Nottingham University Hospitals NHS
NHS Trust

TRENT SIMULATION & CLINICAL SKILLS CENTRE at QMC

NUH Guidelines

# Improving accessibility to clinical guidelines – **NUH Guidelines app**

**Dr Adrian Kwa**

**Project Lead – NUH Guidelines app**

**Trent Simulation and Clinical Skills Centre**

**Nottingham University Hospitals NHS Trust**

Guidelines **at your fingertips**

*We are here for you*

# “Conflict of interest”

- Nottingham Hospitals Charity
- Trent Simulation and Clinical Skills Centre
- East Midlands Academic Health Science Network

# Objective

- Human Factors and Design in Healthcare
- My journey
- The app
- How you might apply this at your Trust

# About me…

## What I am:

- Doctor since 2003
- Anaesthetist
- Technophile
- Patient Safety Enthusiast

## What I am not:

- Not a computer programmer
- Not a businessman
- No formal training in design

# Credentials

- HEEM Quality Improvement Awards 2015 – Winner
- NUH Patient Safety Team Awards 2015 – Winner
- HSJ Awards 2015 – Finalist
- NHS Innovator of the Year 2015 – East Midlands Finalist

# Credentials

- AAGBI Patient Safety Prize 2015 – 2nd Runner-up
- HSJ Value in Healthcare Awards 2015 – Runner-up
- NHS Innovation Challenge Prize 2014/5 – Runner-up
- East Midlands Academic Health Science Network Innovation in Healthcare Awards 2014 – Runner-up

Speaker

Human Fac
*in* Healt
*Sharing good ergono*

Ergonomic
Human Fac

hartered Institute
f Ergonomics
Human Factors

# Wrong car?!?!

- Human Error
- How / Why did this happen?
- Does that mean he is stupid?

# Performance **Variability**

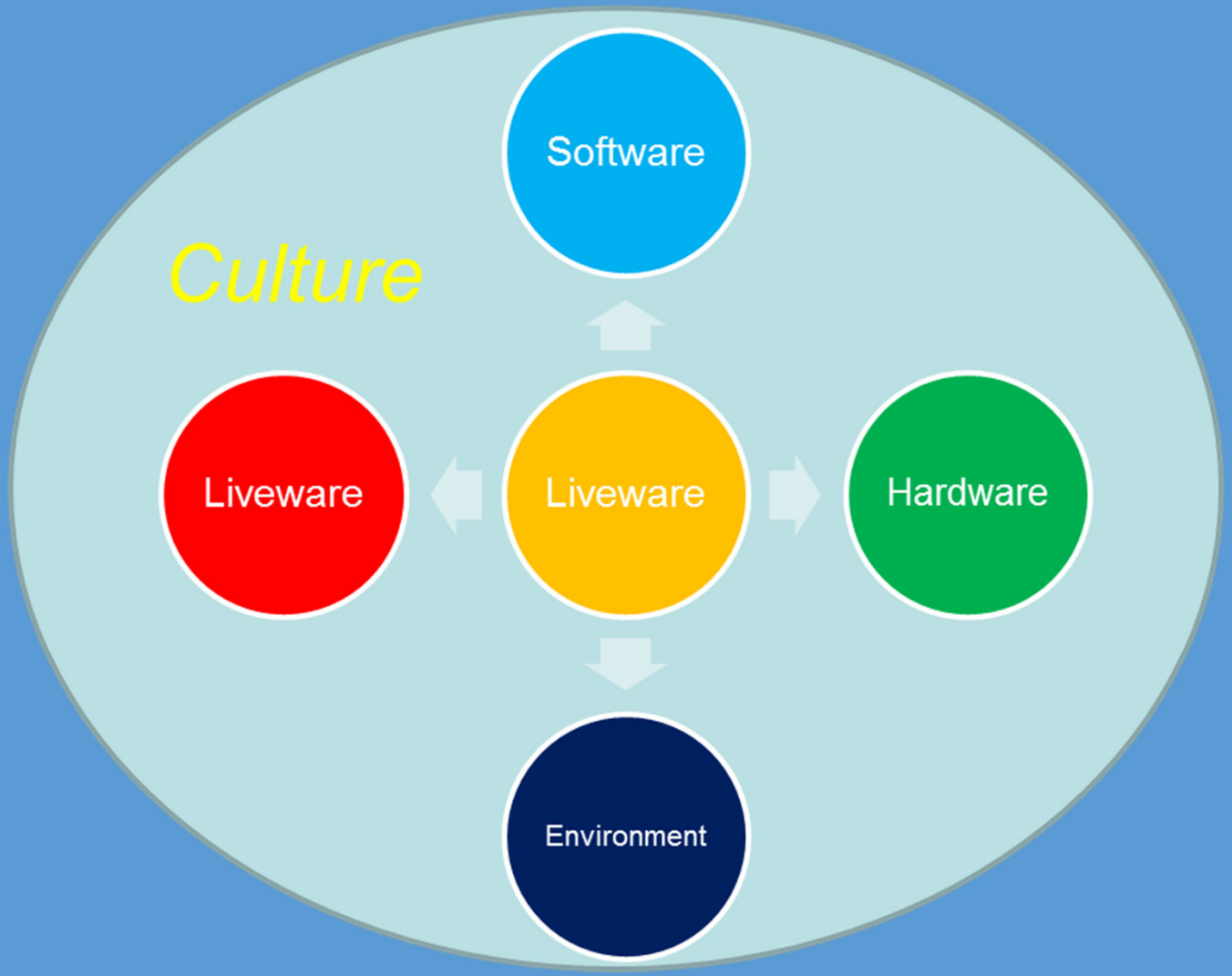
# In Healthcare

- Operating on the wrong site / side
- Wrong operation
- Wrong patient

Newsflash
Healthcare Professionals **(including hospital consultants)** are human too

# Human Factors

# ScHELL Model



# Software

- Policies
  - *“You must do this or you will be sacked”*
- Standard Operating Procedures
  - *“This is what we do and how we do it”*
- Guidelines
  - *“This is best practice. You better have good reasons for deviating from this.”*

# Software

- Do we know where to find it?
- Is it easy to use?
- Do we actually use it?
- If not, why not?

Nottingham Children's Hospital

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# Paediatric Anaesthetic Emergency Data sheets

Editors: J. Armstrong, H. King
Contributors: J. Abbott, H. Fenner, K. James

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## Nottingham Children's Hospital

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# AGE : 3 months

| Wt : 4 – 6 kg | HR : 110 – 160 | RR : 30 – 40 | Systolic BP : 70 – 80 |
|---|---|---|---|

### AIRWAY

| | | | |
|---|---|---|---|
| **OP Airway :** Size : 00 | | **ET Tube :** Diameter : Cuffed: | 2.5 – 3.0 |
| | | Uncuffed: | 3.0 – 3.5 |
| **LMA :** Size : 1 | | Length (Oral) : | 11 cm |

### CARDIAC

| | | | | |
|---|---|---|---|---|
| Defibrillation (4 J/kg) | 20 J | Adrenaline | IV – Arrest (10 microgram/kg) | 0.5 mL (1 in 10,000) |
| Atropine (20 microgram/kg) | 110 microgram | | IM- Anaphylaxis (10 microgram/kg) | 0.5 mL (1 in 10,000) |
| Amiodarone (5 mg/kg) | 28 mg (0.6 mL of minijet) | | Nebulised – Croup (400 microgram/kg) | 2.2 mL (1 in 1,000) |

### FLUIDS

| | | | | |
|---|---|---|---|---|
| Crystalloids : | Trauma (10 mL/kg): Other (20 mL/kg) : | 55 mL 110 mL | Blood, FFP or Platelets (10 mL/kg) | 55 mL |
| 10% Dextrose : (Hypoglycaemia) (2 mL/kg) | | 12 mL | Mannitol 20 % (0.25 - 0.5 g/kg) | 7 – 14 mL (0.5 g/kg = 2.5 mL/kg) |

### DRUGS

| Drug (Dose) | Neat or Dilution (mg/mL) | Calculated Dose (5.5 kg) | Volume to be given (mL) |
|---|---|---|---|
| Propofol (1-4 mg/kg) | NEAT (10 mg/mL) | 5 – 20 mg | 0.5 – 2 mL |
| Ketamine IV (2 mg/kg) | NEAT (10 mg/mL) | 10 mg | 1 mL |
| Fentanyl (1-2 microgram/kg) | Dilute to 10 microgram/mL | 5 – 10 microgram | 0.5 – 1 mL |
| Morphine (0.1 mg/kg) | Dilute to 1 mg/mL | 0.5 mg (Repeat PRN) | 0.5 mL |
| Paracetamol IV (15 mg/kg) | NEAT (10 mg/mL) | 80 mg | 8 mL |
| Suxamethonium (2 mg/kg) | Dilute to 10 mg/mL | 10 mg | 1 mL |
| Rocuronium (1 mg/kg) | NEAT (10 mg/mL) | 5 mg | 0.5 mL |
| Atracurium (0.5 mg/kg) | NEAT (10 mg/mL) | 2.5 mg | 0.25 mL |
| Sugammadex (16 mg/kg) | NEAT (100 mg/mL) | 90 mg | 0.9 mL |
| Tranexamic Acid (15 mg/kg) | NEAT (100 mg/mL) | 80 mg | 0.8 mL |
| 10% Calcium Chloride (0.2 mL/kg) | NEAT | 1.1 mL | 1.1 mL |

