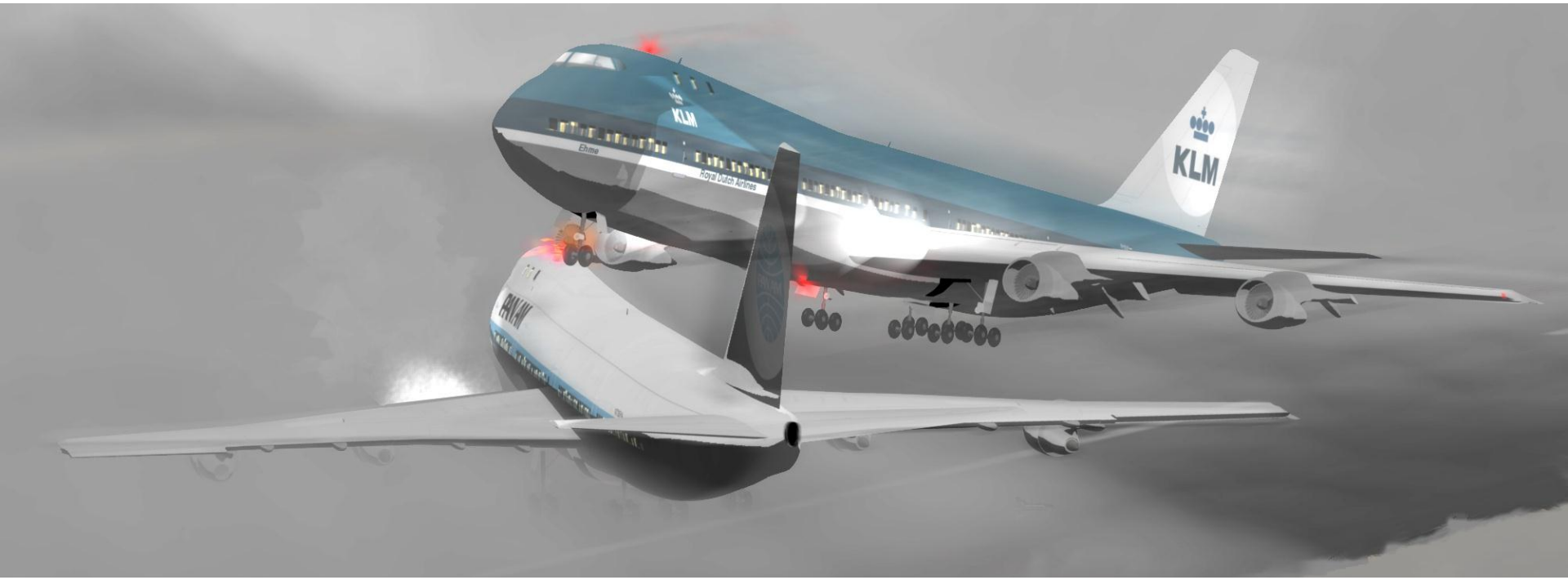
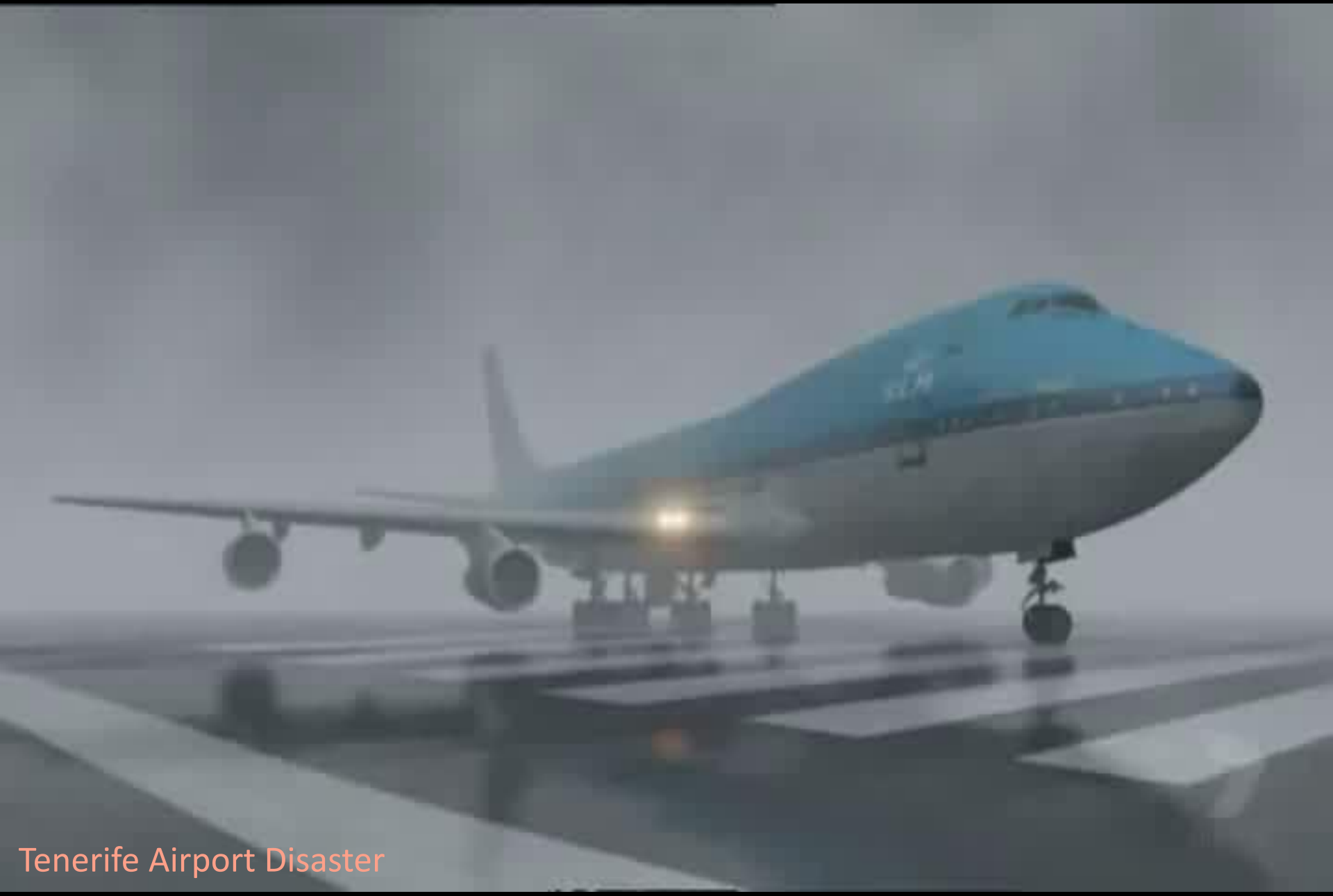
Modern Aviation



Tenerife Airport Disaster

Changi General Hospital

Source: Air Crash Investigation Series



Tenerife Airport Disaster

KLM Celebrity

"Regardless of how well-qualified, experienced … (or) exact profession …"

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Would you speak up if the consultant got it wrong?

...and would you listen if someone said you'd got it wrong?

by Martin Bromiley, boxed article by Lucy Mitchell

Correspondence address: Martin Bromiley, Clinical Human Factors Group, c/o 6 Dudley Close, North Marston, BUCKINGHAM, MK18 3RA

In 2005 my late wife died during an attempted operation. I'm an airline pilot and I recognised early on that the factors that lead to Elaine's death mirrored those commonly found in many aviation accidents.

In this article I'll ask you to reflect on the culture within healthcare around human error and 'teamwork'. I will ask you to reflect on your own personal responsibilities about safety. I will also argue that technical competence is not a guarantee of safe outcomes; alongside it you must have competence in 'non-technical' skills.

Don’t Forget to Check Out

HM4 - Doctor in the Cockpit: Diffusion of Industrial Quality & Safety Innovations in Hospitals

2.30pm

Dr Dirk De Korne

Deputy Director

Health Innovation, Academic Clinical Program

Singapore National Eye Centre

Changi General Hospital

What is Human Factors?

Science of **improving human performance** and **reducing human error**

(simple definition)

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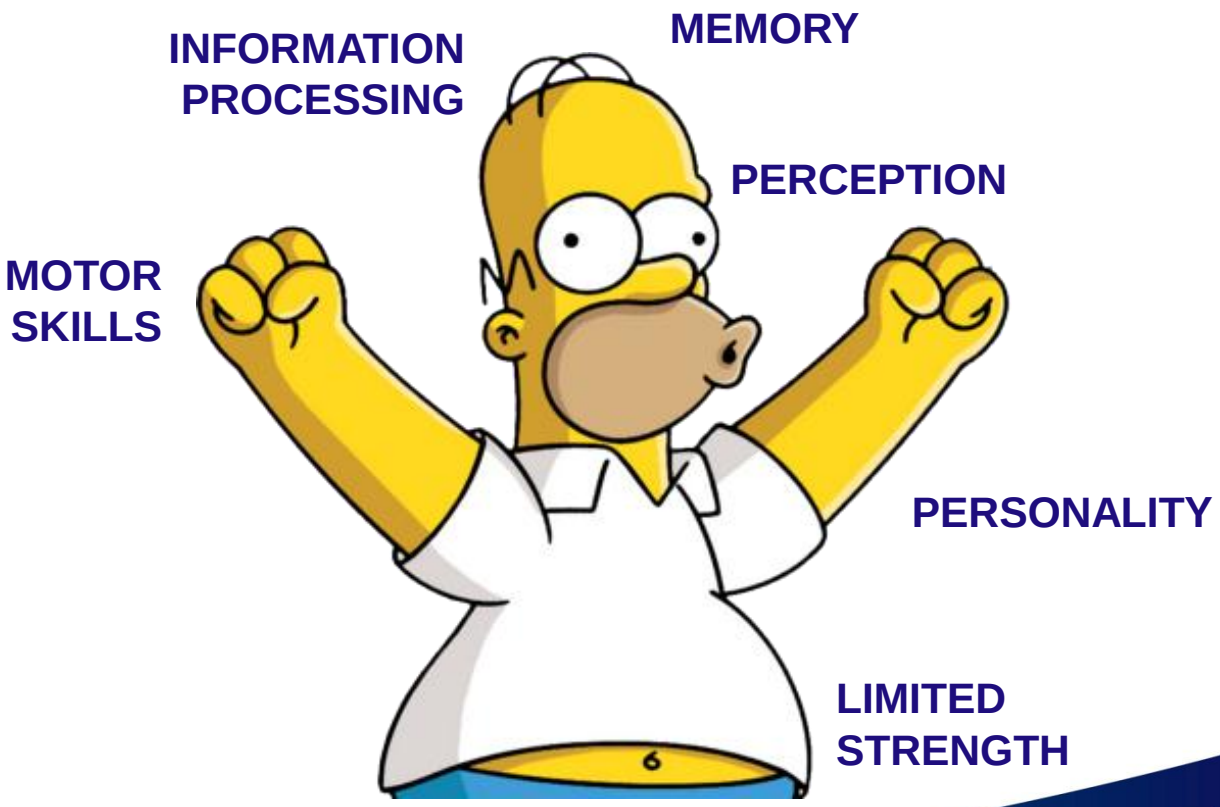
A Weak Link

If you possess any of these components, **you** can cause errors



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Applying Psychology Theories

Perception: visual search, attention, lighting in environments, communication

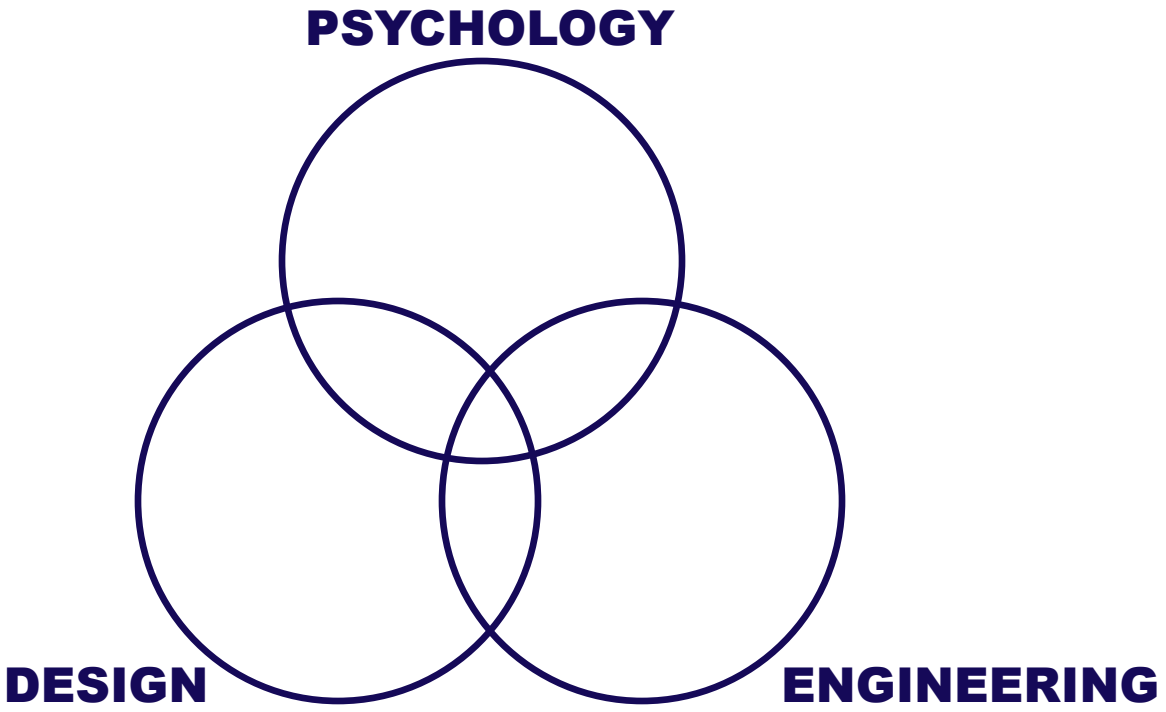
Memory & Cognition: decision-making biases, training, procedure design

Social (Cultural) Psychology: crew resource management, authority

Personality Psychology: personnel selection

Stress & Workload: multi-tasking, fatigue management

Multi-Disciplinary Field



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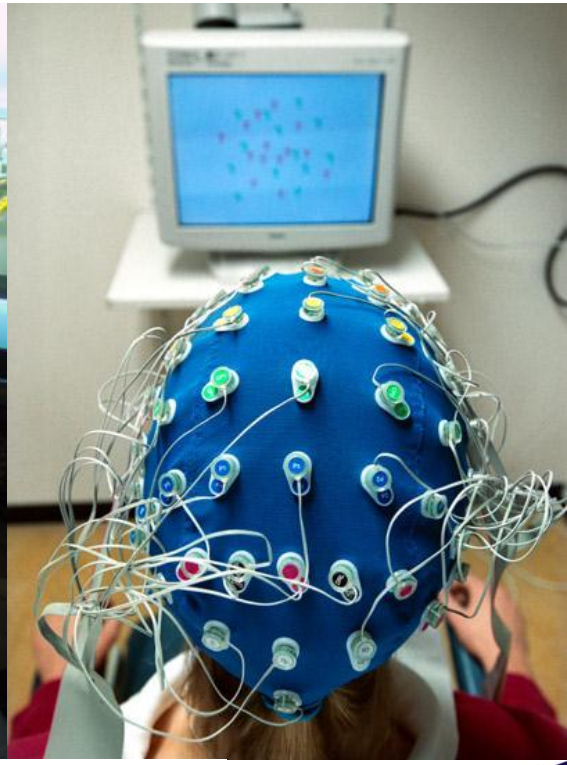
Ordinary Humans in Extraordinary Environments



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HOW OMNIPRESENT IS HUMAN FACTORS?

Same Design, Opposite Instructions

Designs and affordances can encourage us to make mistakes

Distractions While Driving

Do you use the phone or the GPS while driving?

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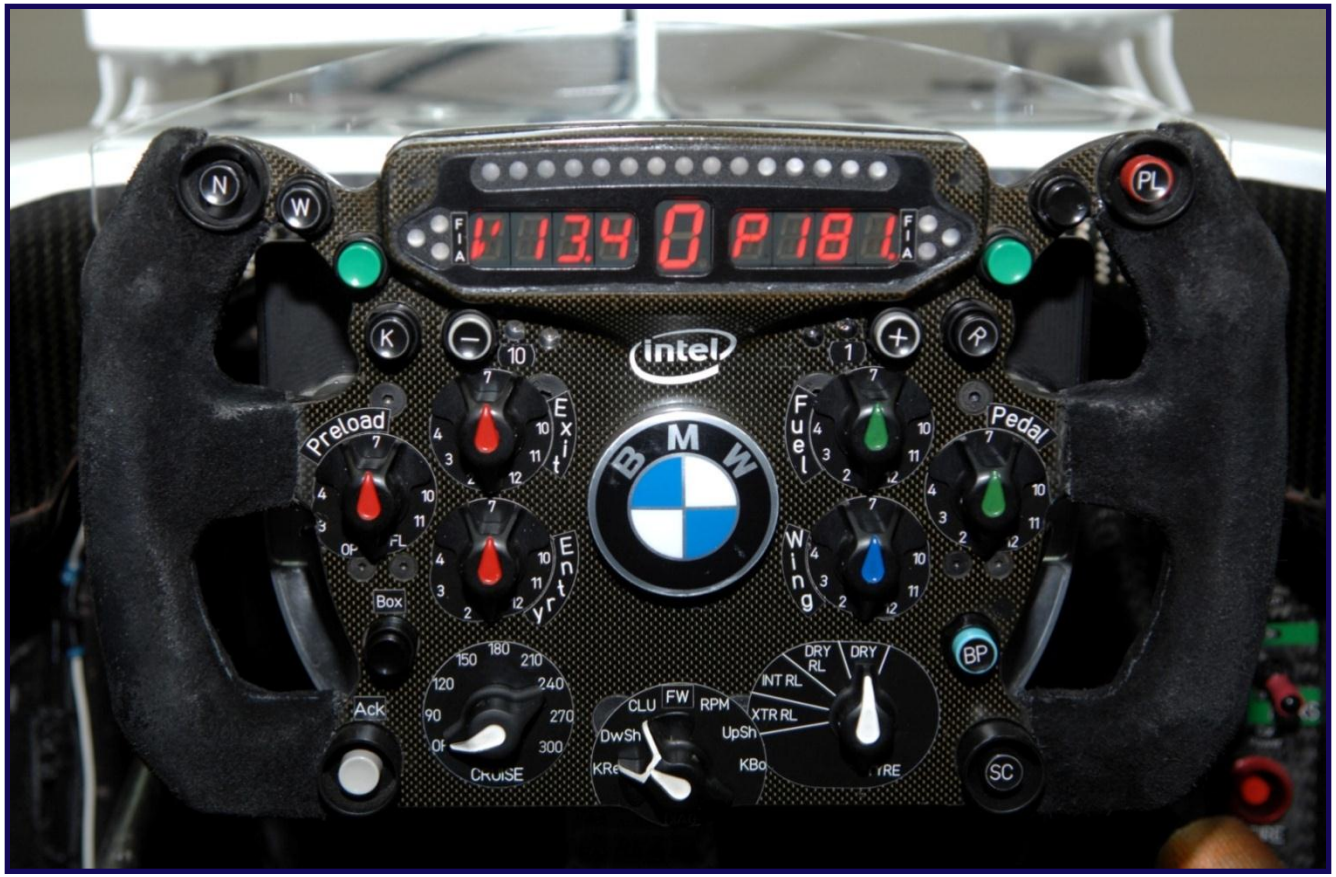
Pushing the Limit