### INFUSIONS

| Drug | To Make Up in 50mL | Infusion Rate |
|---|---|---|
| Propofol (4-12 mg/kg/hr) | NEAT (10 mg/mL) | 2 – 6 mL/hr |
| Morphine (10-40 microgram/kg/hr) | 5.5 mg (1 mg/kg) | 0.5 – 2 mL/hr (1 mL/hr = 20 microgram/kg/hr) |
| Midazolam (60-240 microgram/kg/hr) | 30 mg (6 mg/kg) | 0.5 – 2 mL/hr (1 mL/hr = 120 microgram/kg/hr) |
| Noradrenaline / Adrenaline (0.01 - 0.5 microgram/kg/min) | 1.5 mg (0.3 mg/kg) in 5% Dextrose | 0.1 – 5 mL/hr (1 mL/hr = 0.1 microgram/kg/min) |

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## Nottingham Children's Hospital

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# AGE : 6 months

| Wt : 6 – 8 kg | HR : 110 – 160 | RR : 30 – 40 | Systolic BP : 70 – 90 |
|---|---|---|---|

### AIRWAY

| | | | |
|---|---|---|---|
| **OP Airway :** Size : 000 | | **ET Tube :** Diameter : Cuffed: | 3.0 |
| | | Uncuffed: | 3.5 |
| **LMA :** Size : 1.5 | | Length (Oral) : | 12 cm |

### CARDIAC

| | | | | |
|---|---|---|---|---|
| Defibrillation (4 J/kg) | 30 J | Adrenaline | IV – Arrest (10 microgram/kg) | 0.7 mL (1 in 10,000) |
| Atropine (20 microgram/kg) | 140 microgram | | IM- Anaphylaxis (10 microgram/kg) | 0.7 mL (1 in 10,000) |
| Amiodarone (5 mg/kg) | 35 mg (1.2 mL of minijet) | | Nebulised – Croup (400 microgram/kg) | 2.8 mL (1 in 1,000) |

### FLUIDS

| | | | | |
|---|---|---|---|---|
| Crystalloids : | Trauma (10 mL/kg): Other (20 mL/kg) : | 70 mL 140 mL | Blood, FFP or Platelets (10 mL/kg) | 70 mL |
| 10% Dextrose : (Hypoglycaemia) (2 mL/kg) | | 14 mL | Mannitol 20 % (0.25 - 0.5 g/kg) | 9 – 18 mL (0.5 g/kg = 2.5 mL/kg) |

### DRUGS

| Drug (Dose) | Neat or Dilution (mg/mL) | Calculated Dose (7 kg) | Volume to be given (mL) |
|---|---|---|---|
| Propofol (1-4 mg/kg) | NEAT (10 mg/mL) | 7 – 30 mg | 0.7 – 3 mL |
| Ketamine IV (2 mg/kg) | NEAT (10 mg/mL) | 15 mg | 1.5 mL |
| Fentanyl (1-2 microgram/kg) | Dilute to 10 microgram/mL | 7 – 15 microgram | 0.7 – 1.5 mL |
| Morphine (0.1 mg/kg) | Dilute to 1 mg/mL | 0.7 mg (Repeat PRN) | 0.7 mL |
| Paracetamol IV (15 mg/kg) | NEAT (10 mg/mL) | 100 mg | 10 mL |
| Suxamethonium (2 mg/kg) | Dilute to 10 mg/mL | 14 mg | 1.4 mL |
| Rocuronium (1 mg/kg) | NEAT (10 mg/mL) | 7 mg | 0.7 mL |
| Atracurium (0.5 mg/kg) | NEAT (10 mg/mL) | 4 mg | 0.4 mL |
| Sugammadex (16 mg/kg) | NEAT (100 mg/mL) | 120 mg | 1.2 mL |
| Tranexamic Acid (15 mg/kg) | NEAT (100 mg/mL) | 100 mg | 1 mL |
| 10% Calcium Chloride (0.2 mL/kg) | NEAT | 1.4 mL | 1.4 mL |

### INFUSIONS

| Drug | To Make Up in 50mL | Infusion Rate |
|---|---|---|
| Propofol (4-12 mg/kg/hr) | NEAT (10 mg/mL) | 3 – 8 mL/hr |
| Morphine (10-40 microgram/kg/hr) | 7 mg (1 mg/kg) | 0.5 – 2 mL/hr (1 mL/hr = 20 microgram/kg/hr) |
| Midazolam (60-240 microgram/kg/hr) | 42 mg (6 mg/kg) | 0.5 – 2 mL/hr (1 mL/hr = 120 microgram/kg/hr) |
| Noradrenaline / Adrenaline (0.01 - 0.5 microgram/kg/min) | 2 mg (0.3 mg/kg) in 5% Dextrose | 0.1 – 5 mL/hr (1 mL/hr = 0.1 microgram/kg/min) |

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# Paediatric Trauma CT Guideline

## Are NICE CT Head criteria met?

- Loss of consciousness more than 5 min
- Amnesia (antegrade or retrograde) more than 5 min
- Abnormal drowsiness.
- Three or more discrete episodes of vomiting
- Clinical suspicion of non-accidental injury
- Post-traumatic seizure but no history of epilepsy
- Dangerous mechanism of injury
- GCS lower than 14, (GCS lower than 15 if less than 1 year old) in the ED
- Open or depressed skull injury or tense fontanelle
- Any sign of basal skull fracture
- Focal neurological deficit
- If less than 1 year, head bruise, swelling or laceration of more than 5 cm

**Yes**

**Age 10 or older**

**Age below 10 yrs**

**No**

Any of:
- GCS lower than 8 on arrival
- Strong suspicion of C-Spine injury

**Yes**

**No**

**Lateral C-spine XR**

Inadequate views

Adequate views

**CT head & C-spine (with patient on scoop)**

**CT head only (with patient on scoop)**

Neck imaging needed?

**Lateral C-spine XR**

Inadequate views?

**CT C-spine only (with patient on scoop)**

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# PAEDs

## Paediatric Anaesthetic Emergency Data sheets

Editors: J. Armstrong, H. King
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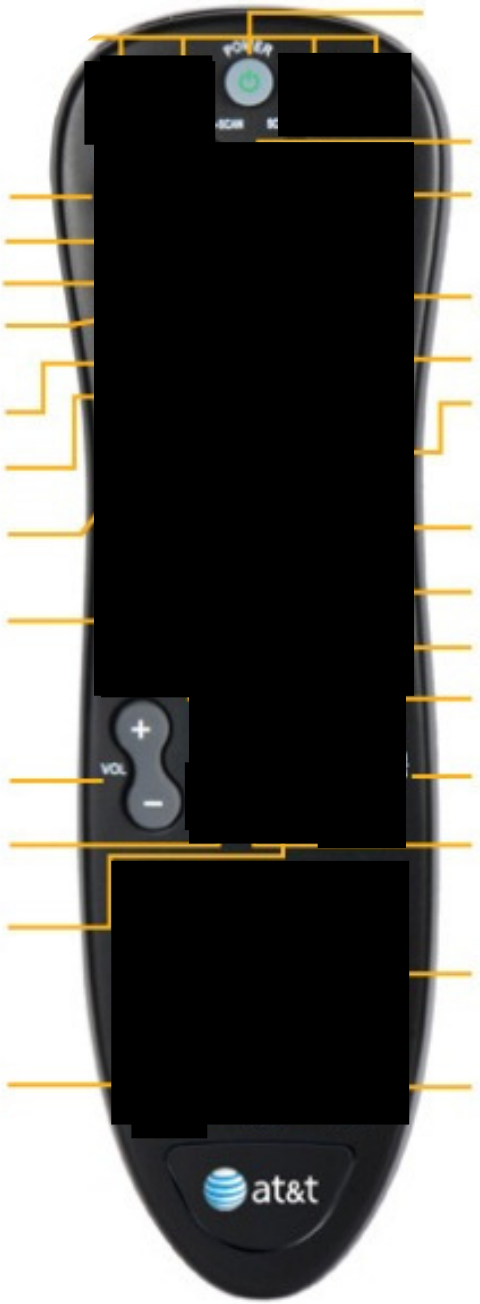
Improving accessibility to *clinical documents* **WILL** lead to improvement in patient safety

# Work as imagined….

…Work as done

Erik Hollnagel

Work as imagined
Work as done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# Work as imagined…

http://nuhnet/nuh_documents/Guidelines/Diagnostics%20and%20Clinical%20Support/Pathology%20-%20C - Windows Internet Explorer
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Web Slice Gallery
http://nuhnet/nuh_documents/Guidelines/Diagn...
Page
Safety
Tools

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Guideline for the Management of Acute Hyperkalaemia in Adults

**If POTASSIUM IS >7.5 mmol/L OR >6.5 mmol/L with ECG changes** OR patient is oligo/anuric or has renal failure seek expert advice **immediately**. Contact Renal Registrar and begin **immediate** treatment for hyperkalaemia.

**$K^+$ > 6.5 mmol/L or ECG changes:** Medical emergency. Urgent action required, if renal failure/oliguria contact Renal registrar oncall **and** continue with emergency treatment as below whilst awaiting specialist review.

Monitor patient's cardiac rhythm

**Step 1 IV CALCIUM GLUCONATE 10% 10ml**
Give undiluted over 5 mins.
Repeat at 5min intervals if needed until ECG normal (max. 3 doses in total). If patient is on digoxin administered in 100ml Glucose 5% over 20mins. See page 7

+/-

**Step 2a ACTRAPID 10 units + GLUCOSE 50% 50ml**
Give into a large vein over 30 mins
Monitor BMs after 15 and 30 mins then hourly. See page 8

+/-

**Step 2b SALBUTAMOL 10 mg NEB**
Response may be attenuated in patients on β-blockers or digoxin
Caution in patients with history of arrhythmias or IHD (may cause tachycardia) See page 8

+/-

**Step 2c** *If pH<7.2 consider Sodium Bicarbonate if advised by Renal SpR or Critical care* See page 8

Stop all potassium-containing/sparing drugs
Treat hypotension

**Recheck $K^+$ after 2 hours**
Using blood laboratory result.

**$K^+$ <5.5mmol/L**

Check potassium and renal function again after 4-6 hours and then daily.

**$K^+$ 5.5-6.5mmol/L**

**Step 3 Reduce Total Body Potassium.**
See page 4+9

**$K^+$ > 6.5 mmol/L or develops renal failure or is oligo/anuric.**

**Contact Renal Registrar on call urgently**



Done
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2.11.15 notes [Read-...
Untitled2 - Paint
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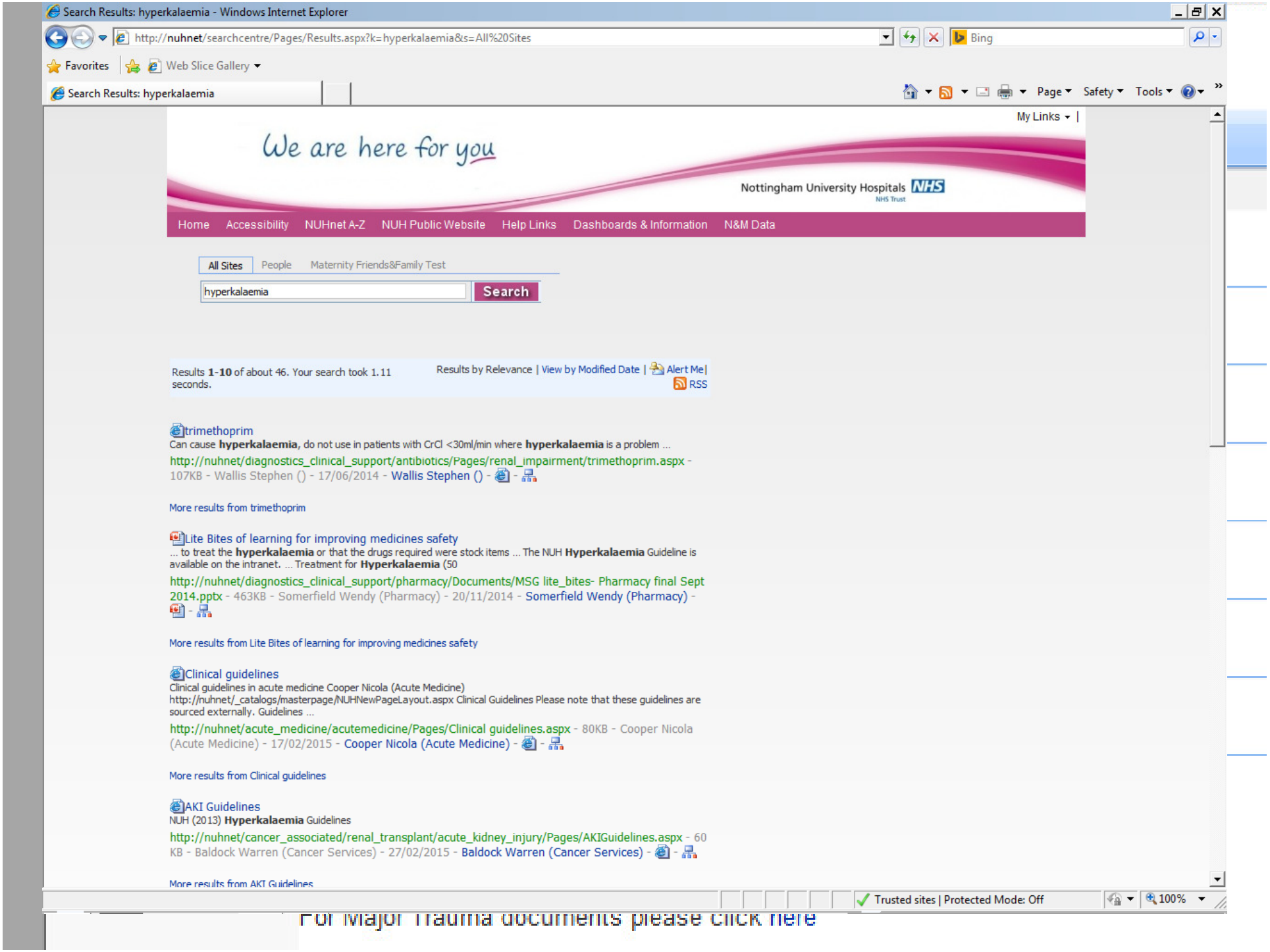
03/11/2015

# Work as done…


Search Results: hyperkalaemia - Windows Internet Explorer
http://nuhnet/searchcentre/Pages/Results.aspx?k=hyperkalaemia&s=All%20Sites
Bing
Favorites
Web Slice Gallery
Search Results: hyperkalaemia
Page
Safety
Tools
My Links
We are here for you
Nottingham University Hospitals NHS
NHS Trust
Home
Accessibility
NUHnet A-Z
NUH Public Website
Help Links
Dashboards & Information
N&M Data
All Sites
People
Maternity Friends&Family Test
hyperkalaemia
Search
Results 1-10 of about 46. Your search took 1.11 seconds.
Results by Relevance | View by Modified Date | Alert Me | RSS
trimethoprim
Can cause hyperkalaemia, do not use in patients with CrCl <30ml/min where hyperkalaemia is a problem ...
http://nuhnet/diagnostics_clinical_support/antibiotics/Pages/renal_impairment/trimethoprim.aspx - 107KB - Wallis Stephen () - 17/06/2014 - Wallis Stephen ()
More results from trimethoprim
Lite Bites of learning for improving medicines safety
... to treat the hyperkalaemia or that the drugs required were stock items ... The NUH Hyperkalaemia Guideline is available on the intranet. ... Treatment for Hyperkalaemia (50
http://nuhnet/diagnostics_clinical_support/pharmacy/Documents/MSG lite_bites- Pharmacy final Sept 2014.pptx - 463KB - Somerfield Wendy (Pharmacy) - 20/11/2014 - Somerfield Wendy (Pharmacy)
More results from Lite Bites of learning for improving medicines safety
Clinical guidelines
Clinical guidelines in acute medicine Cooper Nicola (Acute Medicine) http://nuhnet/_catalogs/masterpage/NUHNewPageLayout.aspx Clinical Guidelines Please note that these guidelines are sourced externally. Guidelines ...
http://nuhnet/acute_medicine/acutemedicine/Pages/Clinical guidelines.aspx - 80KB - Cooper Nicola (Acute Medicine) - 17/02/2015 - Cooper Nicola (Acute Medicine)
More results from Clinical guidelines
AKI Guidelines
NUH (2013) Hyperkalaemia Guidelines
http://nuhnet/cancer_associated/renal_transplant/acute_kidney_injury/Pages/AKIGuidelines.aspx - 60 KB - Baldock Warren (Cancer Services) - 27/02/2015 - Baldock Warren (Cancer Services)
More results from AKI Guidelines
Trusted sites | Protected Mode: Off
100%
For Major Trauma documents please click here

The final design will always be intuitive to the designer…

…but not necessarily to the end-users

# Why make an app?

- From personal experience
- Access from bedside
- Electronic Observations / Digital Health Records

# Alternatives?

- Better design for intranet?
- Internet?
- Paper guide / aide memoir cards?
- Better training???

# Questionnaire

- Sent to all clinical staff
- Just under 500 replies in 3 weeks
- 95% owns a smart device
- Over 50% use the internet to access clinical information at least once a week
- 89% would use an app if one is available