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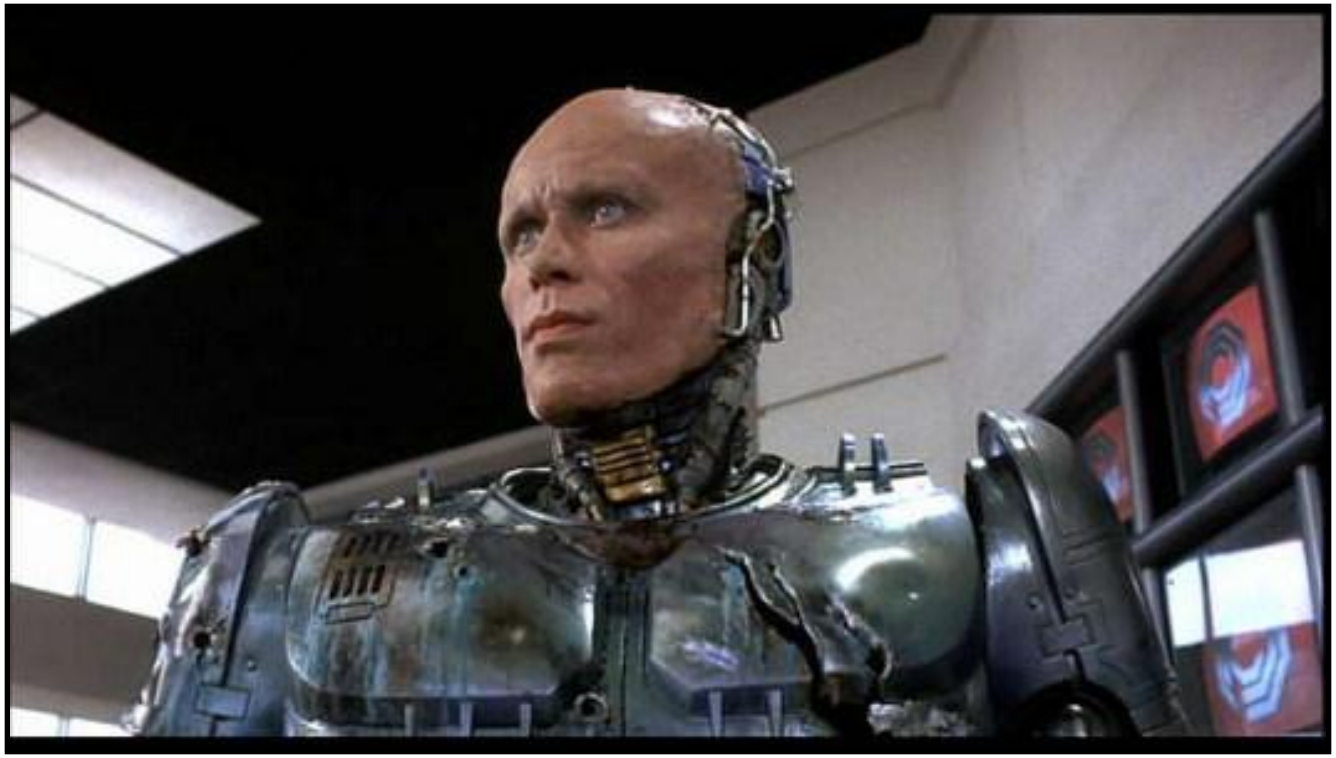
Going Beyond The Limit?



Technology appeals to us where we are most vulnerable

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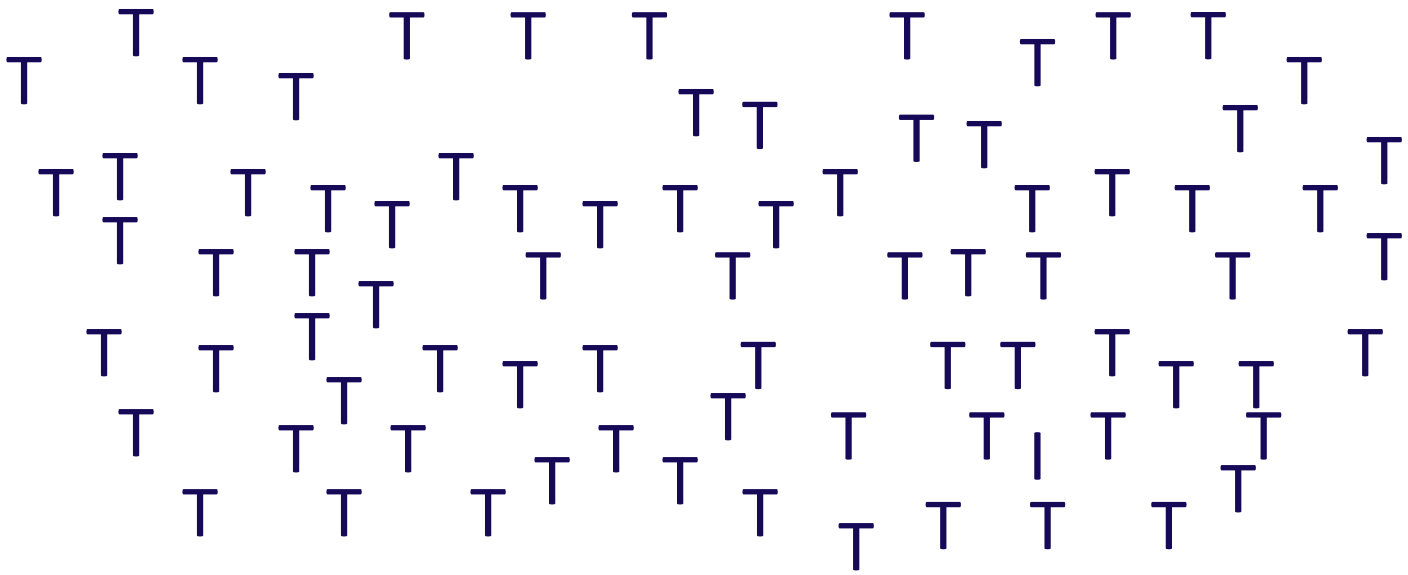
HOW VULNERABLE ARE WE?

To answer this question, we must first understand ourselves.

Are you ready?

Can You Find The Odd One Out?



Increased difficulty in detection = Increased risk of error

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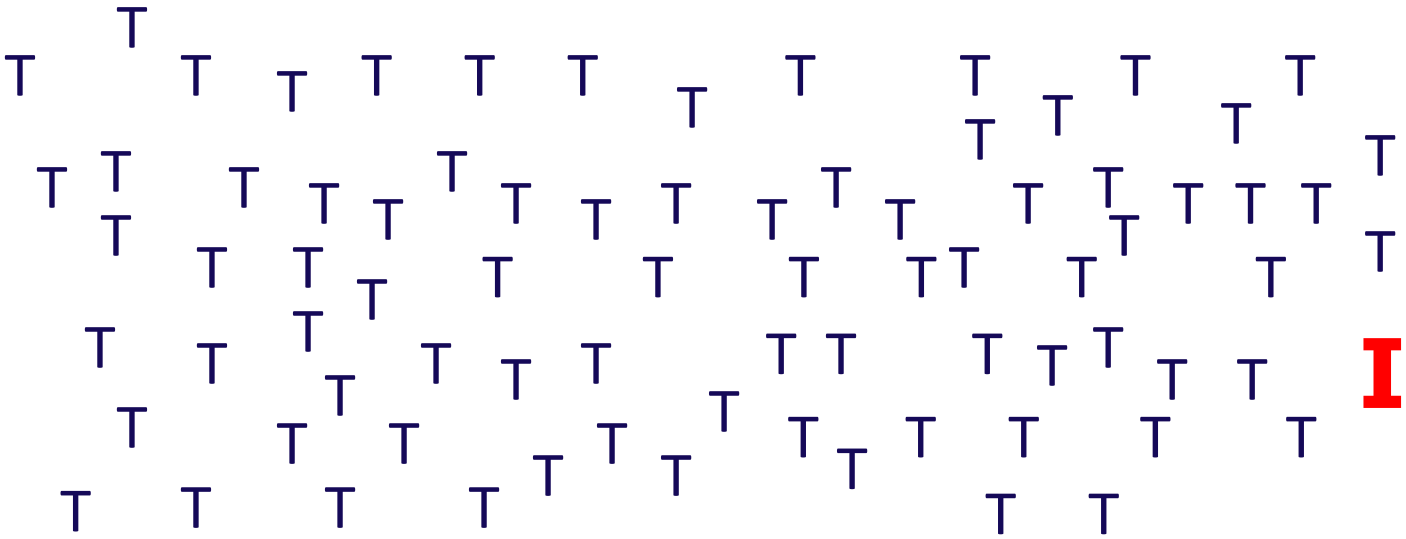
How About Now?



Automatically drawing our attention

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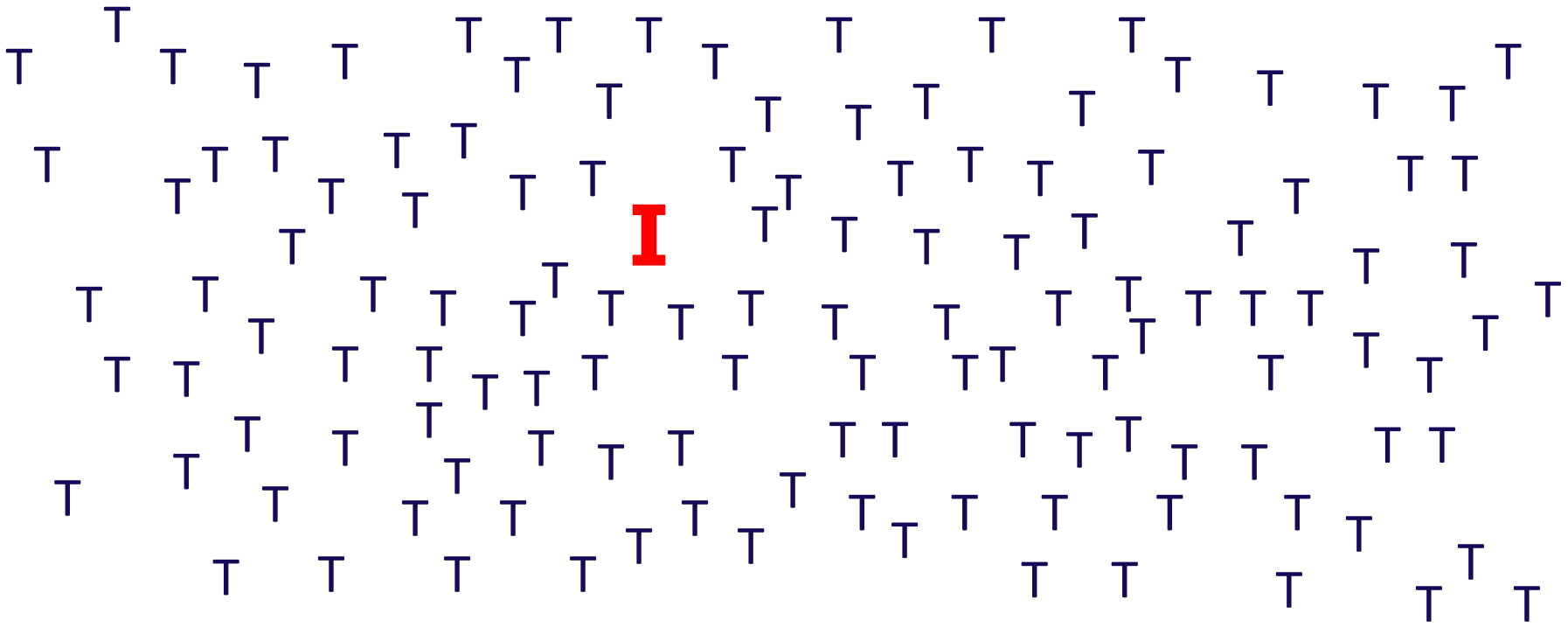
Parallel Search



Effective, regardless of how many distractors present

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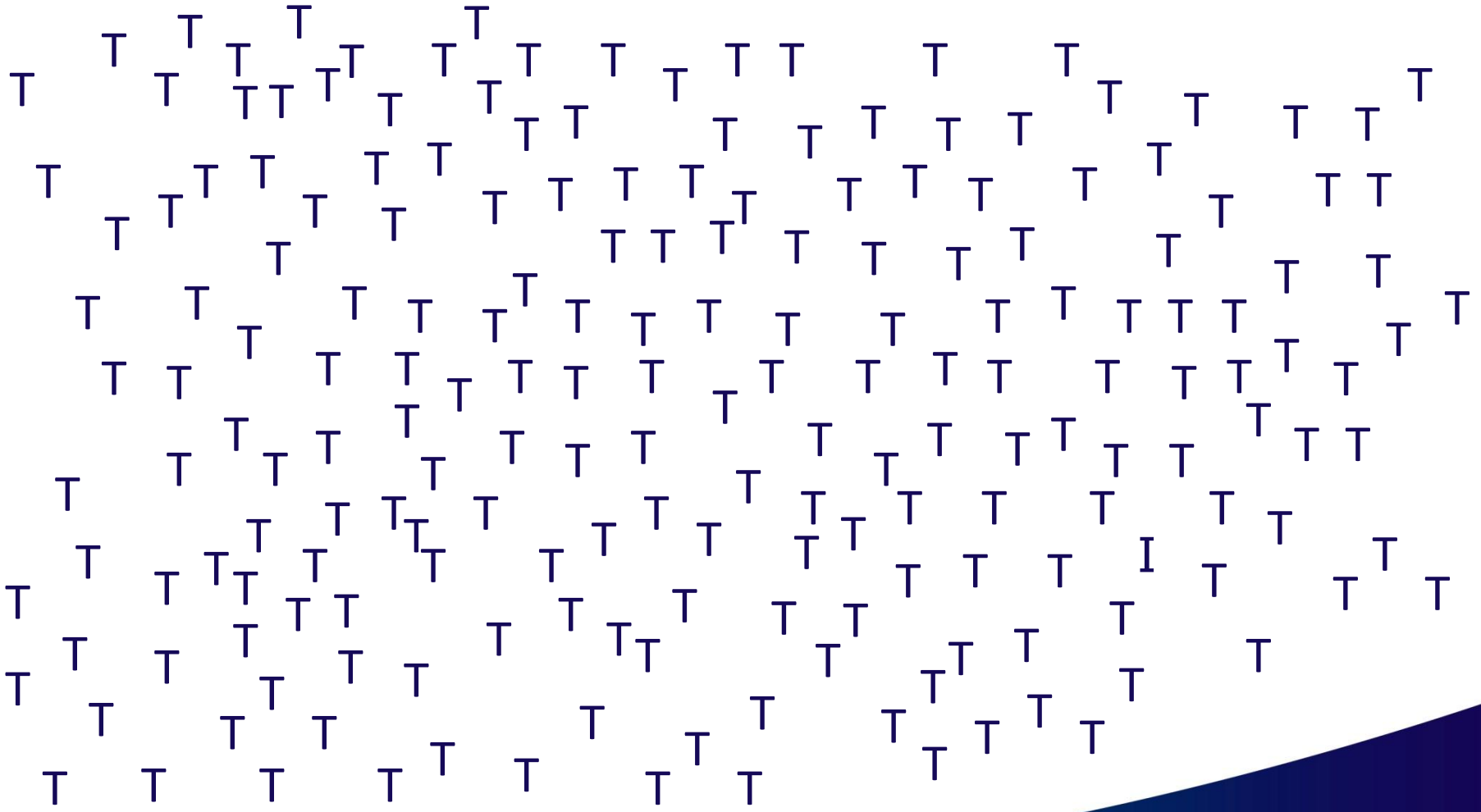
The Boss Stage



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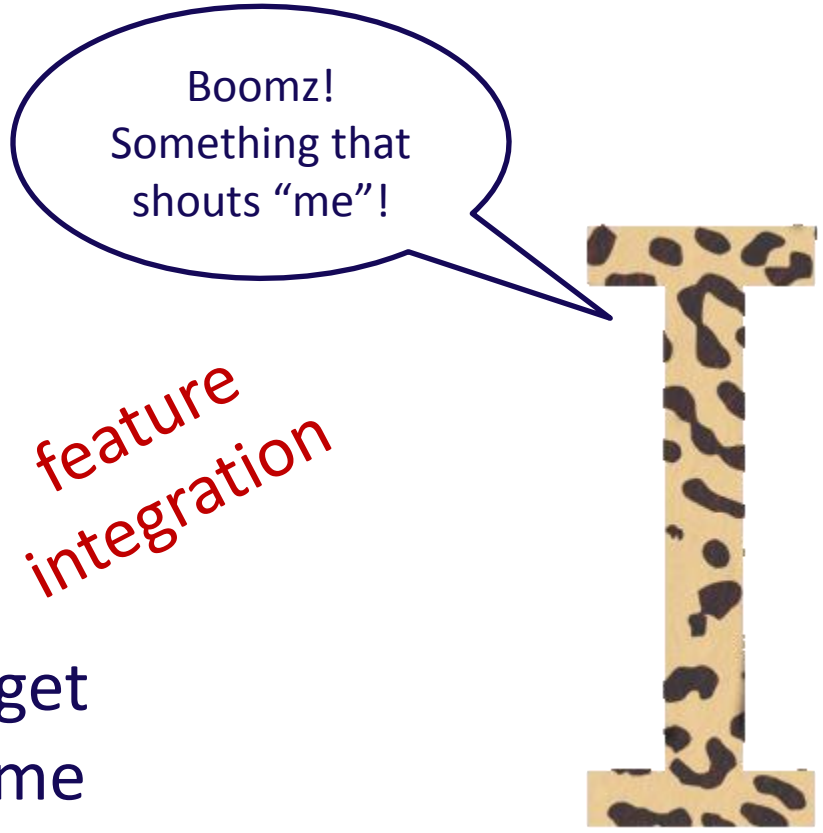
Parallel Processing

- Items in entire array are processed “in parallel”
- “pop-out” effect; **boomz**
- Color, **contrast**, **size**, motion etc.
- Time it takes to detect target in 5 search items is the same for 50 search items

feature integration



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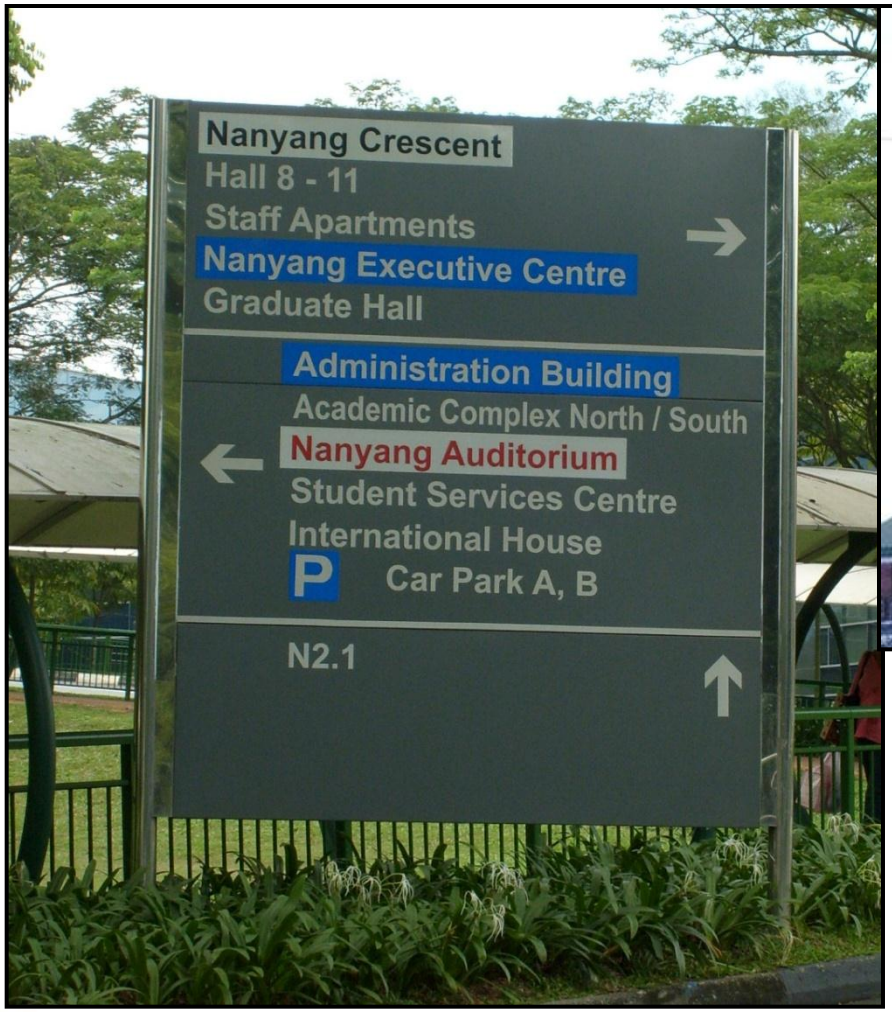
Road Signs