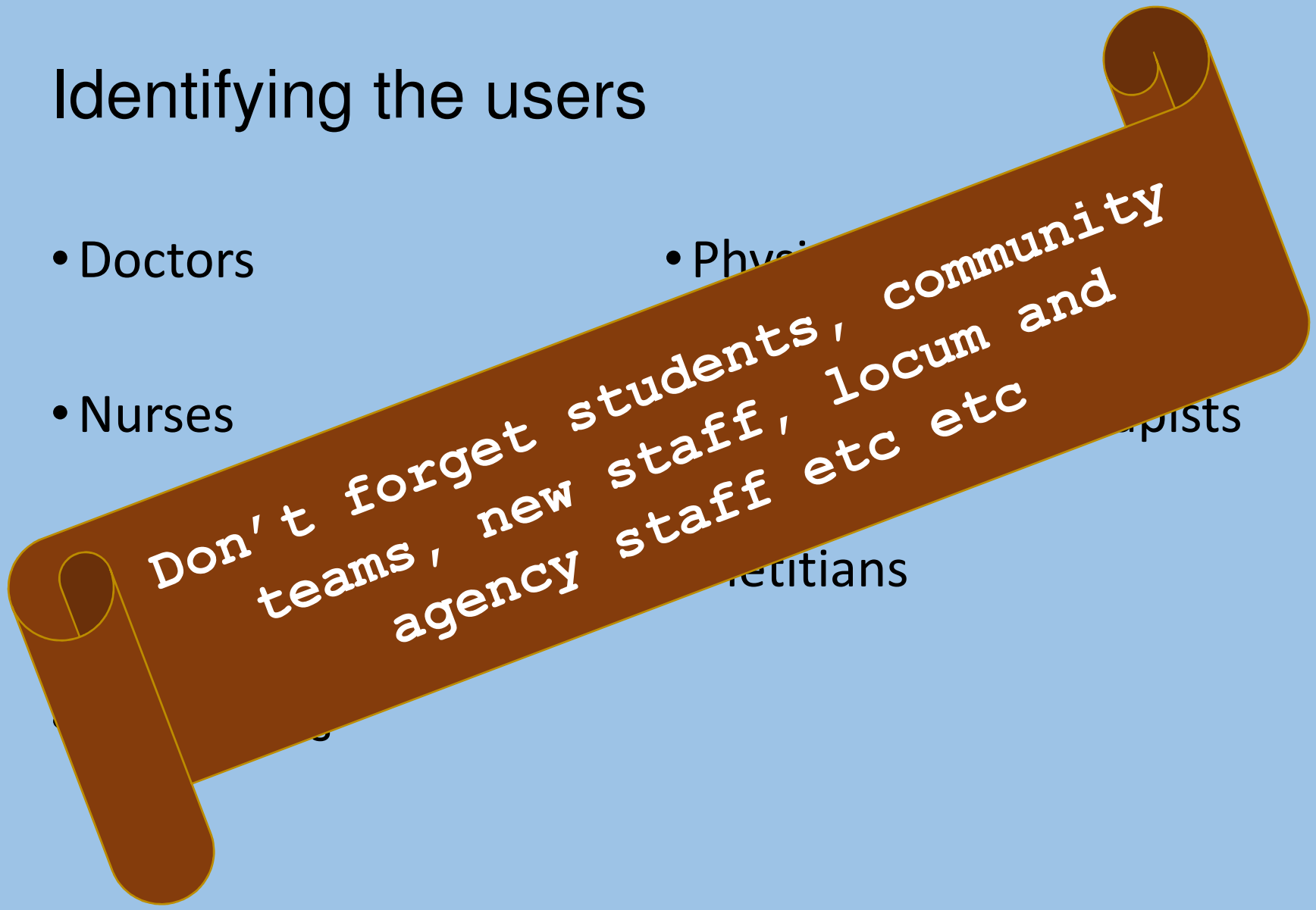
# User-Centred Design

# User-Centred Design

- Design based on how users can, want or need to use the product
- Involving users at all stages of design process
- Not forcing the users to change their behaviour to accommodate the product
- Intuitive to users
  - ie (almost) no training required

# Identifying the users

- Doctors
- Nurses
- Phys
- pists
- ietitians

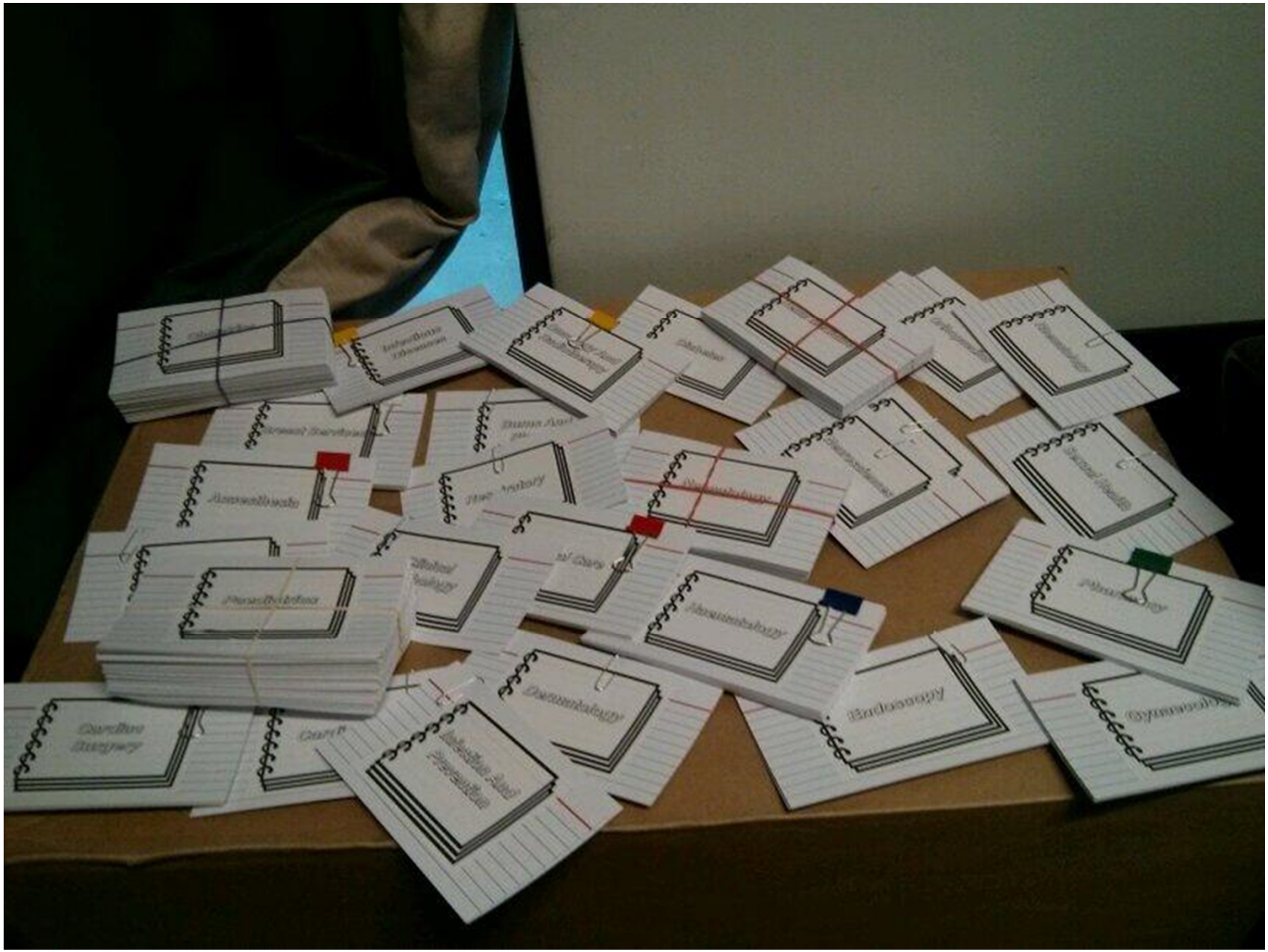


# User-Centred Design

- Help from human factors expert
- Focus groups
  - Around 100 staff involved
- Critical Incident Techniques
- Card sorting exercise

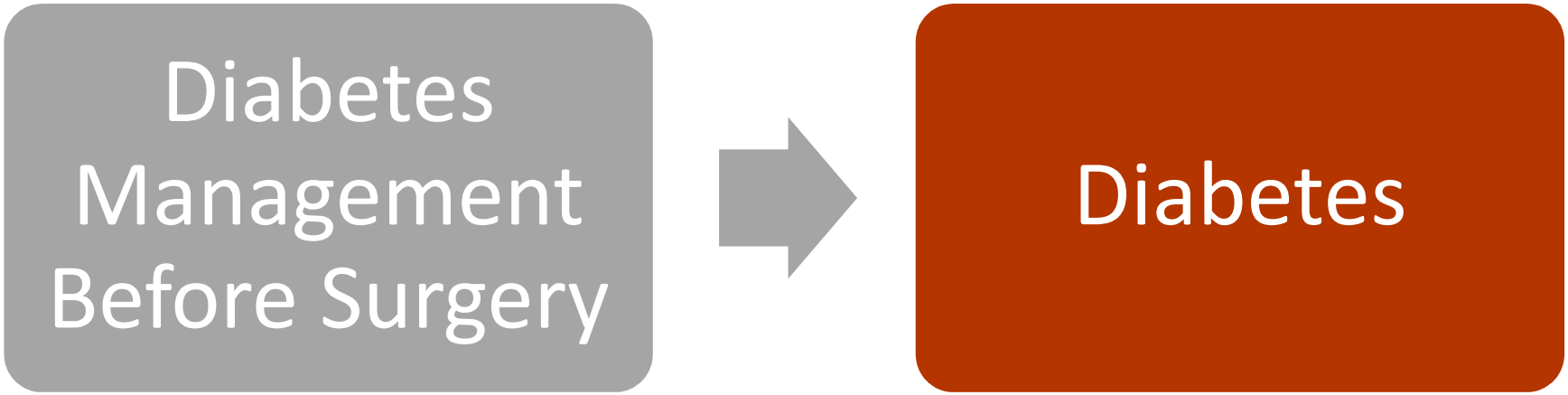
# Critical Incident Technique

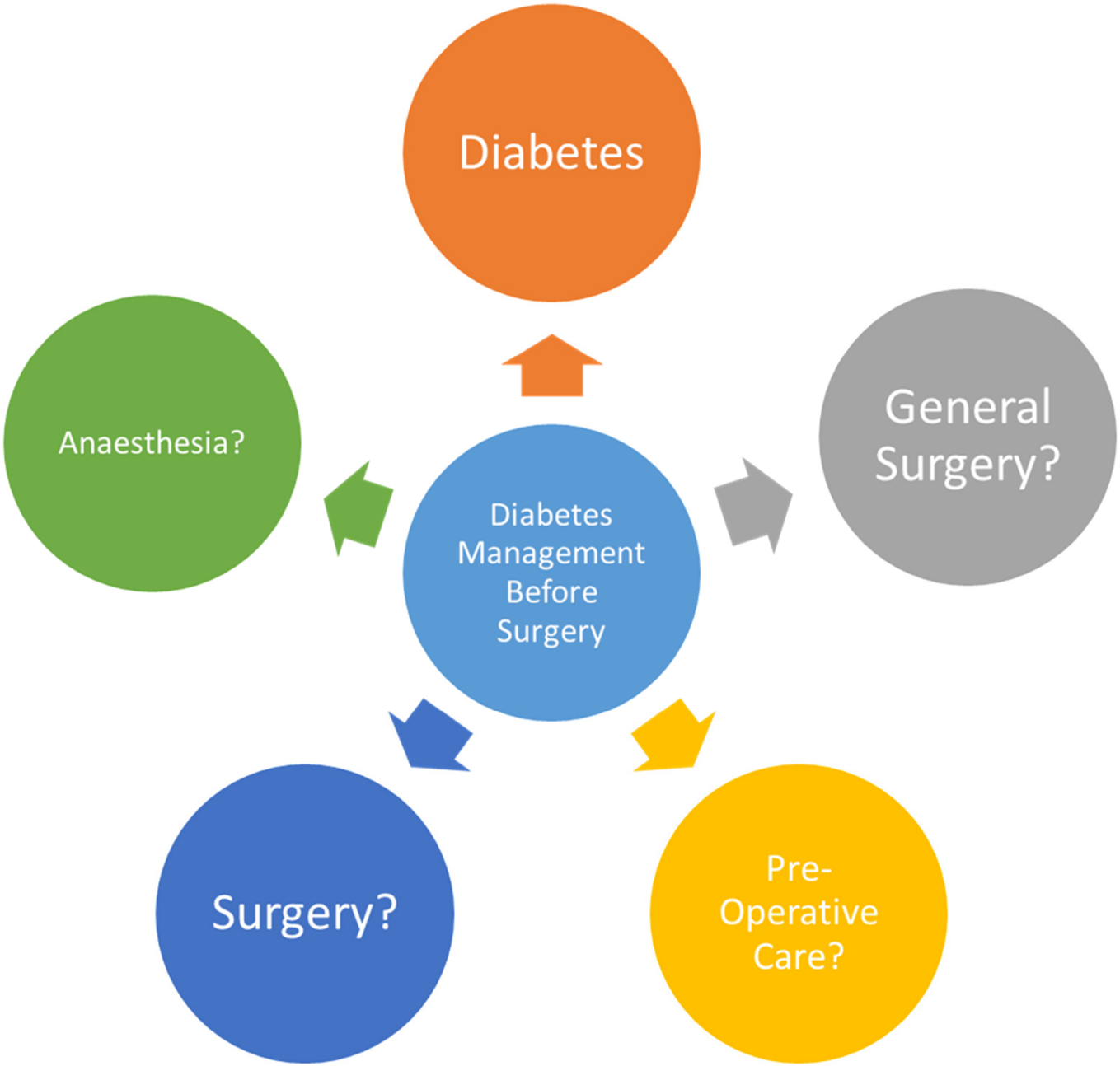
- Interviewing staff
- Asking staff to describe incidence where they had difficulty accessing guidelines
- How they overcame the problem



# Card Sorting Exercise

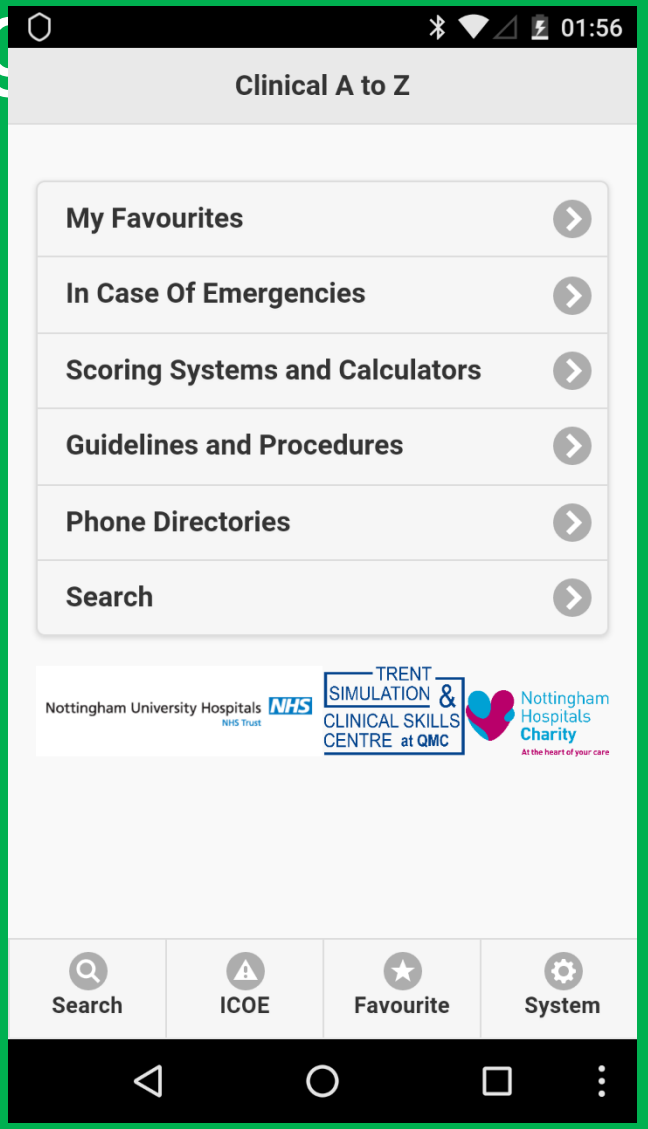
- Difference in opinion
- Many can logically be placed into different “groups” or “specialties” heading
- So who is right / wrong?


Diabetes Management Before Surgery
Diabetes

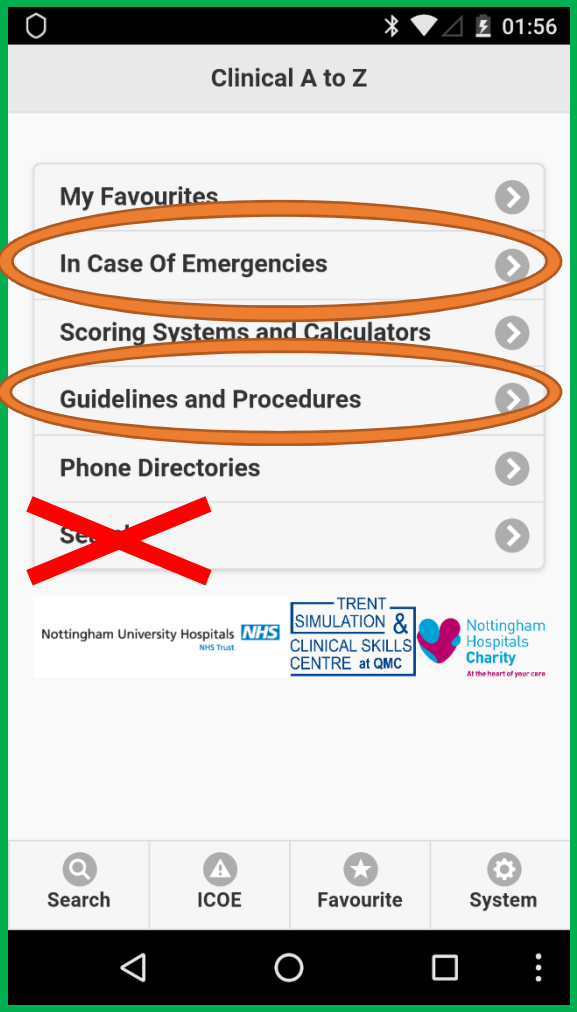

Diabetes
General Surgery?
Anaesthesia?
Diabetes Management Before Surgery
Surgery?
Pre-Operative Care?