(not so good)

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Serial Search

- “serial processing”
- need to focus attention on each item before deciding and identifying target
- more search items = longer search time
- suffers from **speed-accuracy tradeoff**

SERIAL SEARCH TASKS → EFFORTFUL → PAY ATTENTION

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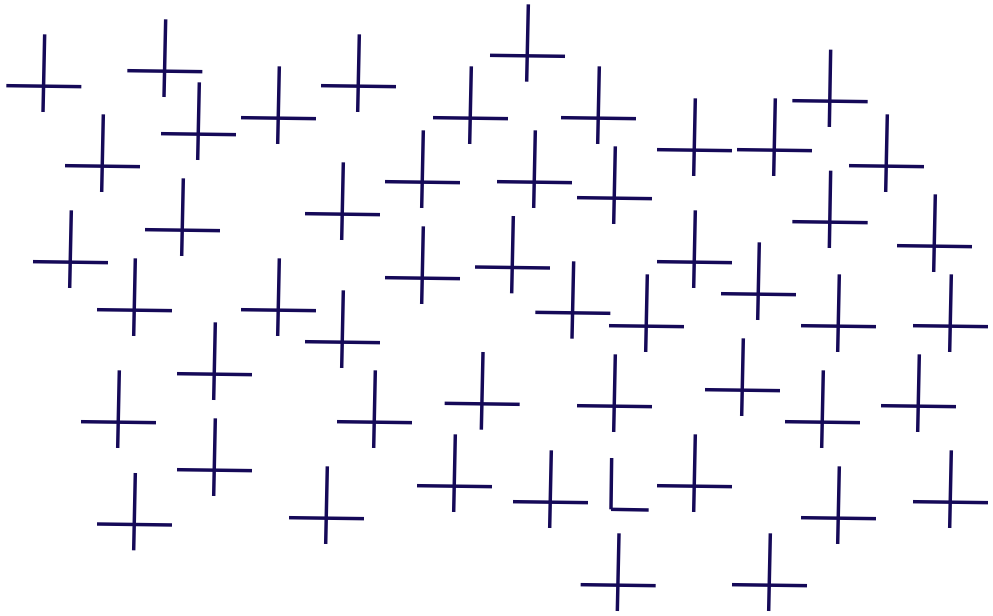
Similarity of Target and Distractors



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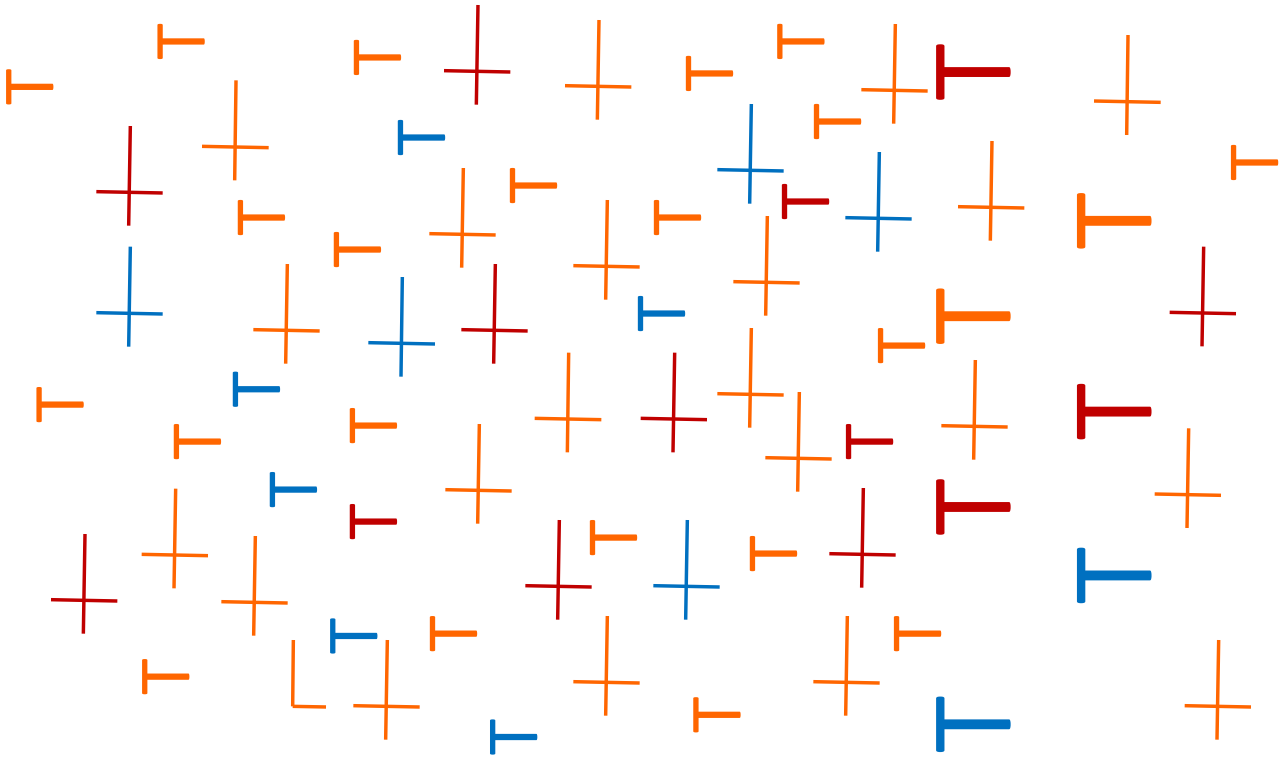
Same Same but Different



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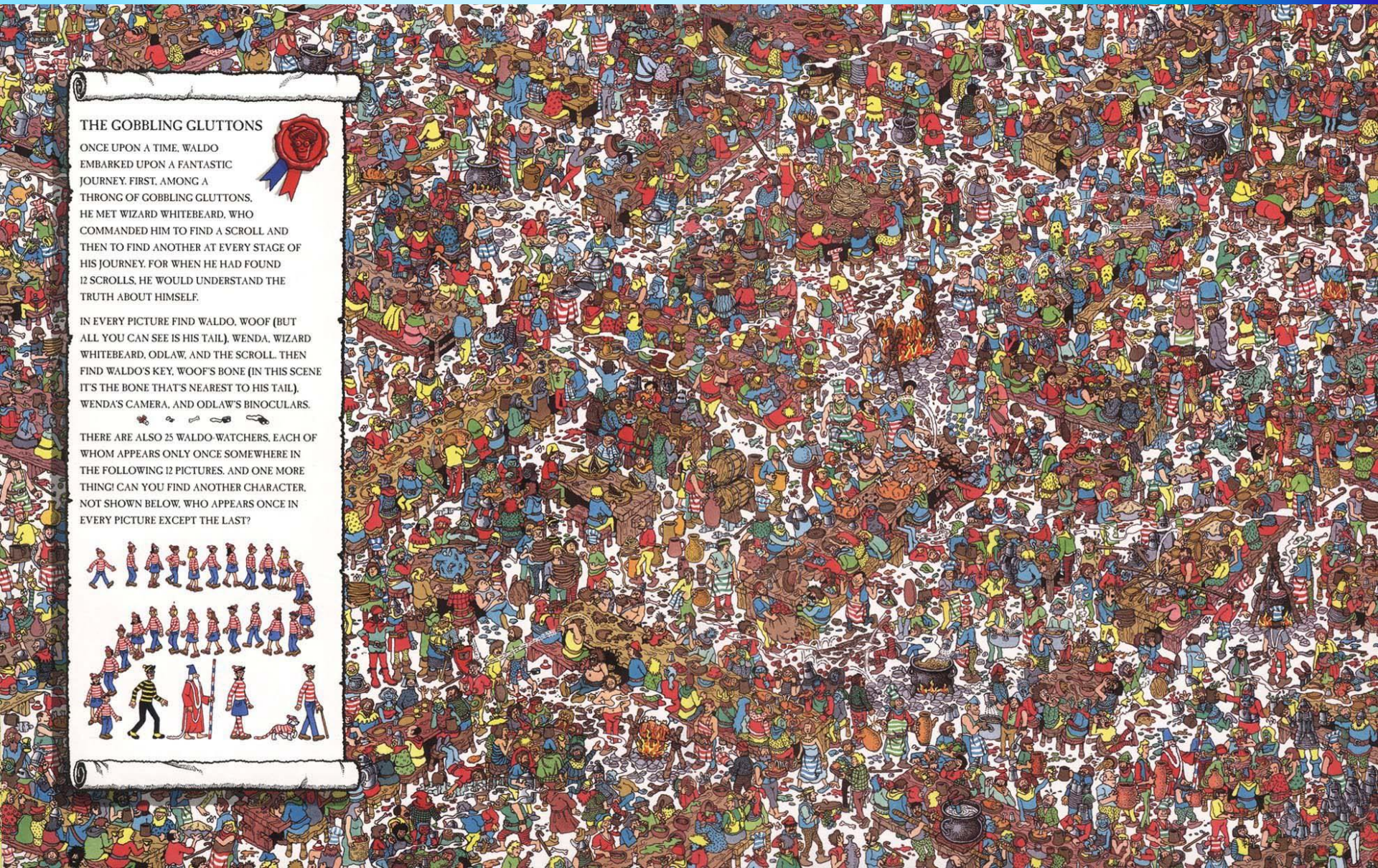
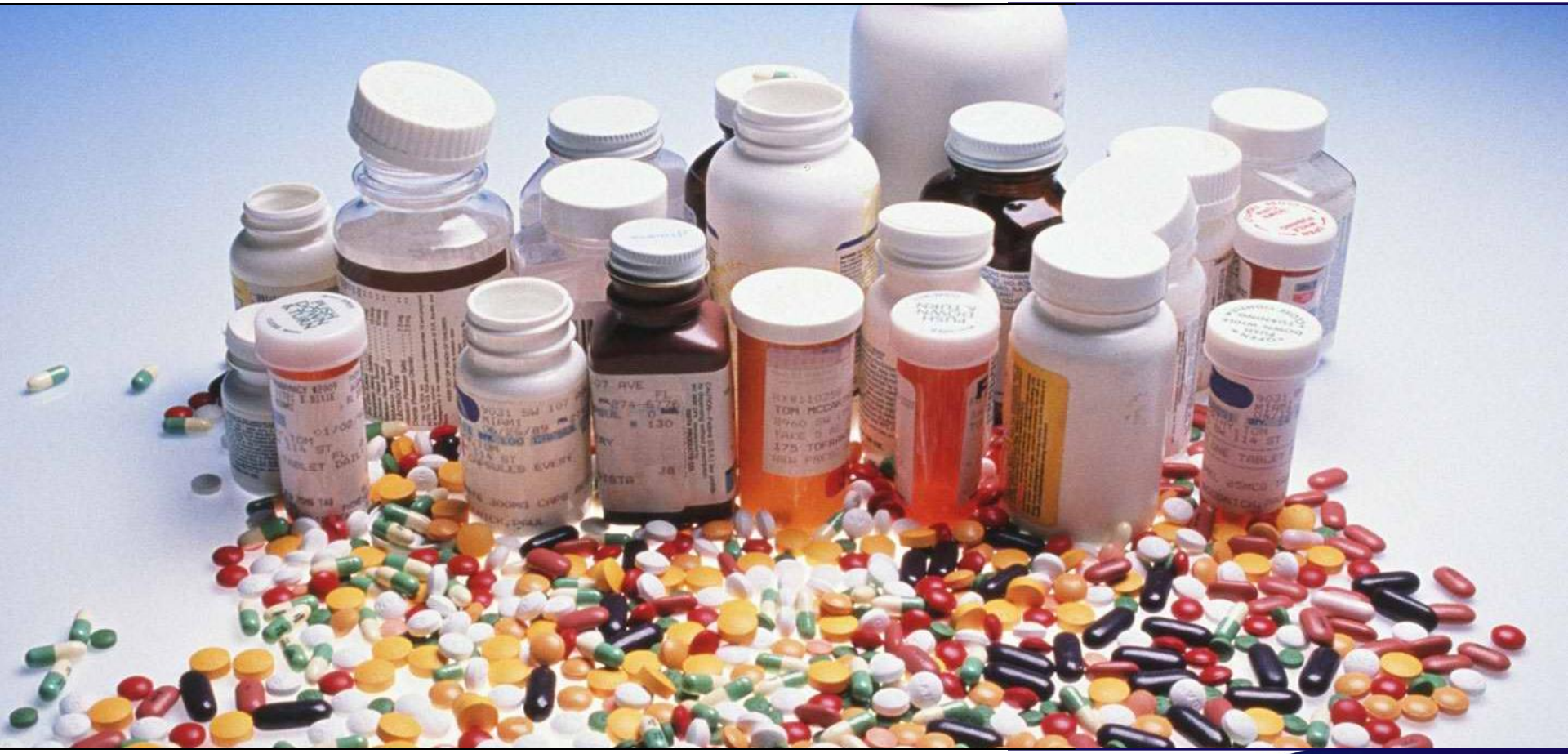
Where's Wally?



Packing The Right Drug



Serial search and inspection all day long

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Heparin Vials

Designed to err

Changi General Hospital

Death by Decimal Points

Quaid sues Baxter over Heparin overdose

December 5, 2007 — 7:59am ET

Are drug makers responsible for a hospital's medical error? That's what actor Dennis Quaid and his wife are alleging in a lawsuit over the blood thinner given to their newborn twins last month. The babies received 1,000 times the proper dose of Heparin, made by Baxter Healthcare.

At issue is the product label and design. The label on the 10-unit vial of Heparin is very similar to the label on the 10,000-unit strength. They're both blue, and the vials are similarly sized.

The couple is seeking only $50,000, saying that the suit is not about money, but about preventing the same overdose in other children. Last year, three Indiana children died after a healthcare worker gave them a similar overdose. Though Heparin, a generic, is made by seven different companies, it was Baxter's product involved in the Indiana overdose as well.

- read this *BBC NEWS* report
- get more details from the *Chicago Sun-Times*

Baxter International

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Medical Error in the USA

"Never" Events:

- Wrongful surgery
- Surgical site infections
- Blood incompatibility
- Falls in the hospital
- Administering wrong meds
- Retained foreign object

… etc

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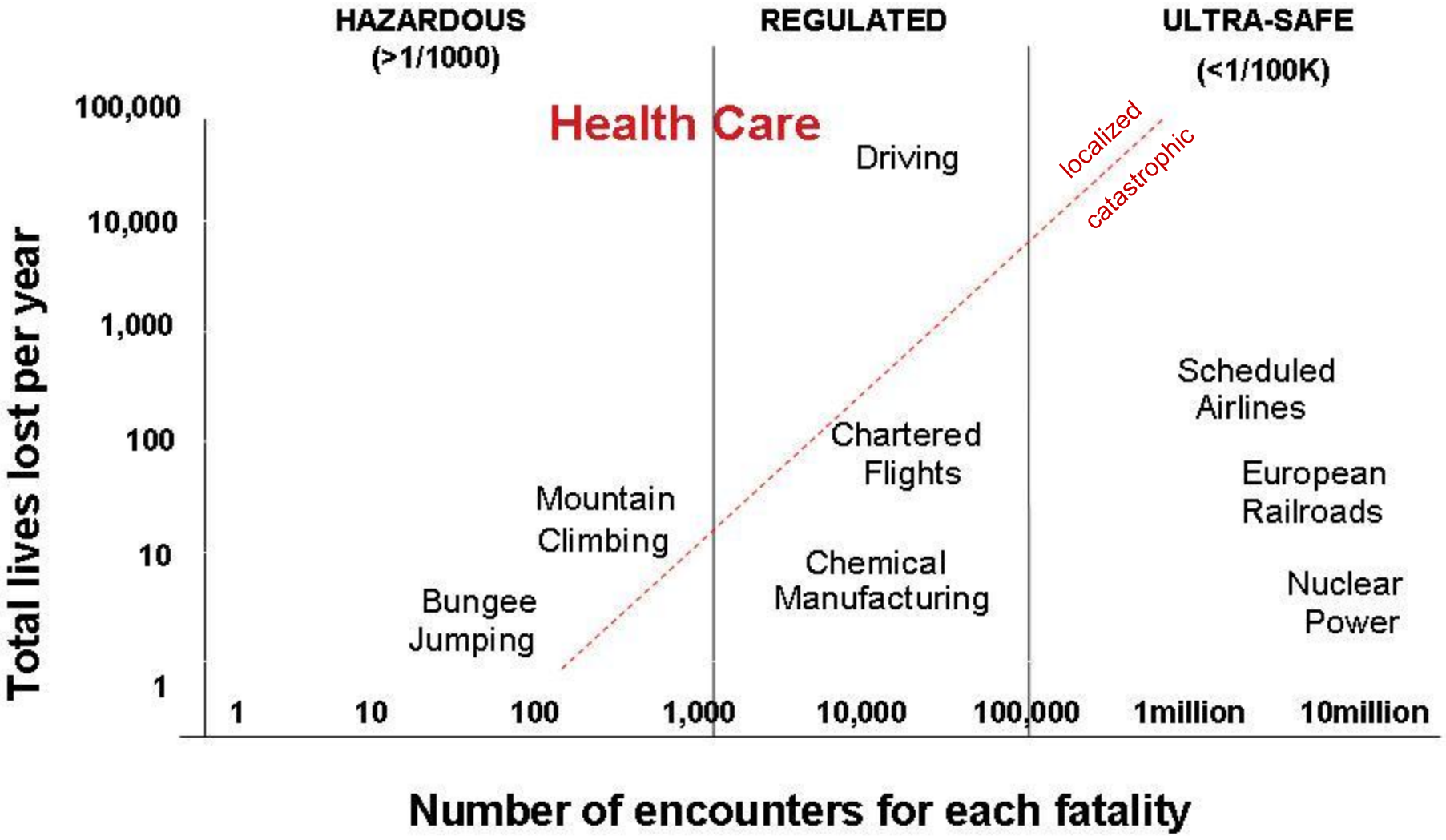
Source: NHS Institute for Innovation & Improvement

Healthcare is hazardous



HOW CAN HUMAN FACTORS HELP?

Changi General Hospital

Human Factors Activities in Healthcare

Quality Improvement & Solution Planning

applying HF concepts and findings based on evidence-based research

User Research

facilitating user experience insights through task analyses and other HF methods

Subject Matter Consultant

for research and innovation, investigations, as well as education and training programs

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RESEARCH & INNOVATION

provide new insights on complex issues, and

generate creative solutions which are evidence-based

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Characteristics of an Ideal Handover Method

There are many ways for patient information to be communicated.