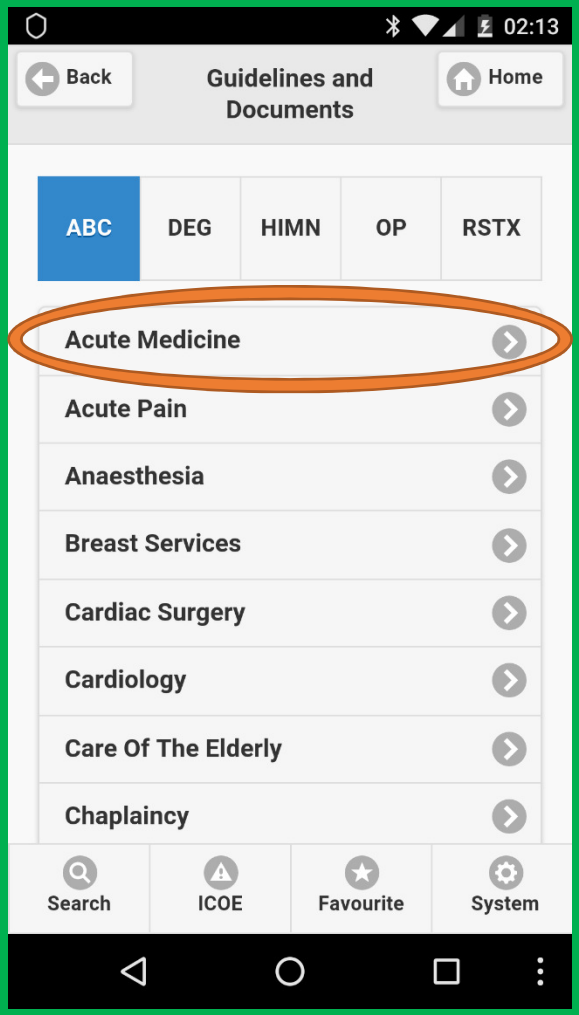
# Prototyping and Testing

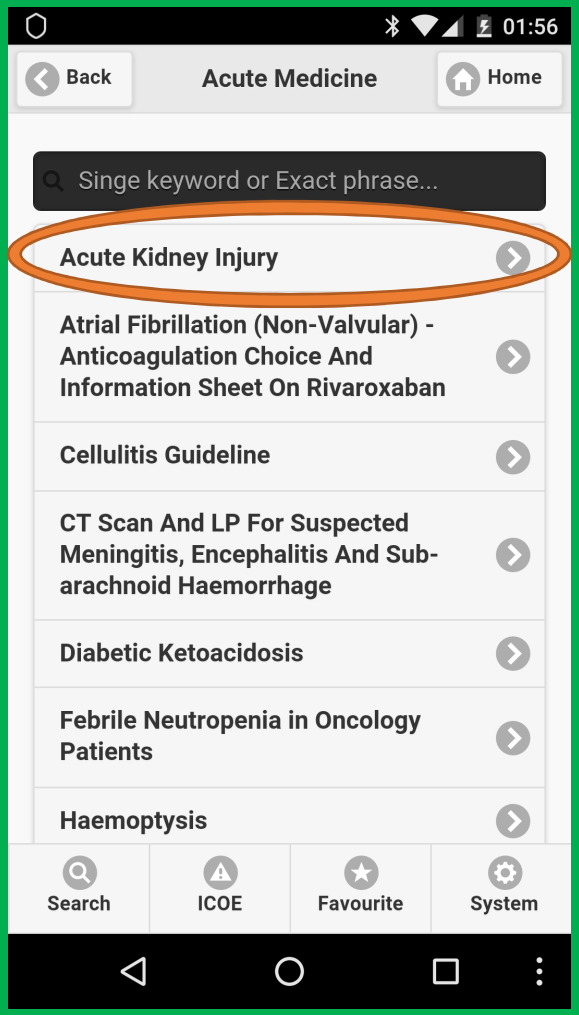
- Home-made prototype app
- “Find the Guidelines (+ other information)” game

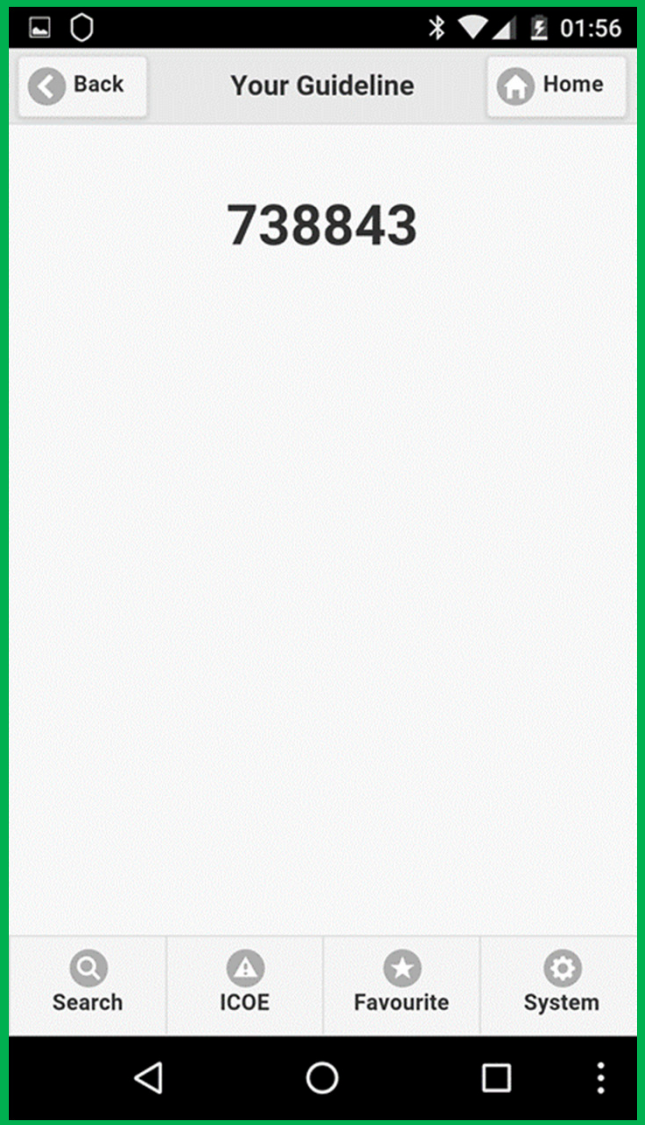


# Prototyping and Testing

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Your Guideline
Home
738843
Search
ICOE
Favourite
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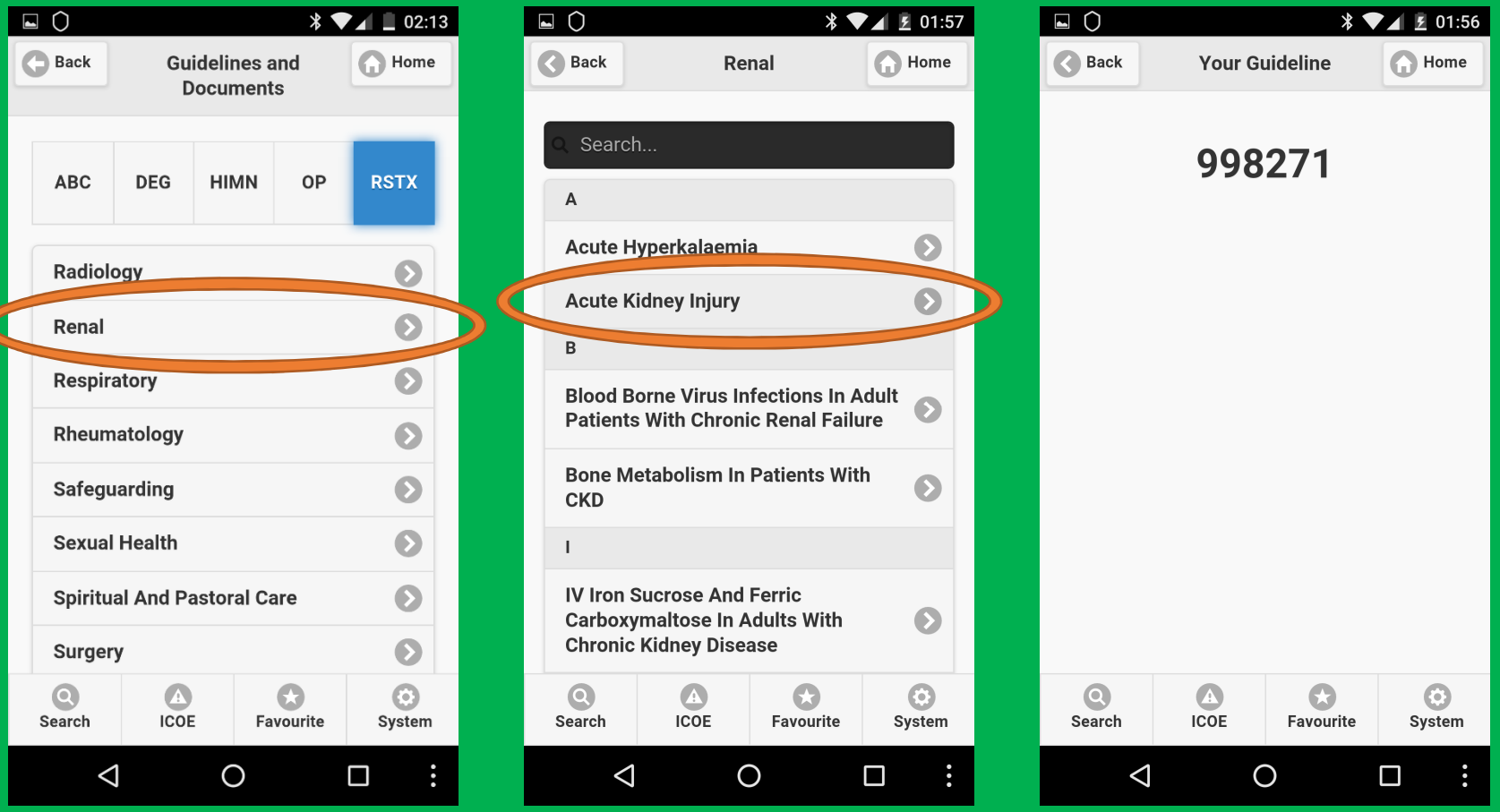
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Guidelines and Documents
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ABC
DEG
HIMN
OP
RSTX
Radiology
Renal
Respiratory
Rheumatology
Safeguarding
Sexual Health
Spiritual And Pastoral Care
Surgery
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Renal
Home
Search...
A
Acute Hyperkalaemia
Acute Kidney Injury
B
Blood Borne Virus Infections In Adult Patients With Chronic Renal Failure
Bone Metabolism In Patients With CKD
I
IV Iron Sucrose And Ferric Carboxymaltose In Adults With Chronic Kidney Disease
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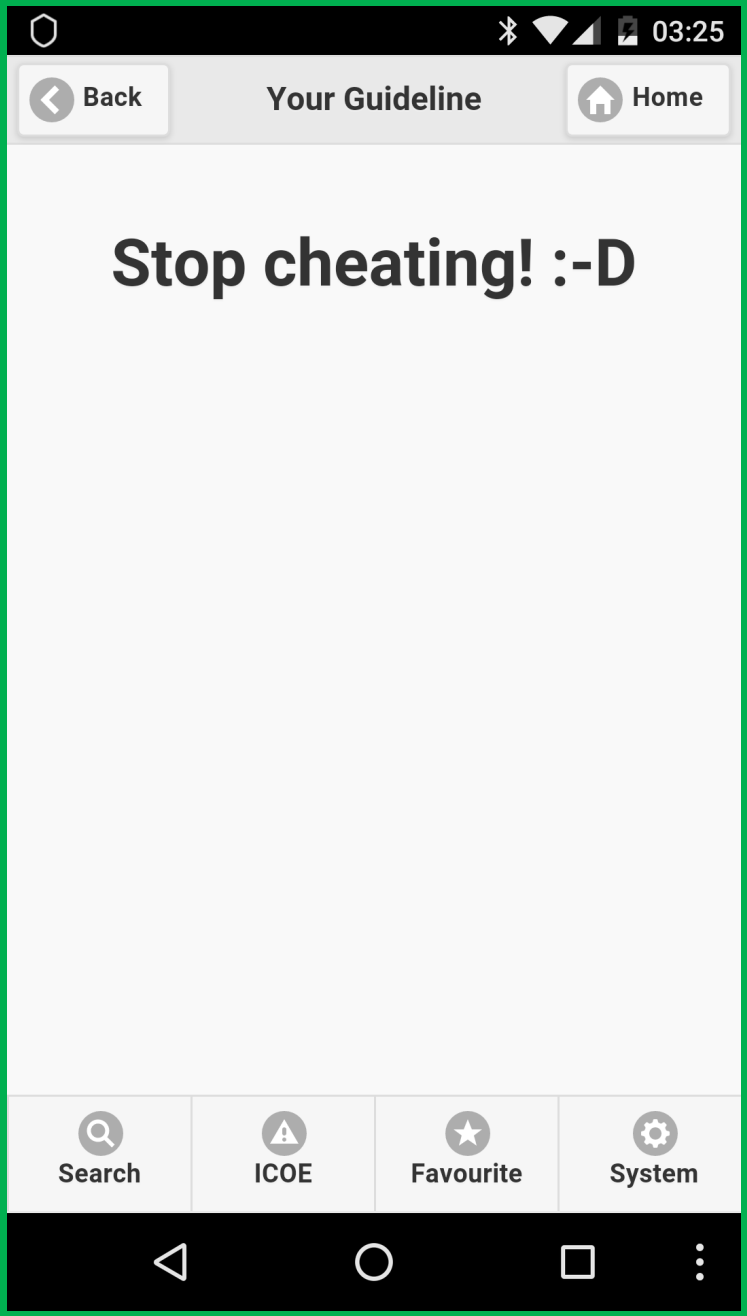
System


03:25
Back
Your Guideline
Home
Stop cheating! :-D
Search
ICOE
Favourite
System

# Results

- Different user-groups access guidelines differently
- Who is **“right”** and who is **“wrong”**?

Is there a r

Can

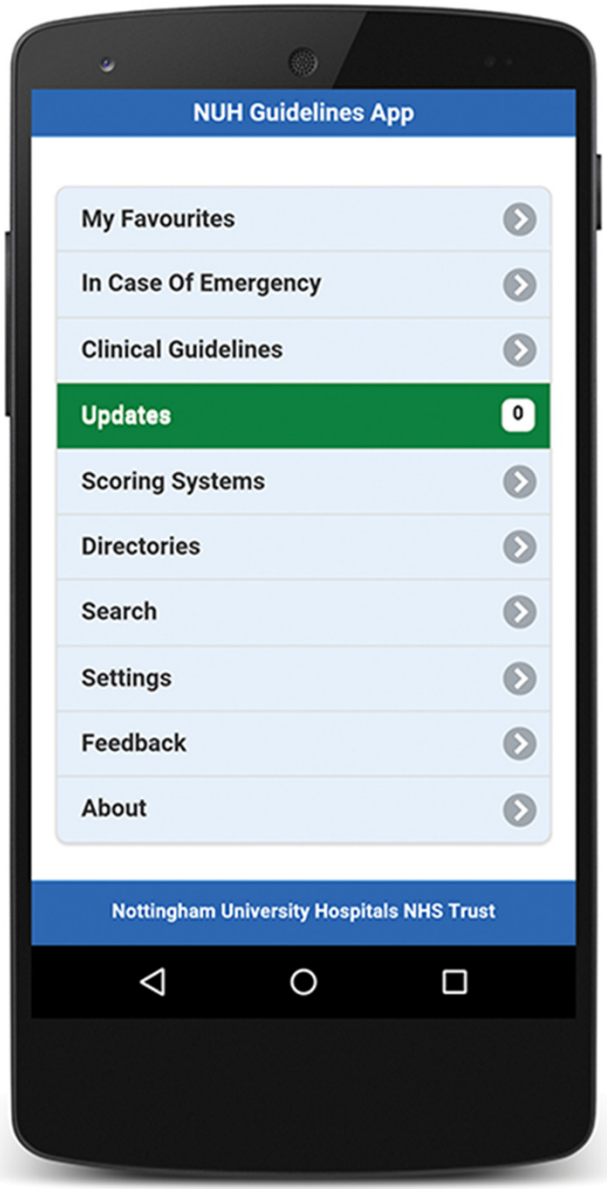
Can we

ht?

Yes!!!

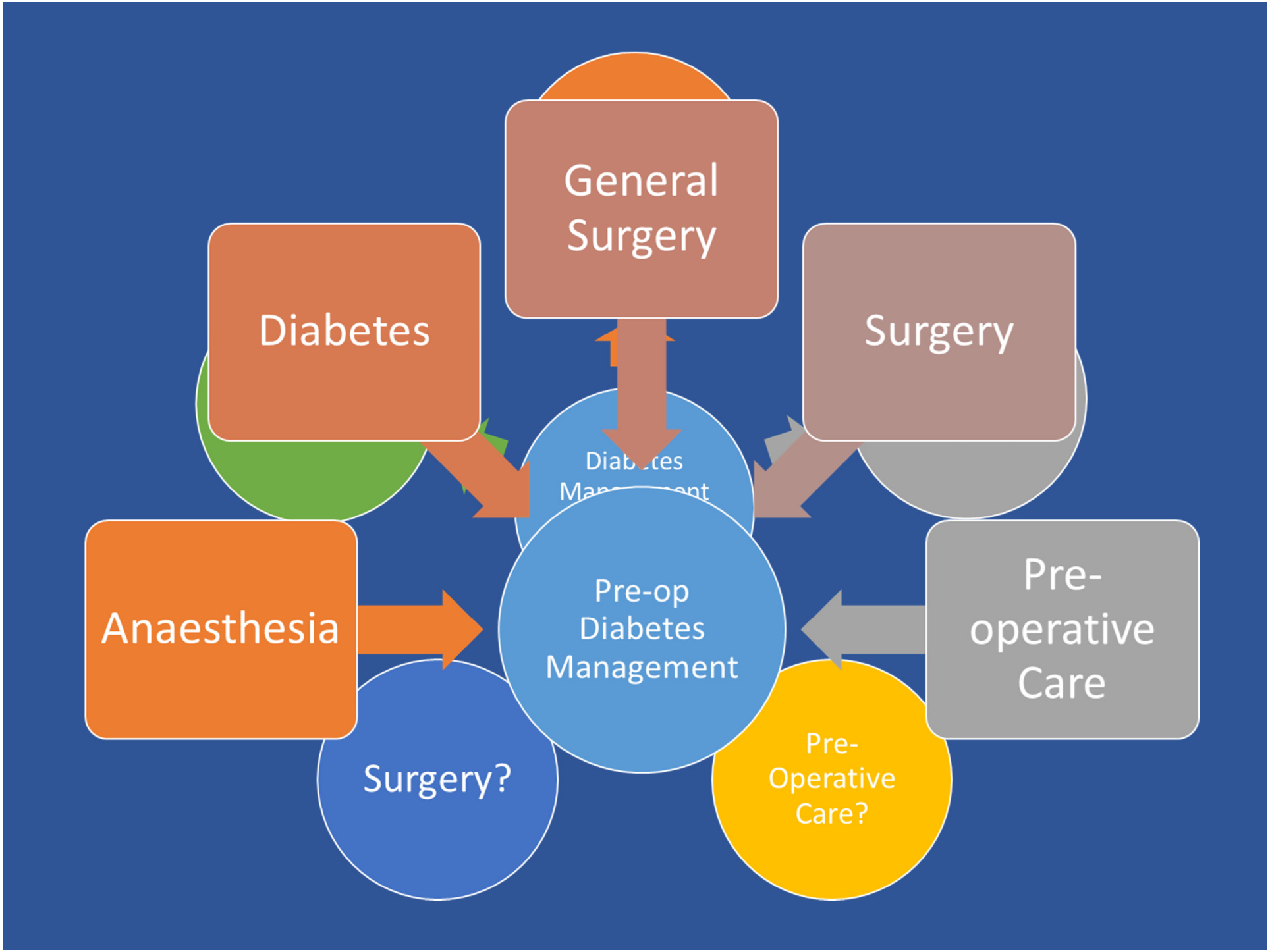
When designing a system, remember who you are it designing for.