Various features found in different methods can encourage or ***afford*** certain behaviors which are beneficial during handovers.

Main Investigators: Dr Kewin Siah (NUH) & Ms Jessie Yang (NTU)

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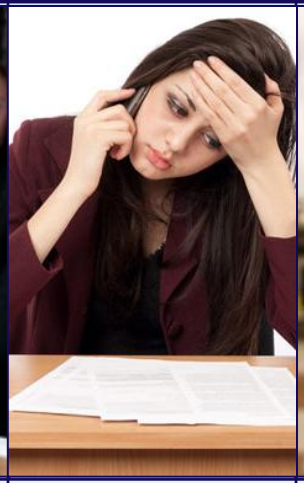
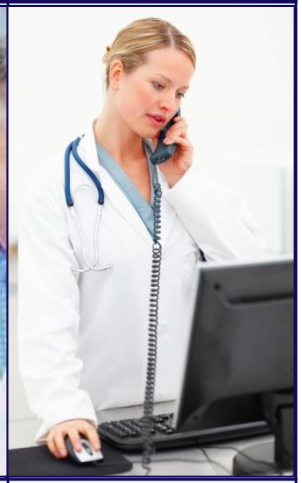
Four Characteristics of Handovers

Affordance: a quality or feature that allows specific behavior or action

Affordances	Support from Medical Literature
Interactivity Able to engage in dynamic, two-way discussions (Q&A, seek clarification, interrupt the speaker etc.)	Positive support from WHO guidelines and quasi-experiments (Joint commission, 2006; Obstfelder and Moen, 2006; Horwitz et al., 2009)
Reviewability Extent to which communicated information can be reviewed during and after the handover process	Positive support from experiments (Bhabra et al.2007 ; Pothier et al., 2005)
Shared Workspace *(Cloud)* Able for both to simultaneously access *e*-case notes (but not necessarily able to see each other)	Positive support from field observation (Anderson and Mangino, 2006)
Visibility Able to see each other (but not necessarily share a workspace)	Positive support from expert opinion (Solet et al., 2005), Opposite opinions from communication theories

HOW WILL EACH CHARACTERISTIC AFFECT HANDOVERS ?

Six Possible Handover Methods

Receiver in Transit	Cellphone Handover	Discussion & Pre-Notes	Audio Recording	Face-to-Face Handover	Remote Data Access
					
Discussion with no note-taking	Discussion with note-taking	Discussion with prepared notes by outgoing Dr.	Voicemail with note-taking	In a meeting room with note-taking *(no case notes)*	Simultaneous discussion, note-taking, and case notes review
Interactivity Visibility Shared Space	**Interactivity** Visibility Shared Space	**Interactivity** Visibility Shared Space	Interactivity Visibility Shared Space	**Interactivity** **Visibility** Shared Space	**Interactivity** Visibility **Shared Space**
Low Review	**Medium** Review	**High** Review	**Medium** Review	**Medium** Review	**Medium** Review

Measuring the Effects of Each Characteristic

"on-shift doctor" was surveyed regarding each unique case that was handover over via each unique method:

- **Memory Recall** of case details and specifics
- **Case Comprehension** of what needs to be done
- **Subjective Evaluation** of the quality of the handover

THE HIGHER THE SCORE, THE MORE POSITIVE THE EFFECTS

Changi General Hospital

Handover Study: Summary of Results

Interactivity

When on-shift doctors were allowed to query and clarify during discussions, they demonstrated higher memory recall and case comprehension.

Reviewability

Providing handover notes significantly improved on-shift doctors' memory recall and subjective evaluation scores.

Shared Workspace

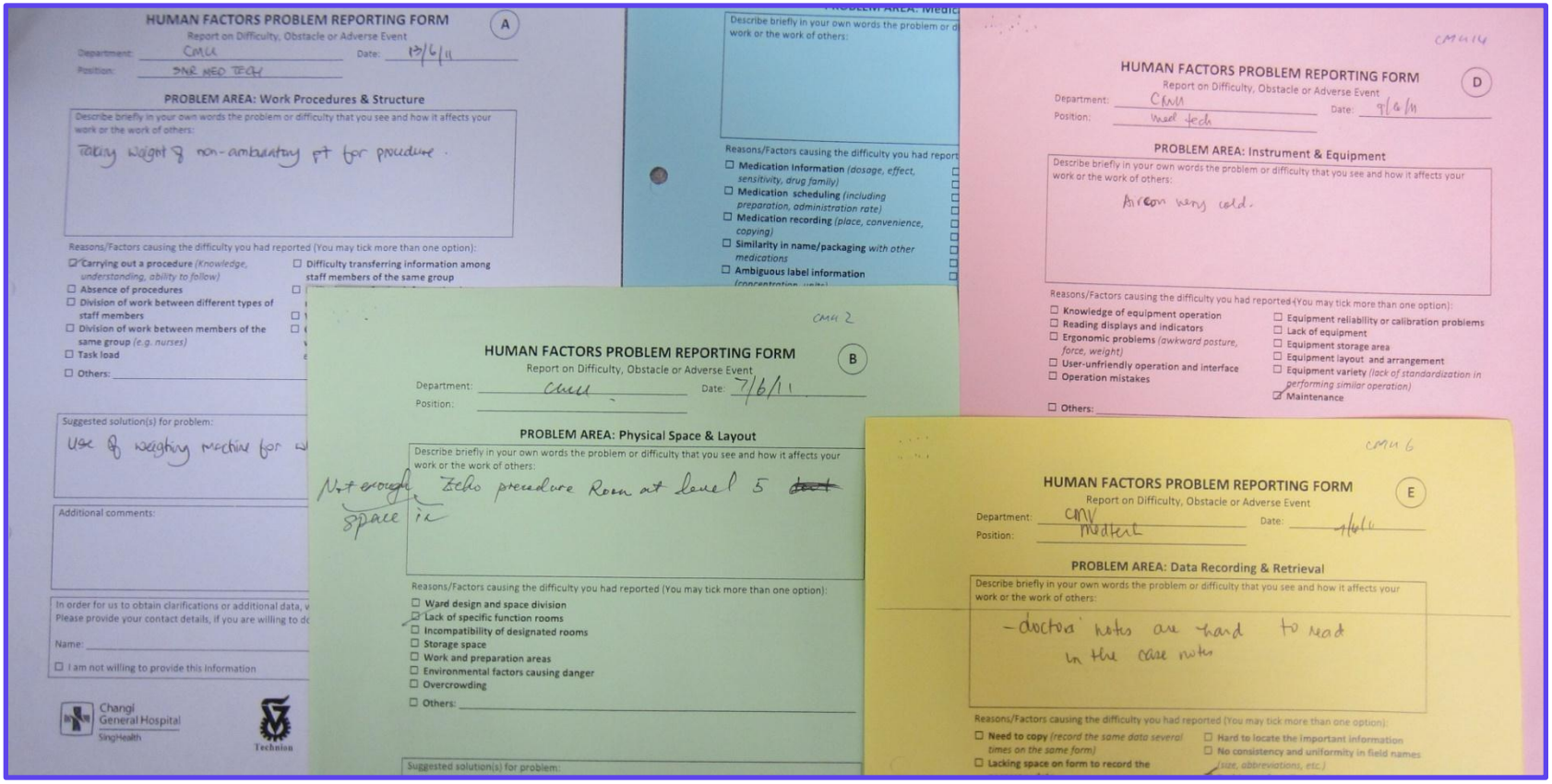
When handover teams were able to simultaneously interact with patient case notes, on-shift doctors had better memory recall of case details.

Visibility

There were no evidence suggesting that face-to-face handover is better than cell phone handover

Changi General Hospital

HQI2F'11 Funded Research Project



HUMAN FACTORS PROBLEM REPORTING FORM (A)
Report on Difficulty, Obstacle or Adverse Event
Department: CMLL Date: 13/6/11
Position: SNR MED TECH
PROBLEM AREA: Work Procedures & Structure
Describe briefly in your own words the problem or difficulty that you see and how it affects your work or the work of others:
Taking weight of non-ambulatory pt for procedure.
Reasons/Factors causing the difficulty you had reported (You may tick more than one option):
☑ Carrying out a procedure (Knowledge, understanding, ability to follow)
☐ Absence of procedures
☐ Division of work between different types of staff members
☐ Division of work between members of the same group (e.g. nurses)
☐ Task load
☐ Difficulty transferring information among staff members of the same group
☐ Others:
Suggested solution(s) for problem:
Use of weighing machine for w
Additional comments:
In order for us to obtain clarifications or additional data, v
Please provide your contact details, if you are willing to d
Name:
☐ I am not willing to provide this information
Changi General Hospital SingHealth
Technion

Describe briefly in your own words the problem or d
work or the work of others:
Reasons/Factors causing the difficulty you had report
☐ Medication information (dosage, effect, sensitivity, drug family)
☐ Medication scheduling (including preparation, administration rate)
☐ Medication recording (place, convenience, copying)
☐ Similarity in name/packaging with other medications
☐ Ambiguous label information

CMH 2
HUMAN FACTORS PROBLEM REPORTING FORM (B)
Report on Difficulty, Obstacle or Adverse Event
Department: CMLL Date: 7/6/11
Position:
PROBLEM AREA: Physical Space & Layout
Describe briefly in your own words the problem or difficulty that you see and how it affects your work or the work of others:
Not enough space in Echo procedure Room at level 5 ~~bed~~
Reasons/Factors causing the difficulty you had reported (You may tick more than one option):
☐ Ward design and space division
☑ Lack of specific function rooms
☐ Incompatibility of designated rooms
☐ Storage space
☐ Work and preparation areas
☐ Environmental factors causing danger
☐ Overcrowding
☐ Others:
Suggested solution(s) for problem:

CMH 4
HUMAN FACTORS PROBLEM REPORTING FORM (D)
Report on Difficulty, Obstacle or Adverse Event
Department: CMH Date: 9/6/11
Position: Med tech
PROBLEM AREA: Instrument & Equipment
Describe briefly in your own words the problem or difficulty that you see and how it affects your work or the work of others:
Aircon very cold.
Reasons/Factors causing the difficulty you had reported (You may tick more than one option):
☐ Knowledge of equipment operation
☐ Reading displays and indicators
☐ Ergonomic problems (awkward posture, force, weight)
☐ User-unfriendly operation and interface
☐ Operation mistakes
☐ Equipment reliability or calibration problems
☐ Lack of equipment
☐ Equipment storage area
☐ Equipment layout and arrangement
☐ Equipment variety (lack of standardization in performing similar operation)
☑ Maintenance
☐ Others:

CMH 6
HUMAN FACTORS PROBLEM REPORTING FORM (E)
Report on Difficulty, Obstacle or Adverse Event
Department: CMH Date: 4/6/11
Position: Student
PROBLEM AREA: Data Recording & Retrieval
Describe briefly in your own words the problem or difficulty that you see and how it affects your work or the work of others:
- doctors' notes are hard to read in the case notes
Reasons/Factors causing the difficulty you had reported (You may tick more than one option):
☐ Need to copy (record the same data several times on the same form)
☐ Lacking space on form to record the
☐ Hard to locate the important information
☐ No consistency and uniformity in field names (size, abbreviations, etc.)

Explore the viability of a patient safety proactive reporting system

Changi General Hospital

Patient Safety Site Visits / Proactive Notification

PS VISITS

– YOUR CHANCE TO SPEAK UP FOR PATIENT SAFETY!

During the course of your work, you may have been asked to fill in "Patient Safety Pre-PS Visit Survey Forms". You may have flagged out some patient safety concerns and even made some recommendations. You may also have attended PS Visit discussion groups.

As one safety slogan goes, "Safety is a Choice not an Accident." By doing these things, you have chosen to do your part for patient safety at CGH. Our patients thank you!

CGH's **Patient Safety Site Visits (PS Visits)** are conducted by Dr Yin Shanqing, Human Factors Specialist, and supported by CGH management and our Patient Safety Committee.

In 2012, Dr Yin replaced the old "Patient Safety Walkabout" system with a system of analysis based on human factors principles. It was later renamed "Patient Safety Site Visits (PS Visit)" in an attempt to remove the stigma that walkabouts were management's way of auditing the site.

As part of the CGH Patient Safety Program, the PS Visit gives hospital management and leaders the opportunity to understand our staff at their workplace, so and to resolve safety issues as well as potential dangers before real harm is done.

PS VISIT SCHEDULE

4 DAYS BEFORE WALKABOUT DAY

- Patient Safety Representatives visit the unit to brief managers on the upcoming Walkabout.
- *Pre-PS Visit Survey Forms* will be provided and distributed by managers to staff.
- Staff members highlight any safety issues or work process difficulties using these Survey Forms.

2 DAYS BEFORE WALKABOUT DAY

- Patient Safety Representatives will collect the

Utilizing the benefits of HFACS in proactive hazard identification and assessment

Changi General Hospital

Single-page Form using SBAR Format

Patient Safety **Proactive Notification Form**

Serial No.

Date: _____ **Location / Dept:** _____

S Situation

Describe the problem. Give details on how the situation becomes unsafe and how it affects you or others from working efficiently.

Does the problem / task / situation involve *(you may tick more than one box, or none at all)*

- ☐ medication or drugs
- ☐ tools, instruments, equipment, devices or I I interface
- ☐ physical space and/or layout of working area
- ☐ forms, charts or paperwork
- ☐ standardized work procedure or protocol
- ☐ communication of information
- ☐ working with staff from the same department
- ☐ working with staff from other units *(doctors, nurses, pharmacists)*
- ☐ direct contact with patient(s)
- ☐ direct contact with visitors (i.e.: not patients)

B Background

Can you estimate how frequent this situation has been occurring? *(tick one)*

☐ daily ☐ weekly ☐ few times a month ☐ once every few months ☐ five times or less a year

Do you know if any patient or staff has been harmed due to this situation? ☐ yes ☐ no

If yes, briefly describe what happened:

Are there any reasons or root causes that are causing, or will increase the likelihood of, this problem?

A Assessment

What do you think are some of the work-related risks or patient safety concerns? How will this situation harm patients or staff?

R Recommend

Do you have any recommendations that would help you to handle or reduce such problems?

****Optional: Please share with us your name and contact number in case we have further questions****

Name: _____ **Contact Number:** _____

Nov 2012

What is the Patient Safety Proactive Notification Form?

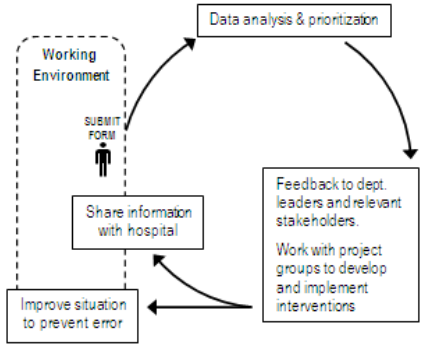
PURPOSE

This form allows any hospital staff to share any observations about potential patient safety dangers.

Rather than *reacting* to incidents, the hospital wants to *proactively* resolve issues before they become incidents. Through the **CGH Patient Safety Program**, the objective of Proactive Notification is to highlight and capture any close calls or potential mishaps *before* they occur and cause real harm.

Frontline staffs form vital eyes and ears of the hospital, identifying potential hazards that may affect work performance, staff safety, as well as the safety of patients. Some examples include similar-looking drugs, confusing equipment or storage layout, inappropriate interruptions, irregular standard procedures etc. If there is a situation which you think may result in a safety lapse, please use this form to let the hospital know.

PROACTIVE NOTIFICATION PROCESS



After your form has been submitted, it will be processed by a team of patient safety representatives.

The team will analyse and prioritize this information, and may explore additional details before coming up with recommendations. The team then discusses with the relevant department managers, leaders, and problem stakeholders, and work with the appointed project groups to come up with and implement possible interventions.

In order to create awareness of the problem, some of your inputs along with the team's findings will be shared with the rest of the hospital via *QUEST*, the monthly e-newsletter published by the Patient Safety Committee.

All the submitted data, findings, and outcomes will be documented and stored in a database for future reference, and used solely for improving patient safety.

INSTRUCTIONS

The form is designed for information to be communicated in a concise manner through the familiar SBAR format. Forms with clear and explicit details greatly help the analysis process.

1. Indicate the date and your department
2. Describe the problem or **situation**. Give details on the *purpose* of the task, *who* is involved, *what* items or equipment are required, *where* the situation occurs, and *when* the situation becomes unsafe or problematic.
3. Check the boxes that are relevant to the problem, if any. You may tick more than one box.
4. Identify any **background** factors that may lead to or is causing this problem.
5. Provide a brief **assessment** on how work performance or patient safety is affected by the problem. *Why* is this problem a problem?
6. **Recommend** any solutions or interventions, if any.
7. OPTIONAL—include your name and contact number so that the team can consult you for additional details.
8. Submit this form via the dropbox provided.

Your insights and inputs go a long way in helping us maintain high patient safety standards. Thank you.

An Initiative of the CGH Patient Safety Program

Changi General Hospital

Eastern Health Alliance

Data Analysis using HFACS & Risk Assessment

Proactive Notification **Analysis & HFACS Form**

Use for back-office analysis, or during Site Visits

Serial No.

Date: _____ **Location / Dept:** _____

Additional Details (Conducted On Site)

Are there any additional details that further describes the problem?	**AIM** To elicit crucial details that may have been omitted in the notification / survey form **ASK** What is the main focus of the problem? What are the key components of the problem? Who are the people involved? How is the task performed (in greater detail)? How is the problem normally handled or resolved? Why are some of the existing safety barriers difficult to implement? What is the history of this problem?

Conduct HFACS

(read out each factor and circle all that apply)

What are the background factors causing / encouraging this problem?

ENVIRONMENTAL FACTORS		CONDITION OF CARE PROVIDER			PERSONNEL FACTORS	
Physical	**Technological**	**Cognitive**	**Physiological**	**Physical / Mental**	**Team**	**Personal**
lighting	bad usability	distraction	overexertion	visual limitation	poor hand-off	inadequate rest
noise	bad ergonomics	fatigue		hearing limitation	bad communication	poor nutrition
temperature	bad design	complacency		physical limitation	no verification	lack of fitness
clutter	defects	stress		movement restrict	improper terms	
ventilation	wear-&-tear	attention tunnelling		info overload	missing ownership	
	lack of safeguard	boredom		limited experience		
		confusion		lack of proficiency		

Any supervisory factors that can help mitigate / reduce this problem?

SUPERVISOR ROLE	PLANNING	PROBLEM CORRECTION
better-trained supervisor	more practice opportunities	revise / enhance remedial process
revise break timings	training for new process	recognition for proper performance
provide checklist and guidelines	better team pairing	greater enforcement of standard protocol
establish communication channels	reduce haste and pressure	
more situation monitoring	more briefing / reporting	
	reduce task / work assignments	

Any organisational influences that can help mitigate / reduce this problem?

RESOURCE MANAGEMENT	ORGANISATIONAL CLIMATE	ORGANISATIONAL PROCESSES
staff selection	more chain-of-command visibility	review organization pressure, quota, schedule
general staff training	clearer communication channels	establish / review SOPs
increase manpower (estab. not fulfilled)	make supervisor / superior more accessible	increase employee involvement with SOPs
increase staffing establishment	formal accounting of actions	provide easy access to SOP documents
introduce / improve attrition policies	review promotion policies	define objectives clearly
increase funding / minimize cost-cutting	review hiring, firing, retention policies	review safety / risk management programs
purchase suitable equipment	clarify norms and rules	review incident reporting / investigation process
correct known design flaws	promote values, beliefs, attitudes	review performance measures
contact vendors regarding issues		establish performance feedback loop

Risk Assessment

What are the potential safety risks to patients and/or staff? Severity of Impact / Harm = HIGH or LOW (circle one)	**AIM** To identify the potential risk(s) should this problem or situation persists **REVIEW** "Assessment" section in Proactive Notification Form **ASK** **Does the problem result in any *immediate* physical harm when it occurs?** How will the situation harm patients or staff? **How big is the problem impact? (major or minor injury / hospitalization or out-patient attention)** Is the risk currently tolerable or manageable?

Stakeholders

Who should know about this situation? Who can help resolve this situation?	**AIM** To identify stakeholders involved in this situation **REVIEW** "Situation" and "Additional Details" sections **ASK** Who should be involved in resolving this situation?

Problem Prioritization

What priority should this situation have? ☐ **HIGHEST**: resolve ASAP [at least ☹☹☹] ☐ **HIGH**: front of the queue for resolution [☹☹] ☐ **MEDIUM**: KIV in the resolution queue [☹] ☐ **LOW**: need not be resolved immediately	**AIM** To consider the necessary urgency for an intervention **REVIEW** "Frequency": *daily* or *weekly* = ☹ History of Harm: *yes* = ☹ Immediate physical harm during occurrence = ☹ High severity and/or impact of harm = ☹ **ASK** How much risk is naturally inherent in the situation? Is the risk tolerable, acceptable?

Recommendations & Action Items (Walkabout Use Only)

ACTION ITEMS	OWNER	√

Jan 2013

ON-SITE SOLUTION-PLANNING

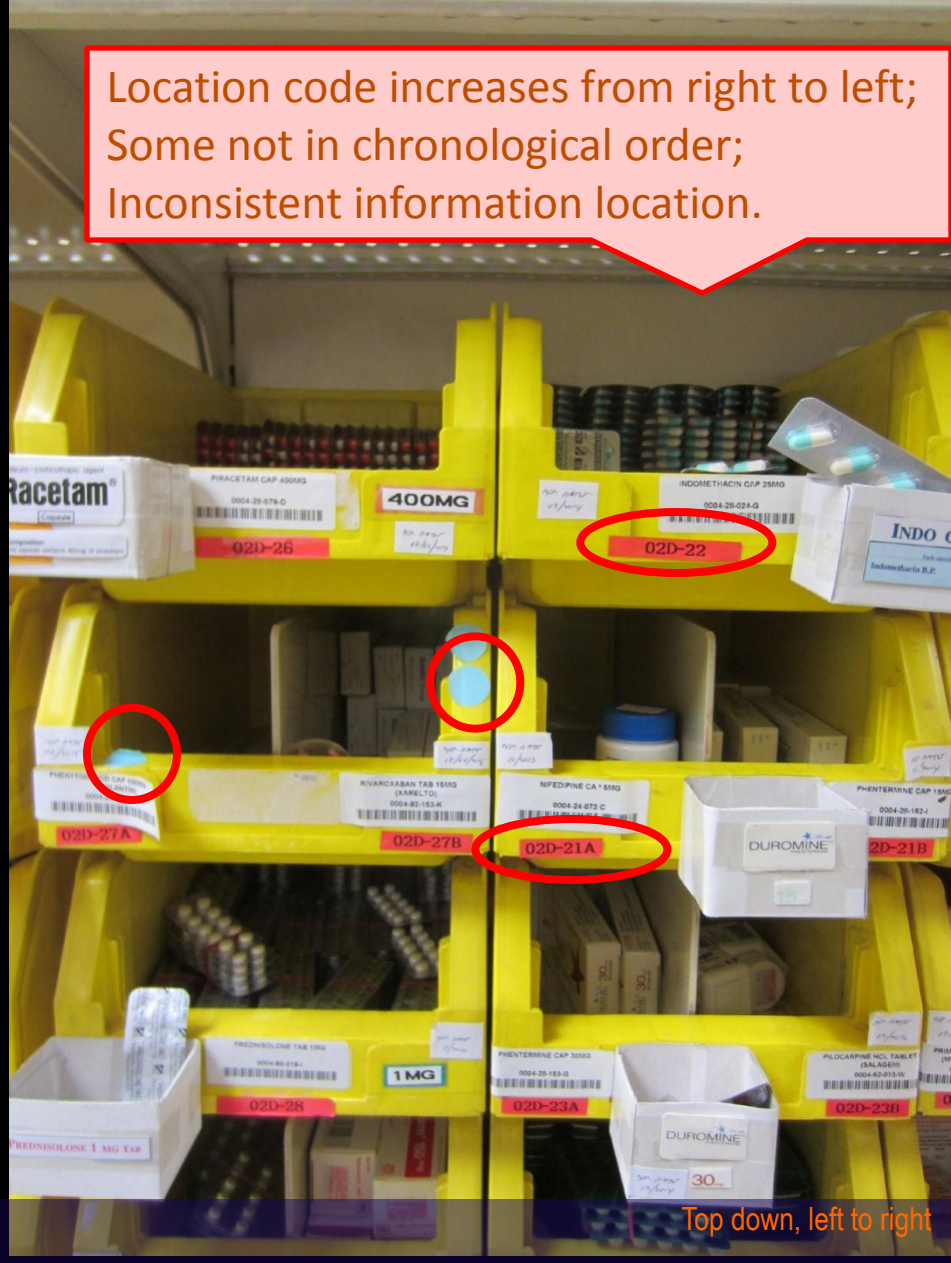
working closely on the ground to review existing processes, identify gaps, and propose solutions

Changi General Hospital

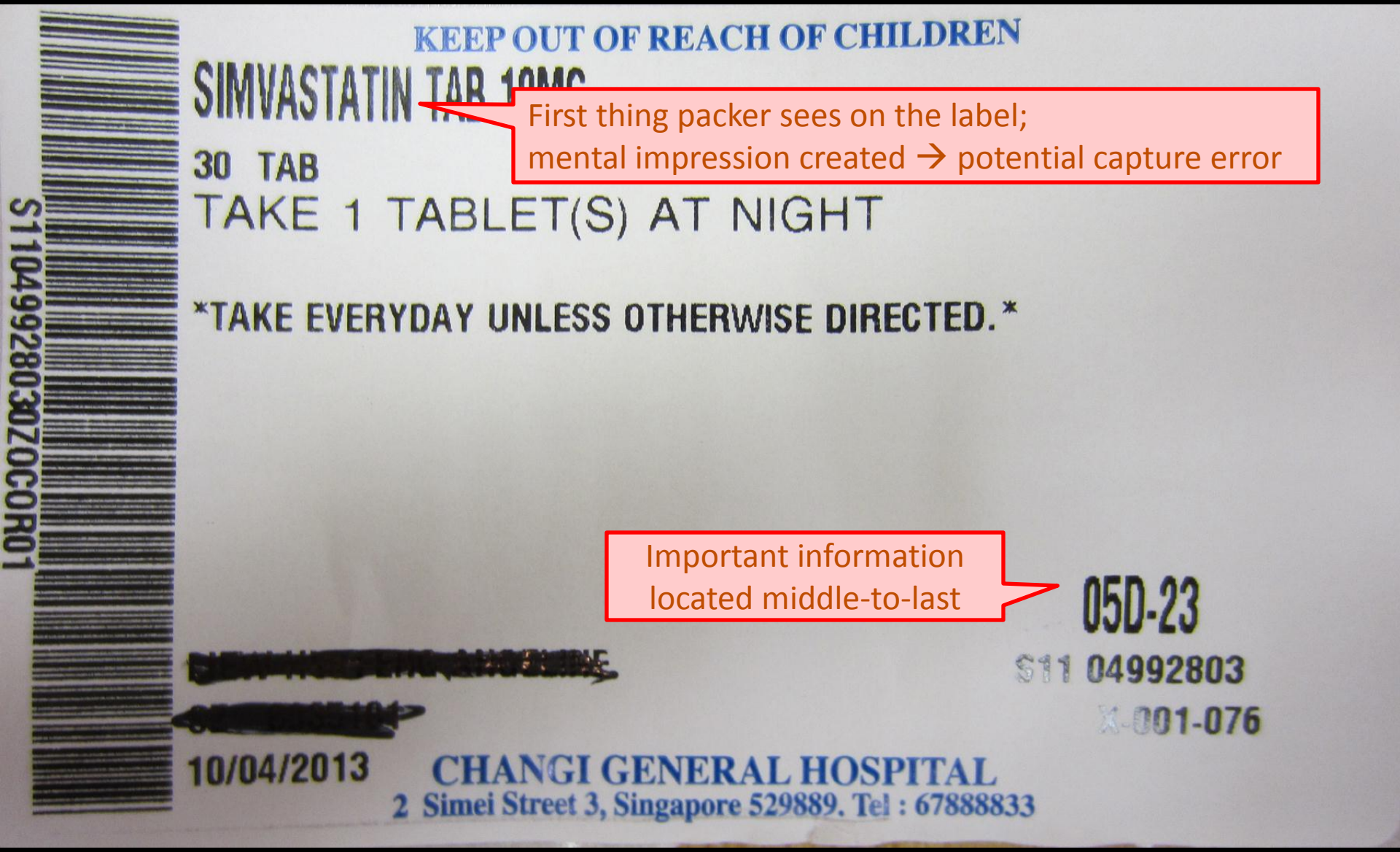
CGH Outpatient Pharmacy

Attached as pharmacy packer for two weeks

Changi General Hospital



Good information, inconsistent layout



Label hinders packing by location

A&E Out-patient Department

"The patient's allergy information isn't very prominent in the system."

"The existing documentation system occasionally causes unnecessary confusion between different patients."

Review system and processes for safety gaps and possible solutions

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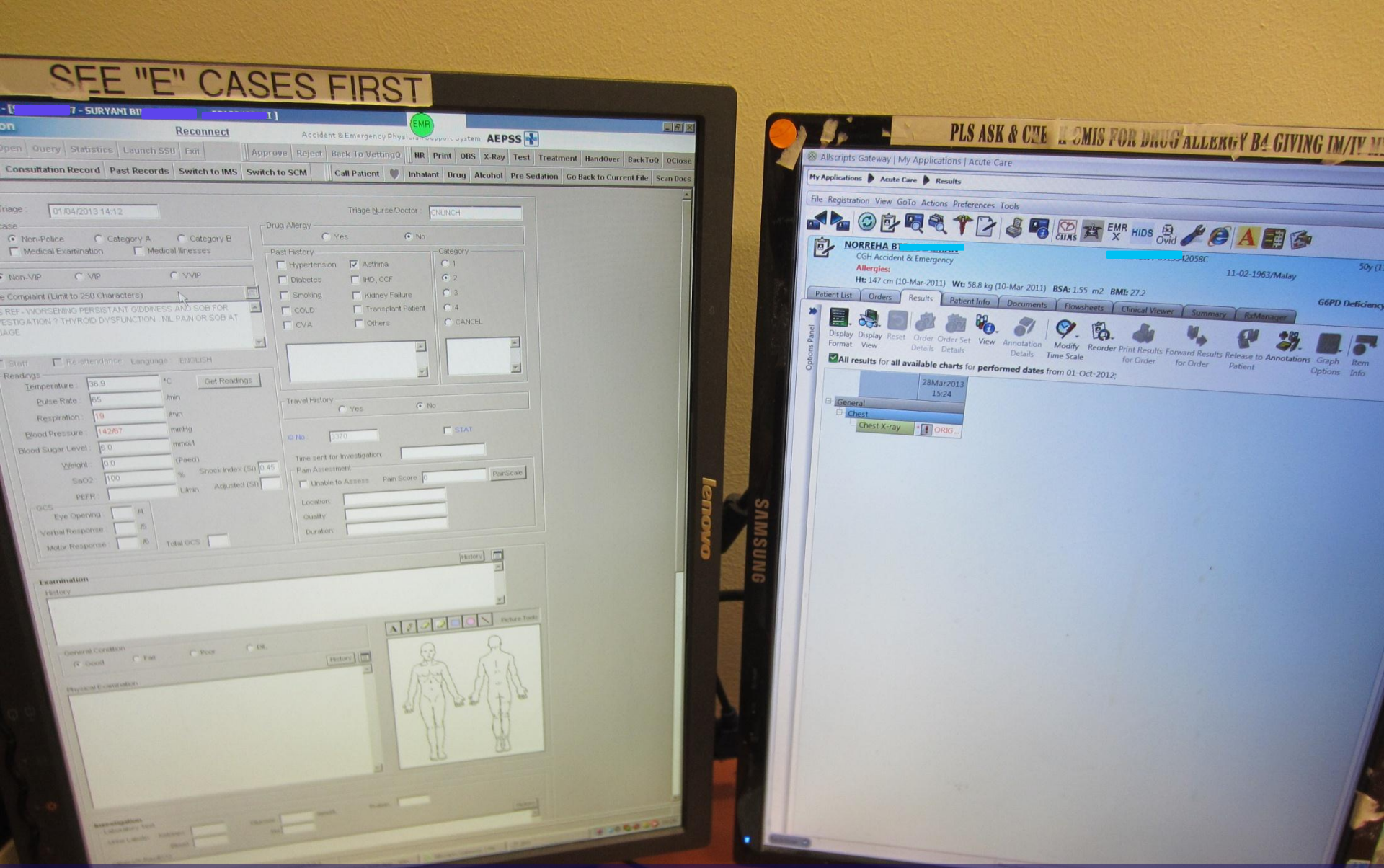
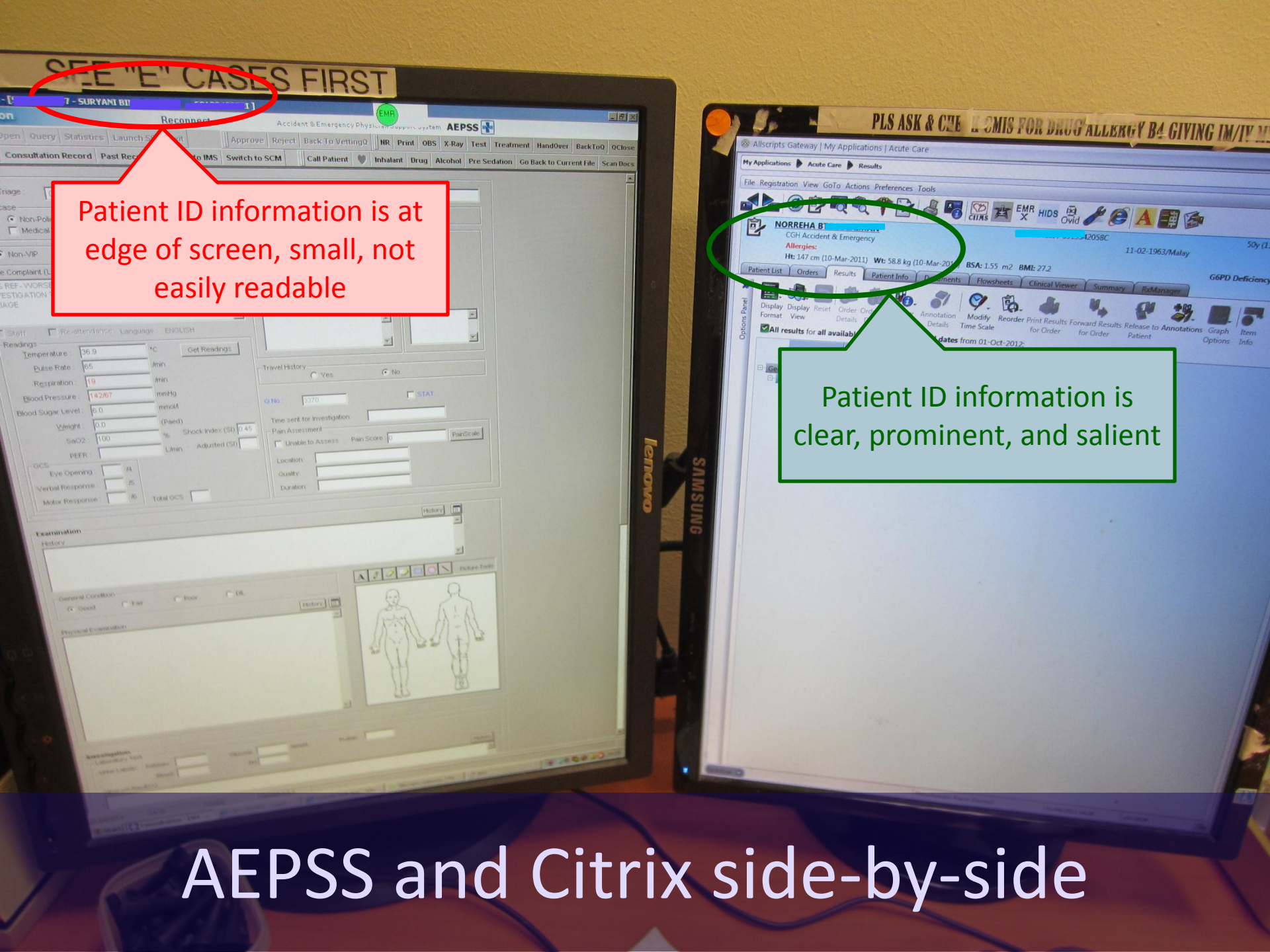
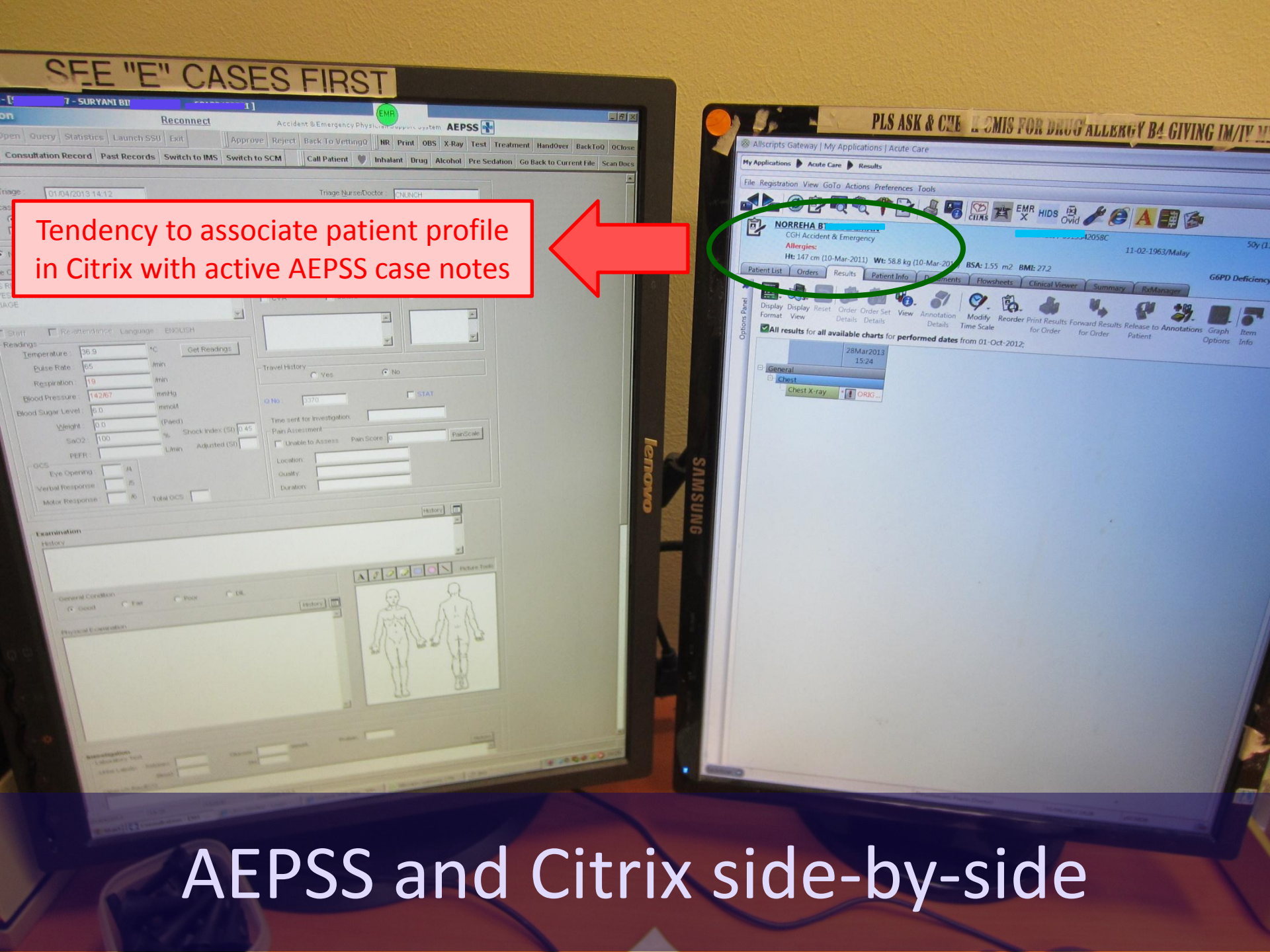


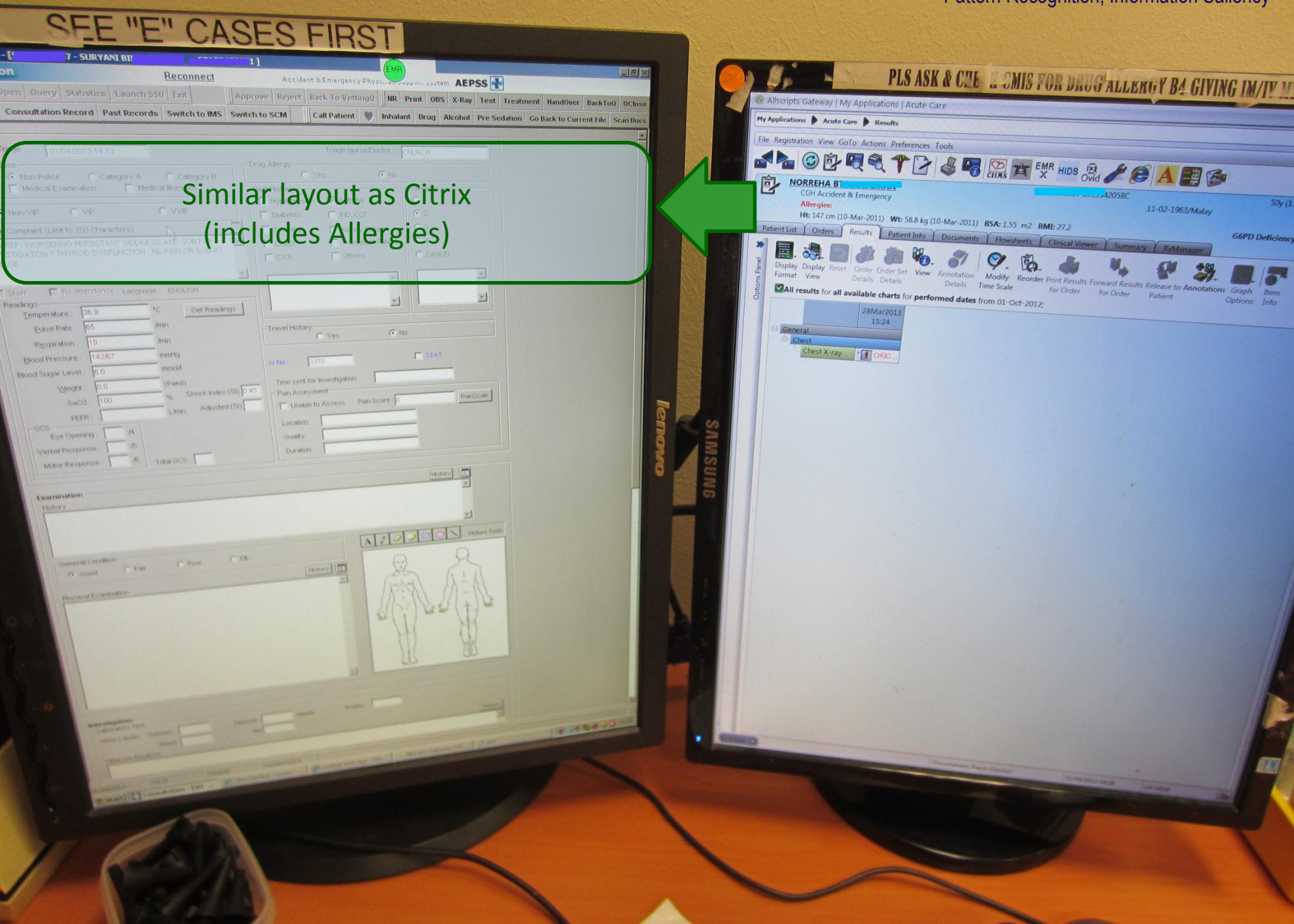
AEPSS and Citrix side-by-side



AEPSS and Citrix side-by-side



AEPSS and Citrix side-by-side


SEE "E" CASES FIRST
Reconnect
AEPSS
Consultation Record
Past Records
Switch to IMS
Switch to SCM
Call Patient
Similar layout as Citrix
(includes Allergies)
PLS ASK & CHE
FOR DRUG ALLERGY B4 GIVING IM/IV
Allscripts Gateway | My Applications | Acute Care
NORREHA BT
CGH Accident & Emergency
Allergies:
Ht: 147 cm (10-Mar-2011) Wt: 58.8 kg (10-Mar-2011) BSA: 1.55 m2 BMI: 27.2
G6PD Deficiency
lenovo
SAMSUNG

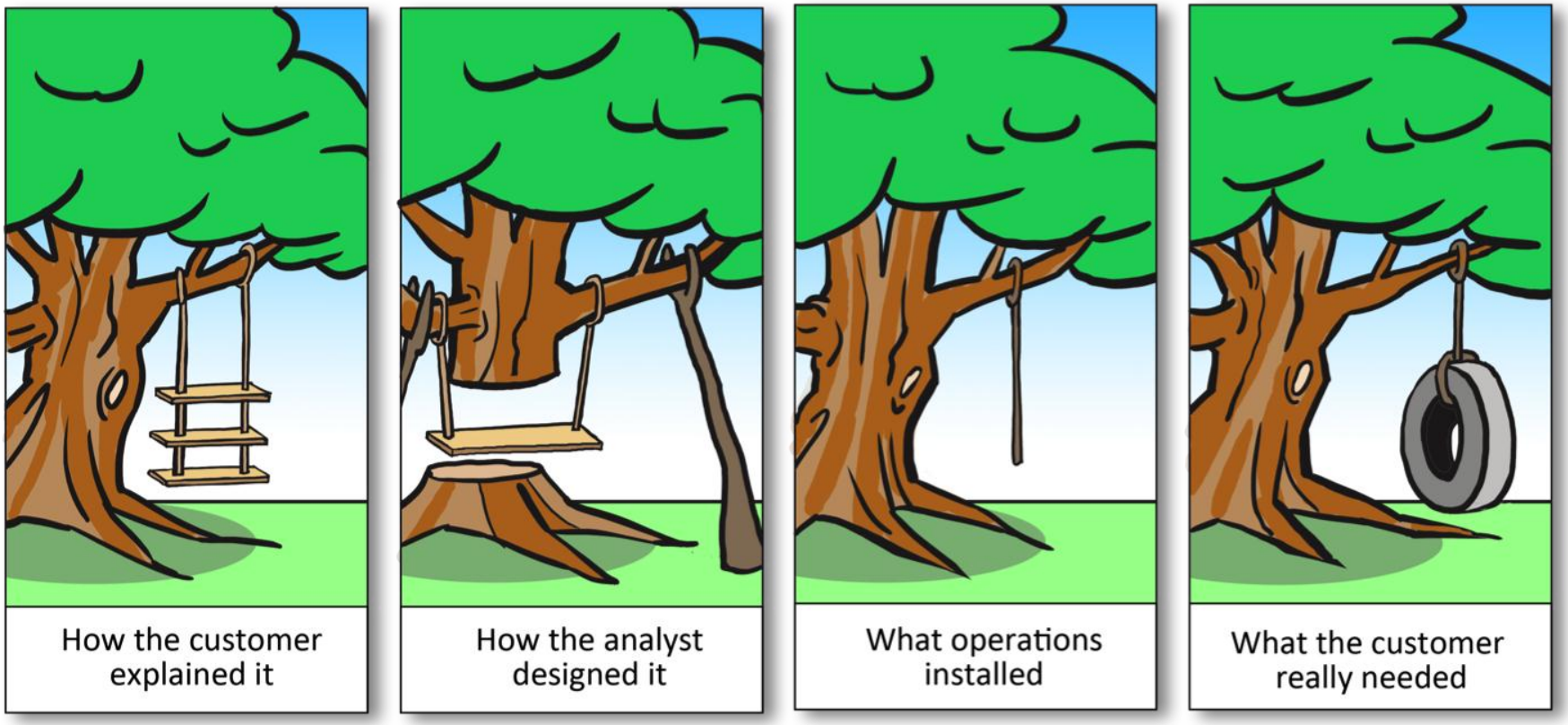
USER RESEARCH

designing out systemic problems

by first understanding the operational requirements

Changi General Hospital

The Need to Understand the User



How are important user requirements captured and conveyed?

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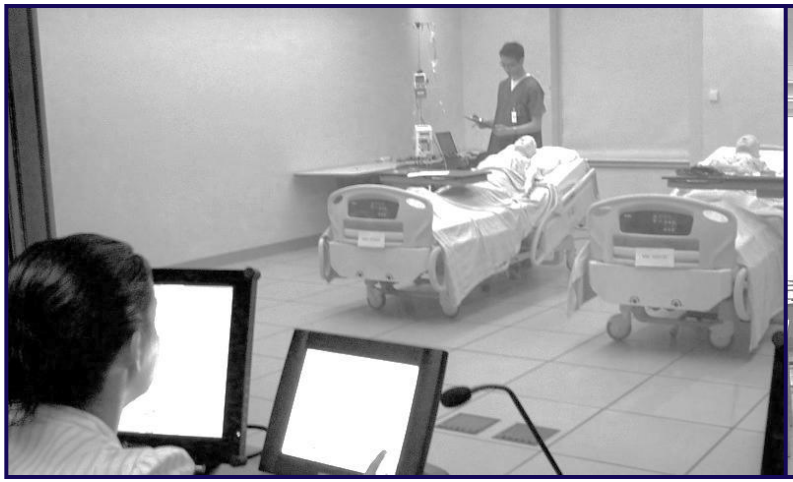
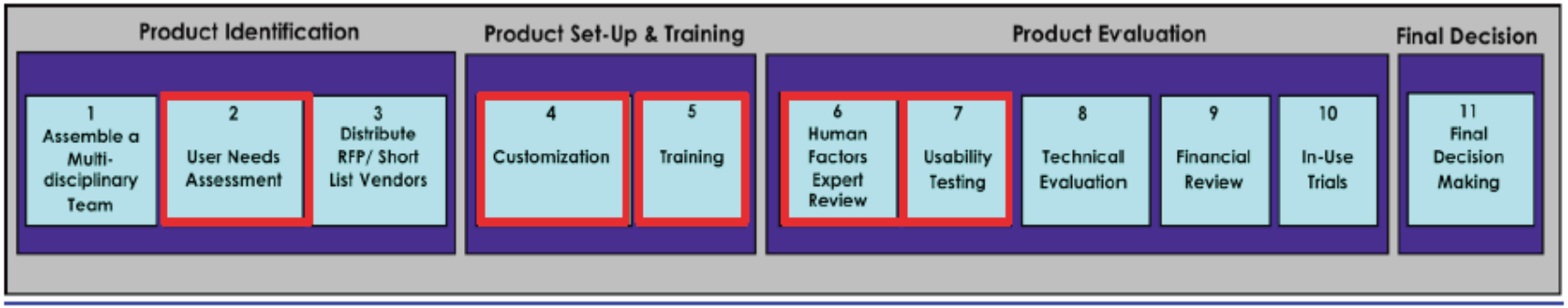
Usability

The Practice of User Research





University Health Network

Human Factors Informed Procurement for Technological Solutions

Changi General Hospital

Why Conduct User Research

Attain **user buy-in** for proposed design and solution implementation

Increased **employee productivity** due to optimized tool / environment

Risk mitigating strategies identified early
(versus reactive responses)

Save **time and resources** later on

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Human Factors Methods

Cognitive Task Analysis

Heuristic Evaluation

GOMS (Goals, Operations, Methods, & Selection Rules)

Usability / User Experience Testing

Naturalistic Observations

Quantitative Research etc.

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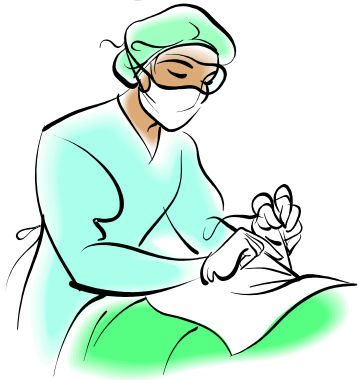
Verbal (mis)Communication



I would like an OT that features … it should have enough space for … reuse some of the existing equipment like …

Sure, we'll come up with a proposal and seek your approval ☺

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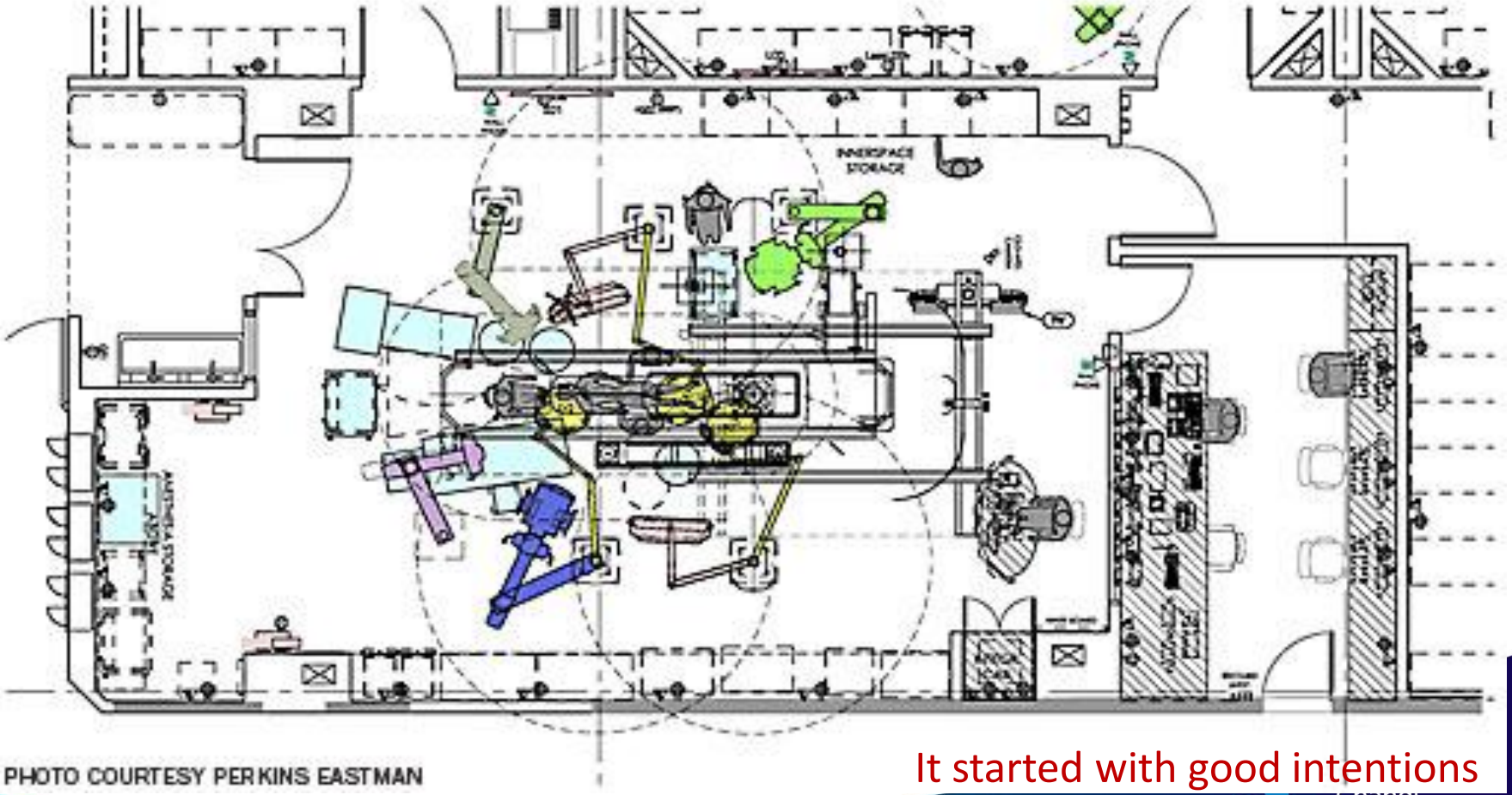
A Wonderful Plan?

"Please imagine what it looks like and see if it's ok"



It started with good intentions

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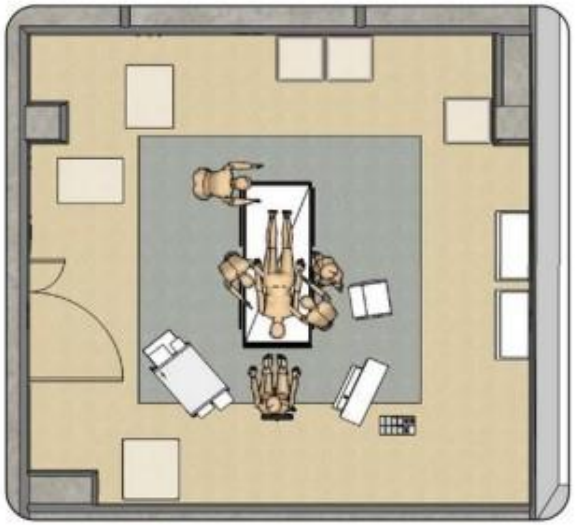
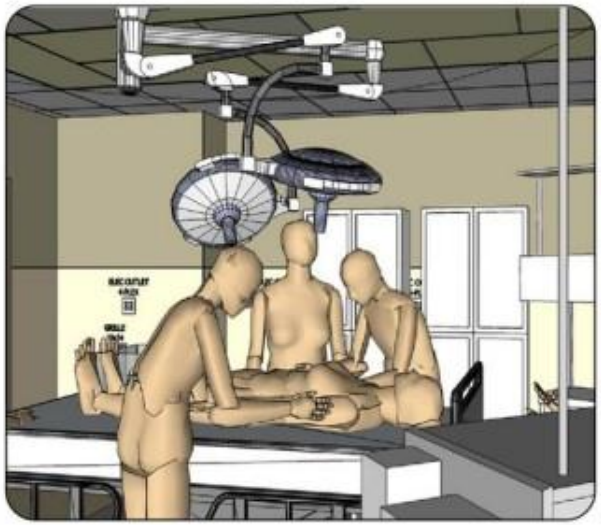
3D Modeling?





"Let me help you visualize!"

"But you still need to use your imagination to go through the processes and tell me if this is what you want."

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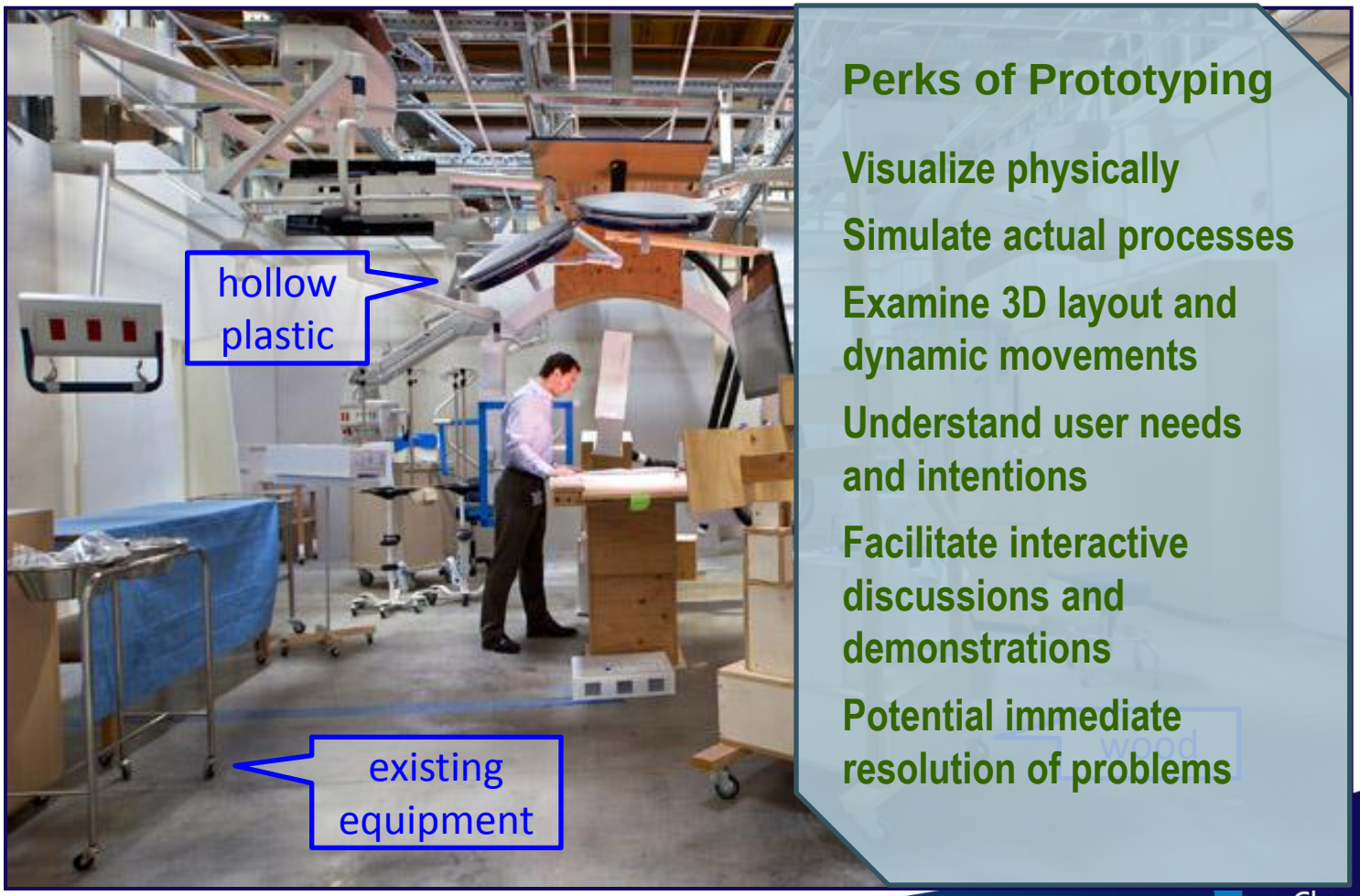
Communication via Prototyping



Perks of Prototyping

- Visualize physically
- Simulate actual processes
- Examine 3D layout and dynamic movements
- Understand user needs and intentions
- Facilitate interactive discussions and demonstrations
- Potential immediate resolution of problems

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ROI of Proper User Research

$ = resources and time

Pre-development Modifications

- Modifying the plans ($)
- Finding a mock-up space ($)
- Building low-fidelity features ($$)

- Work on a *blank slate*

Post-development Modifications

- Removing paid work ($$$$$)
- Additional vendor labor ($$$)
- Additional disruptions to operation to be scheduled ($$)

- Work with infrastructural constraints; “first-aid”

Cost of fixing an error after development is 100x that of fixing an error before development

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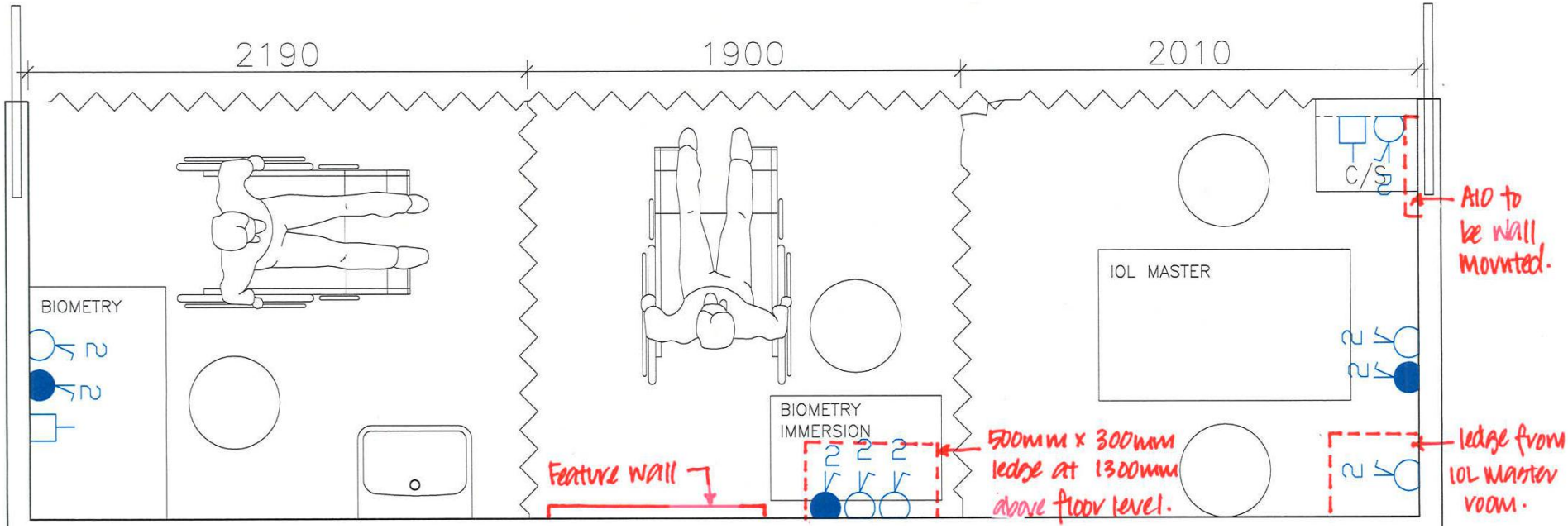
Redesigning the Biometry Room



Patients undergo a sequence of tests, some of whom are wheel-chair users

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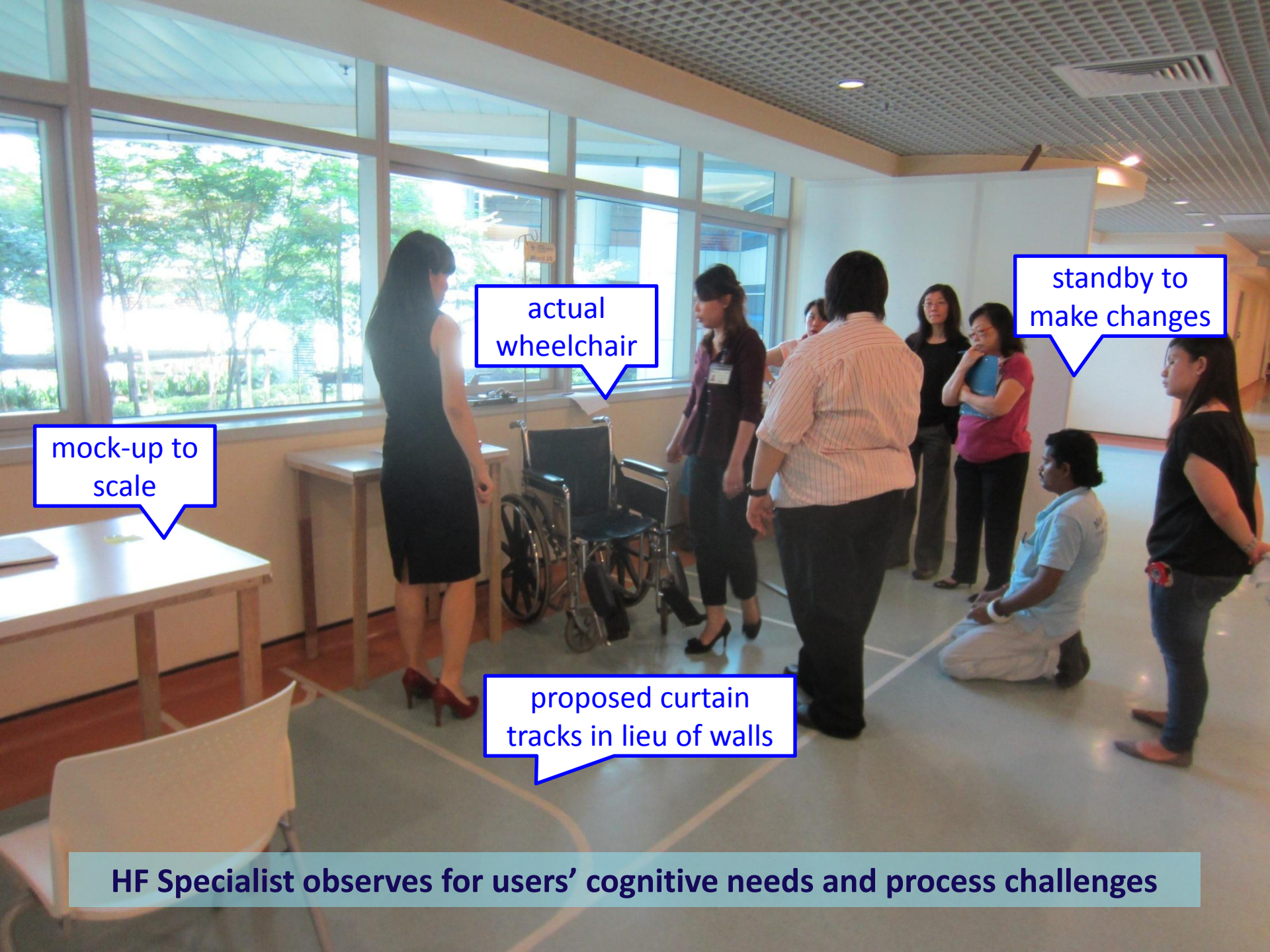
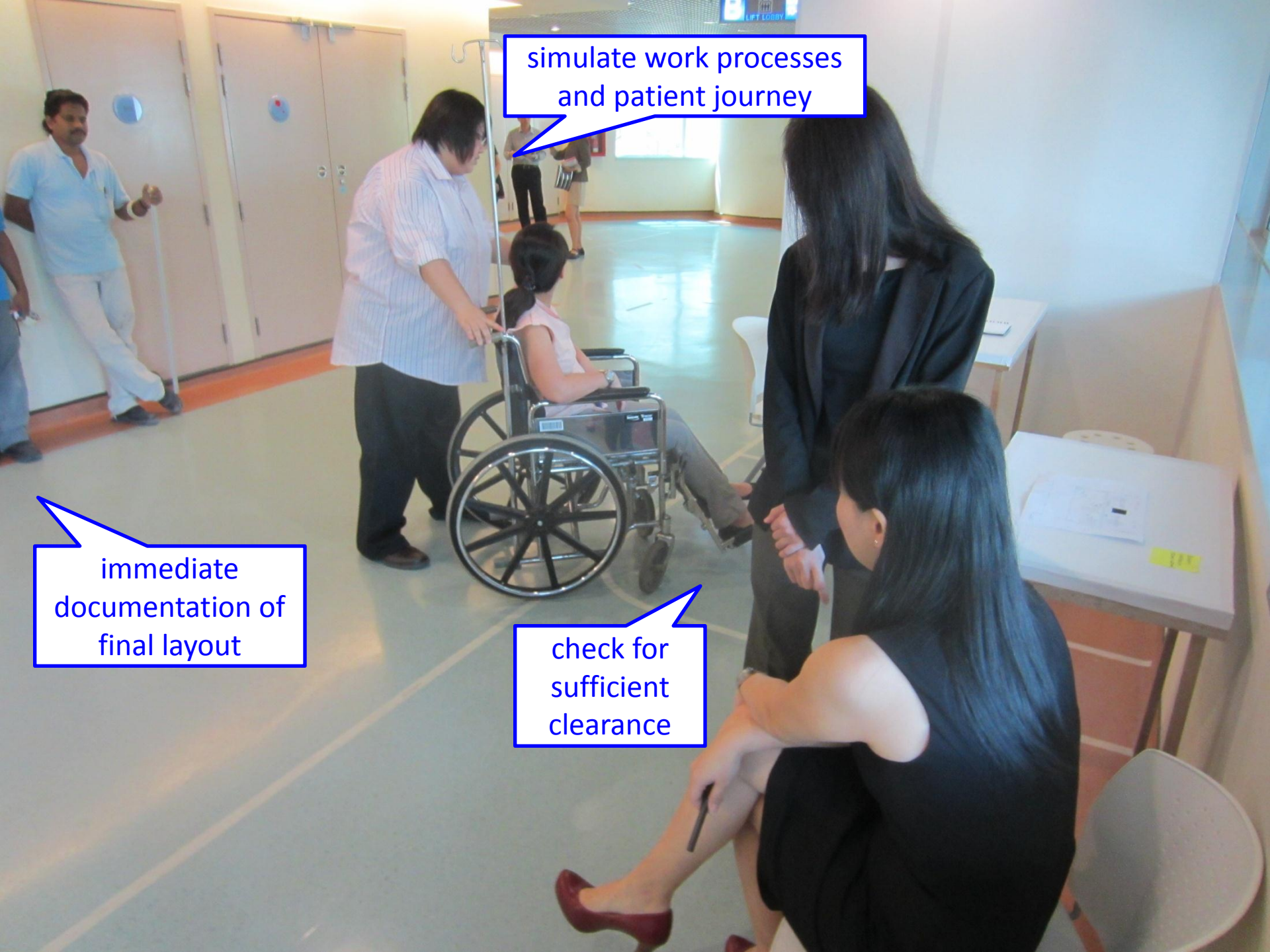


HF Specialist observes for users' cognitive needs and process challenges


simulate work processes and patient journey
immediate documentation of final layout
check for sufficient clearance


check for
sufficient
clearance

THE INTEGRATED BUILDING

(2014)

Patient-centered care in a home-like environment

EDUCATION & OUTREACH

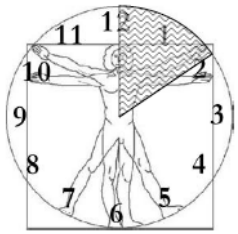
creating the awareness of patient safety issues

equipping the organization with the knowledge of human factors

Changi General Hospital

“Ten Minutes of Human Factors”

LEARN BASIC HUMAN FACTORS IN TEN MINUTES
if your shift briefing or department meeting has ten minutes to spare
consider adding one of these presentations to the agenda



Ten Minutes of Human Factors

VISUAL SEARCH
No matter where Wally is, why is he so hard to find?

FATIGUE : MYTHS
Uncover the truth behind fictitious information regarding fatigue.

FATIGUE : STRATEGIES
Survive the rest of the day with these simple facts and useful techniques.

ATTENTION MANAGEMENT
Information to help you focus on other information. Made from concentrate.

PERCEPTUAL GROUPING
Find out how items on display can cause errors due to “guilty by association”.

BLIND OBEDIENCE TO AUTHORITY
Do you really think you will stop following the instructions which you think is harmful?

AUTOMATIC SKILLS
Well-practiced skills are effortless to execute, but can we switch them off when we need them to?

SHORT-TERM MEMORY
There is only so much work we can perform mentally. How do we maximize our mental workspace?

LONG-TERM MEMORY
Why do we forget stuff we thought we remembered? Discover ways to retain and recall effectively.

MENTAL MODELS
Are you thinking what I’m thinking? Differences in thought processes can cause unexpected fumbles.

AFFORDANCES IN DESIGN
Have you pushed a “pull” door? Are you’re stupid, or is design encouraging you to make stupid mistakes?

ORDERING IS AS EASY AS 1-2-3
1. Choose one item
2. Contact your friendly neighborhood Human Factors Specialist
3. Confirm your meeting date, time, and place (no special logistics required)

HUMAN FACTORS SPECIALIST
Dr. Shanqing “S.Q.” Yin
shanqing_yin@cgh.com.sg
6850 4723

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“Creating awareness for human error traps, ten minutes at a time.”
a patient safety initiative from the CGH PSProgram
supported by the CGH Patient Safety Committee

EASTERN HEALTH ALLIANCE

Jan2013

Building culture and awareness
Ten minutes at a time

Changi General Hospital

Feedback on 10-Minutes-of-Human-Factors

Dr. Lee Chien Earn
CEO, Changi General Hospital

"The presentations supported planning and **enabled setting of realistic policies**;

enabled supervisors and managers to make better judgment and **implement more effective corrective actions** when they need to work with staff to resolve non-compliance issues;

and provided a good education for self-awareness to **avoid booby traps**, both in the professional and personal lives."

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WHAT'S NEXT IN MEDICAL HUMAN FACTORS?

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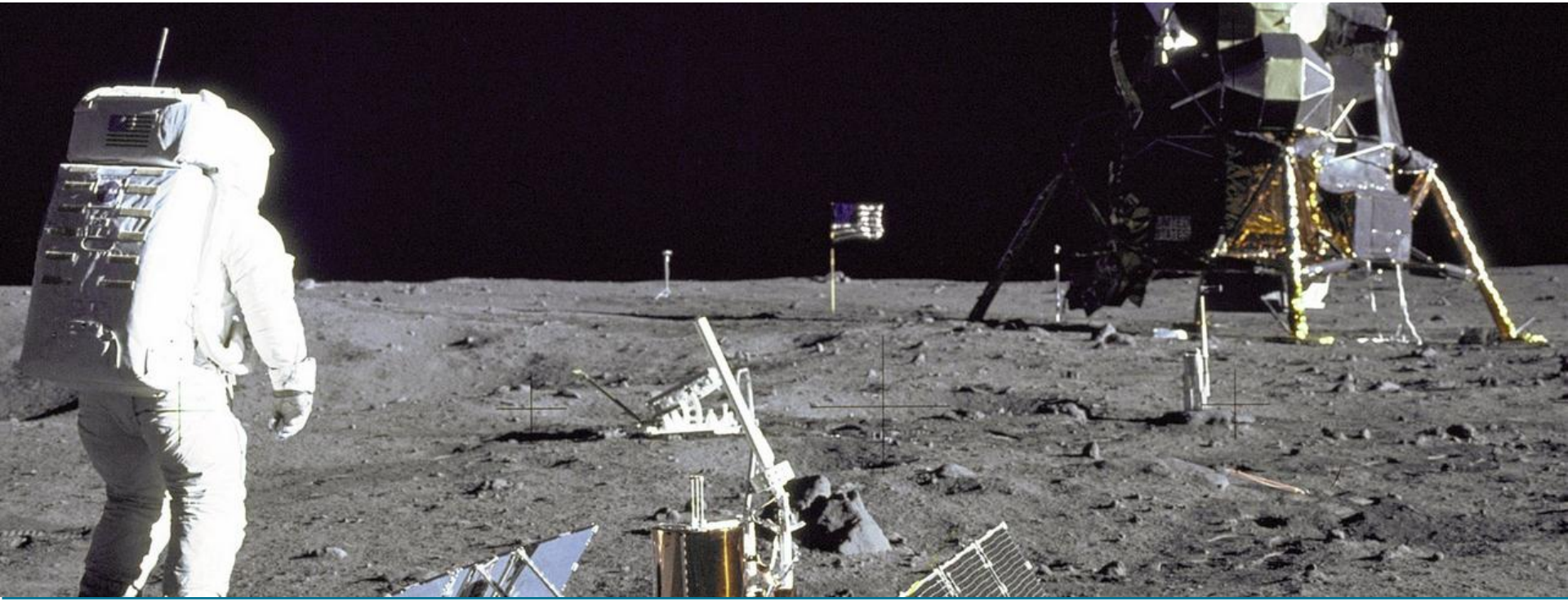
Humans Going Forward



Man once dreamt to touch the moon, can now do so through technology

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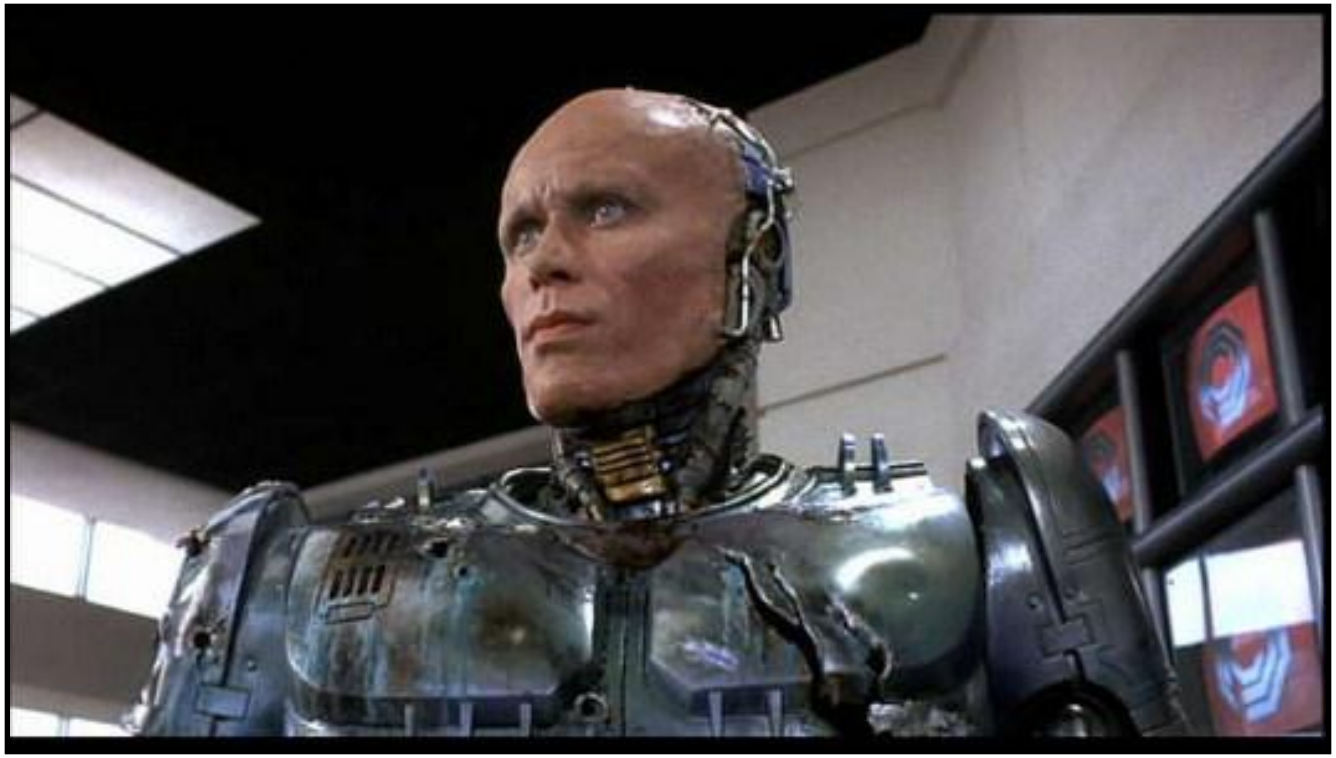
Future Healthcare Workers?



Able to achieve more through technology integration

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Human-Systems Integration

Dreamers and Innovators

Apple's iWatch Could Arrive By The End Of 2013, Says Bloomberg

DARRELL ETHERINGTON

Monday, March 4th, 2013 **79 Comments**

Apple's iWatch is the new primary focus of speculation for the company's unannounced products, and a new **article at Bloomberg** today detailing its market potential also let slip that the wrist-mounted computer could arrive by the end of this year. Bloomberg's source, which is one of the same that **leaked details about the team within Apple working on the iWatch**, said Apple hopes to have the device out to market "as soon as this year."

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HAL Exoskeleton

Hybrid Assistive Limb by Prof. Yoshiyuki Sankai (University of Tsukuba)

YouTube

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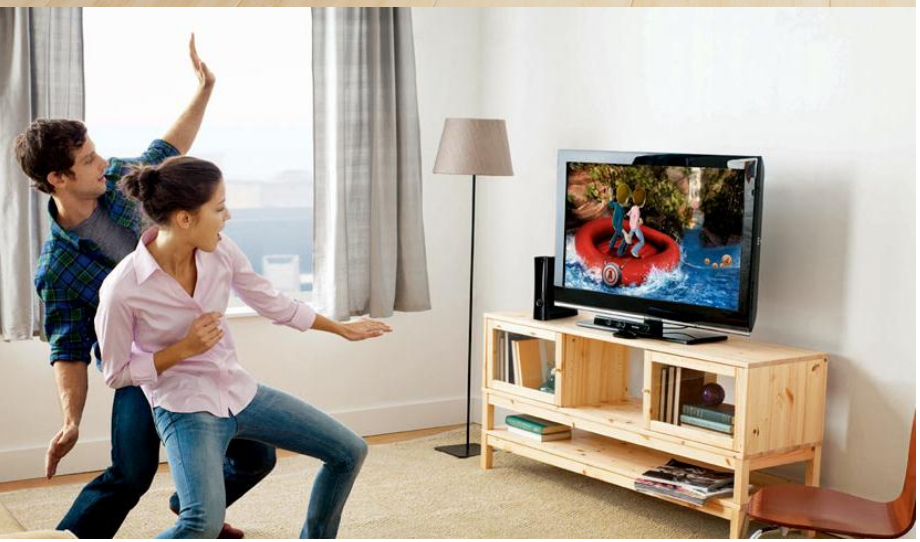
Machines Are Getting Smarter



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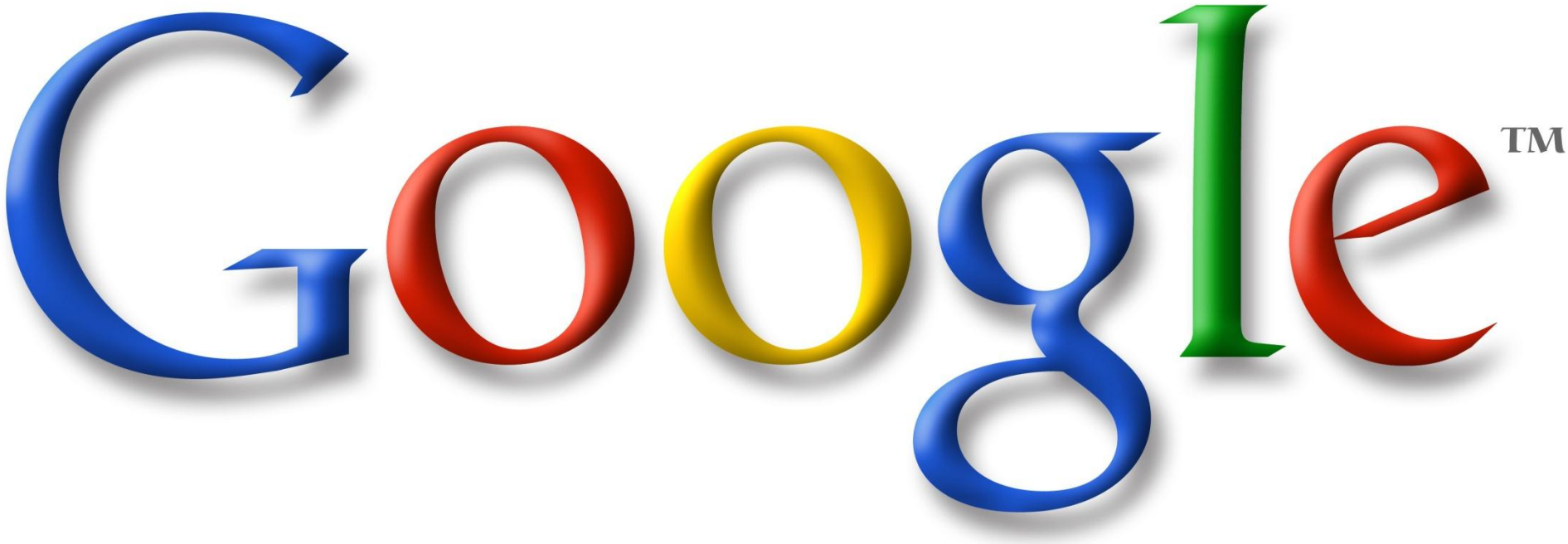
Empowered by Technology



… is the brain I never had

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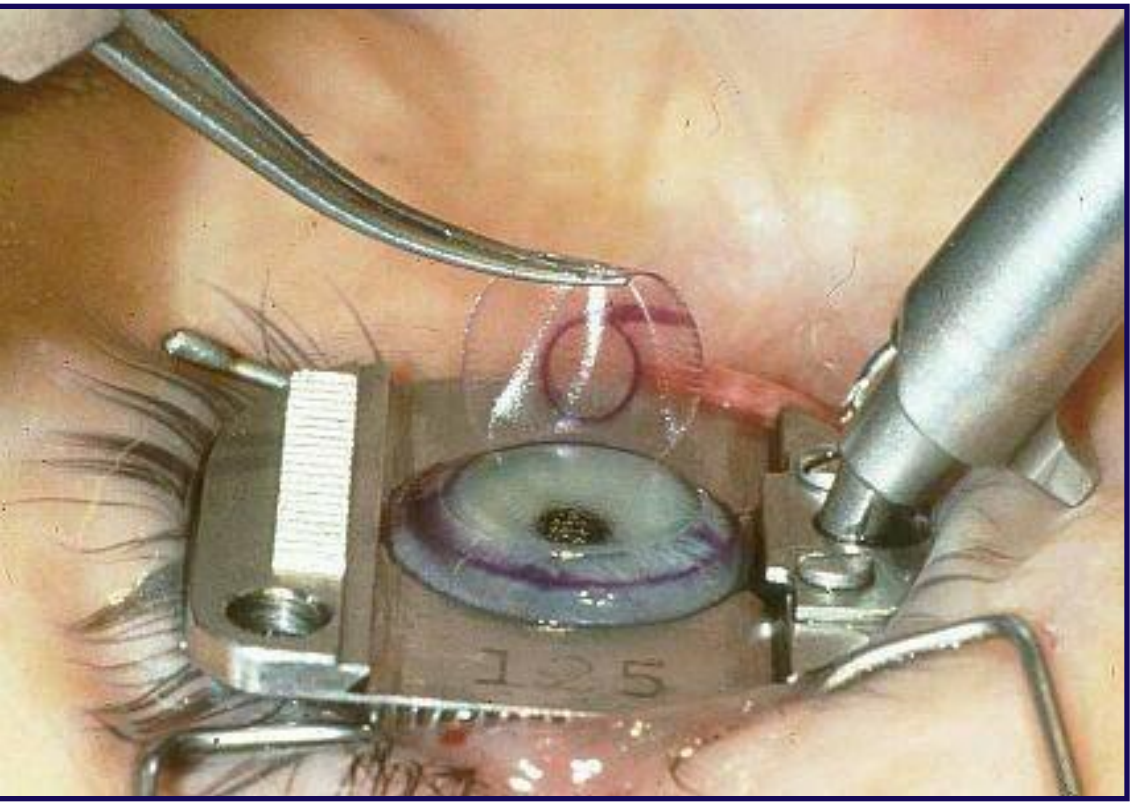
Keratome LASIK Surgery



Man-Machine Systems

New Challenges

- User interface
- Automation trust and reliability
- Troubleshooting skill sets
- Lack of practice
- “Black Swans”

Technology changes the nature of the errors

Imperfect Automation

Changi General Hospital

To Be Continued …

Prof Albert Boquet,

Associate Professor

Human Factors & Systems

Embry-Riddle Aeronautical University

ERM 5 : Interface of Care – Human vs. Technology in Integrated Healthcare Delivery

Enterprise Risk Management Congress 2013

21st August, 4pm

Changi General Hospital

What Can Human Factors Do For You Today?

Human Factors Research / Solution Planning

evidence-based insights and solutions, healthcare innovation

Subject Matter Consultations

investigations, education & training

Human-Systems Integration

user research, identifying systemic issues, interfacing with new technology,

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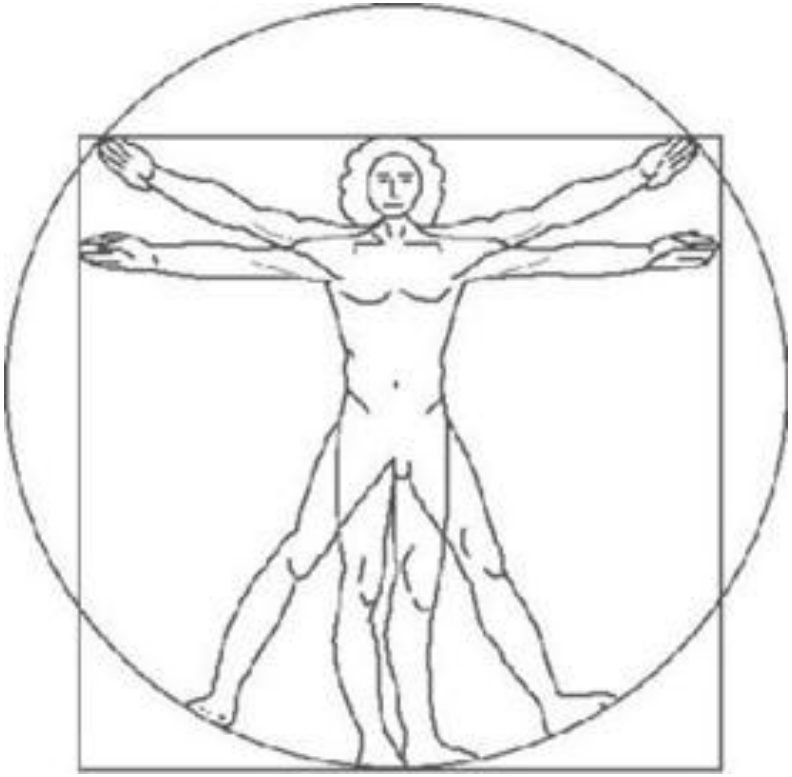
Understand the User



HUMAN CAPABILITIES AND LIMITATIONS

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Support the User

EFFECTIVE HUMAN-SYSTEMS INTEGRATION

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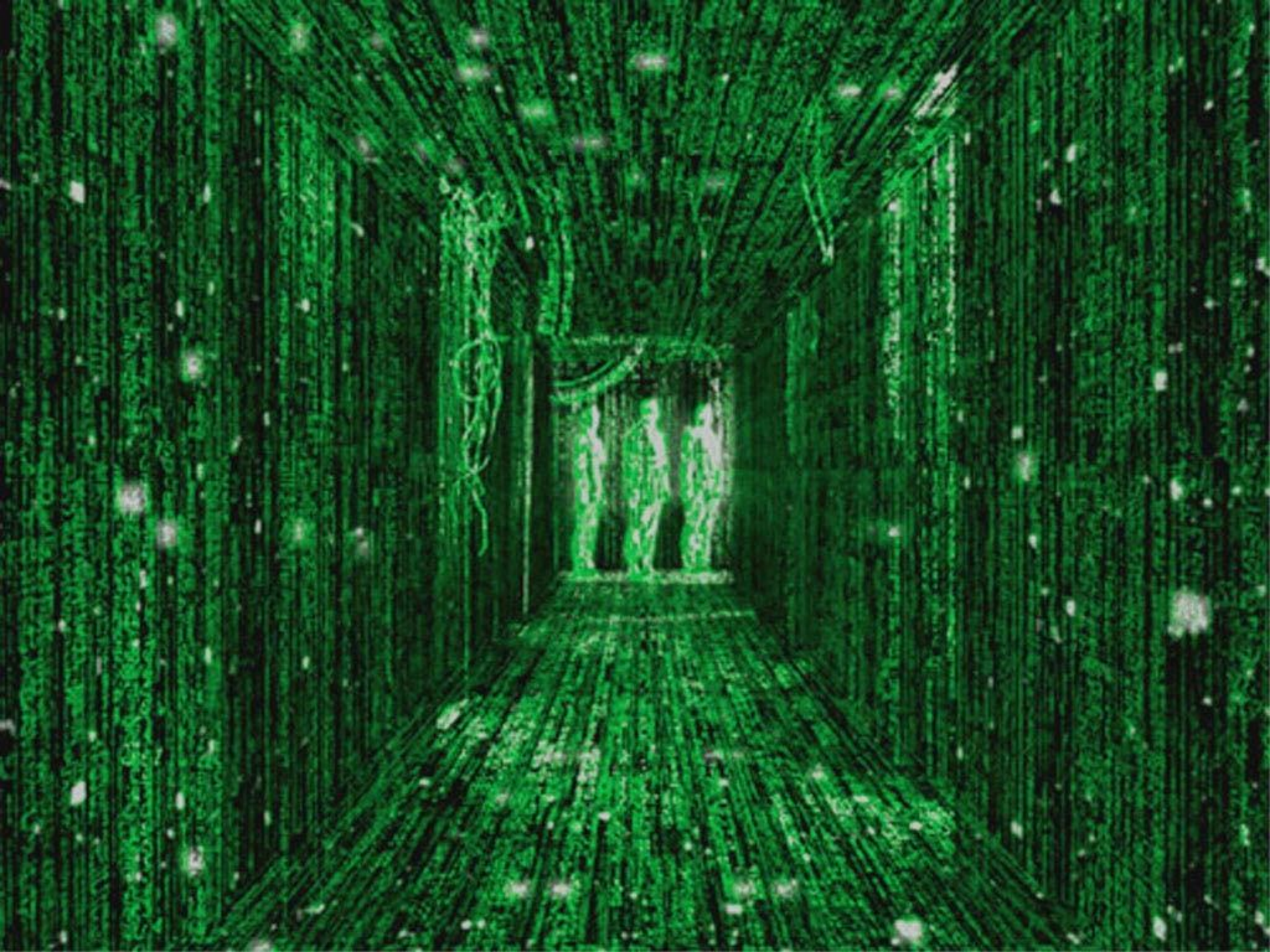

Thank you!
Any questions?

Dr. Yin Shanqing
shanqing_yin@cgh.com.sg

Changi General Hospital