NUH Guidelines

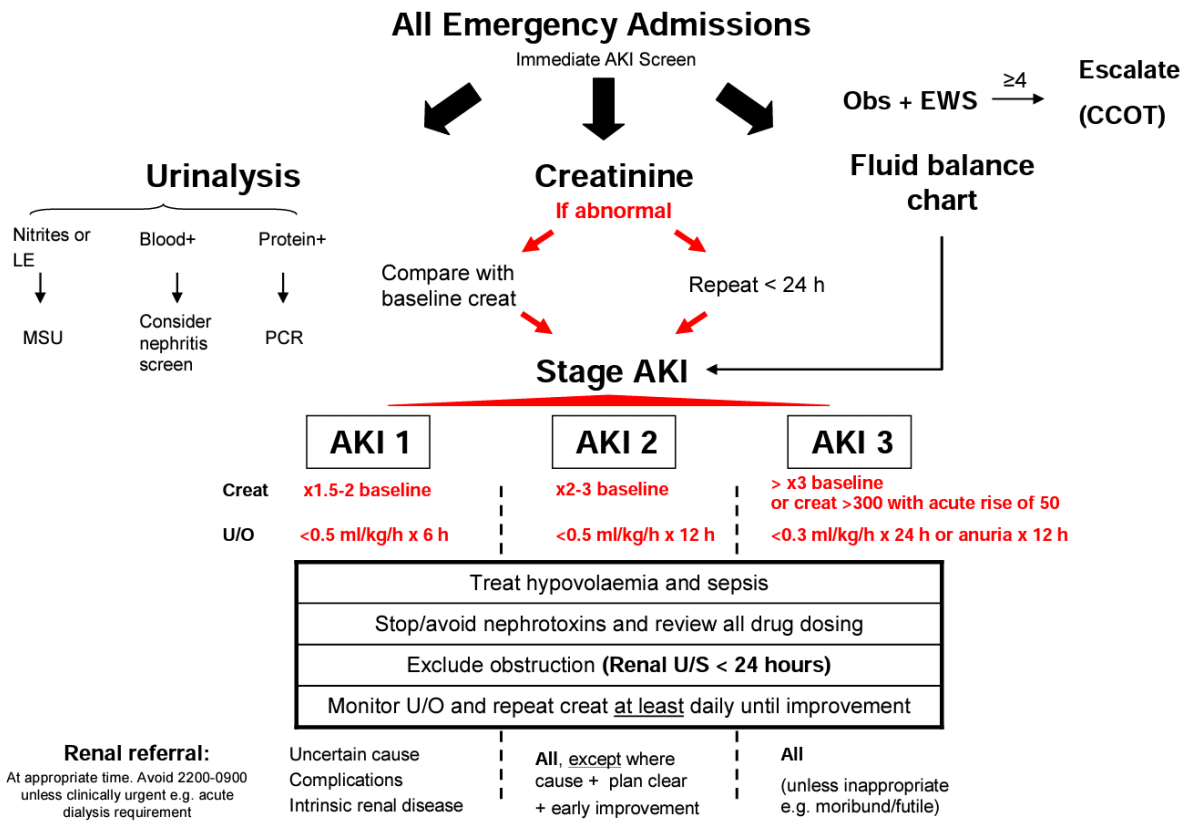

NUH Guidelines App
My Favourites
In Case Of Emergency
Clinical Guidelines
Updates
0
Scoring Systems
Directories
Search
Settings
Feedback
About
Nottingham University Hospitals NHS Trust

# 3 – clicks, multiple point of entry menu system

- Easy navigation
- Back to starting point quickly
- Difficult for the designer!

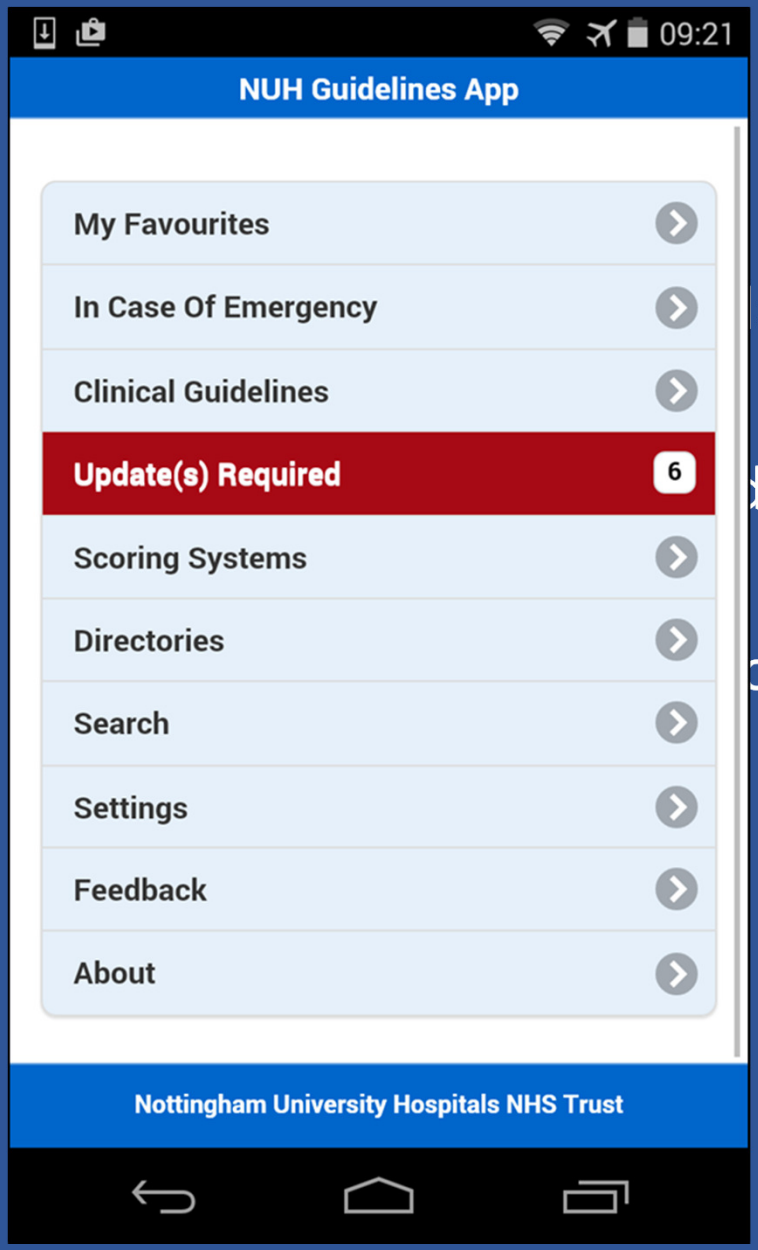

General Surgery
Diabetes
Surgery
Anaesthesia
Pre-op Diabetes Management
Pre-operative Care
Surgery?
Pre-Operative Care?

# Acute Kidney Injury (AKI) – Initial Management



# Offline Access

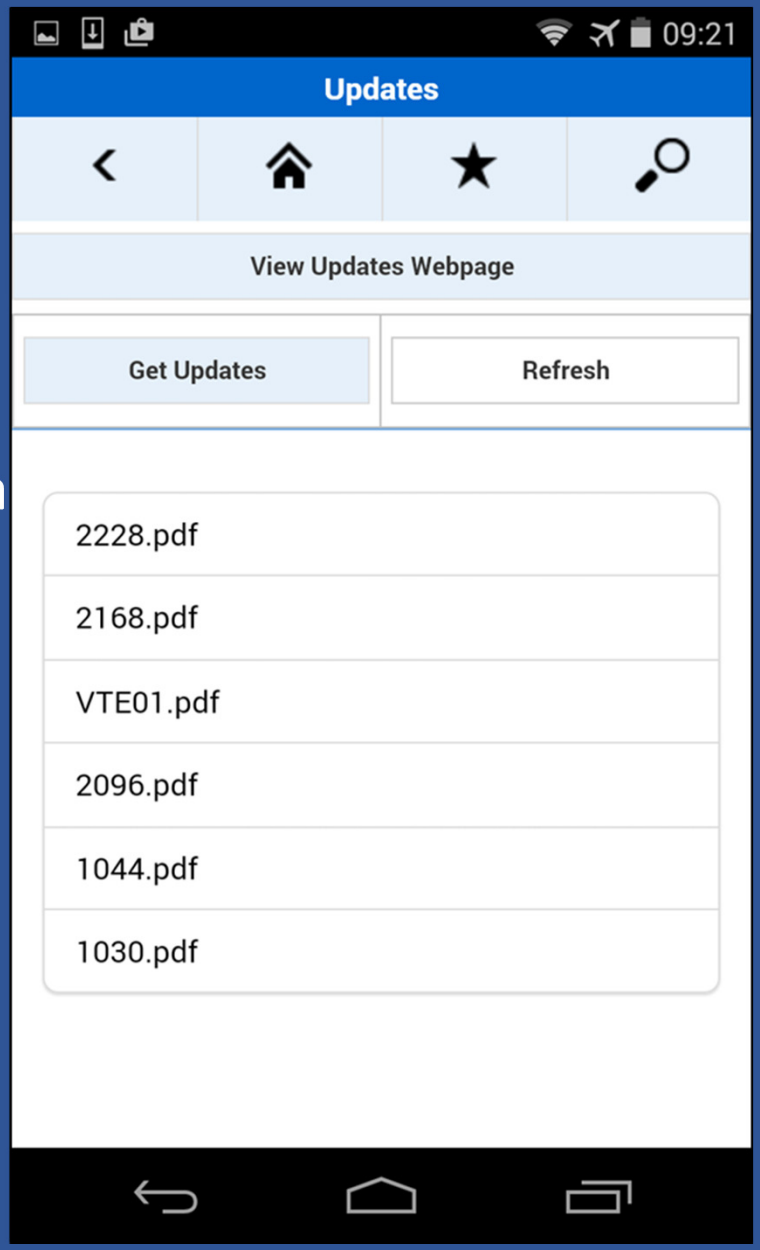
- No issues with signal blackspots
- Faster
- Issue with keeping guidelines up to date




ate

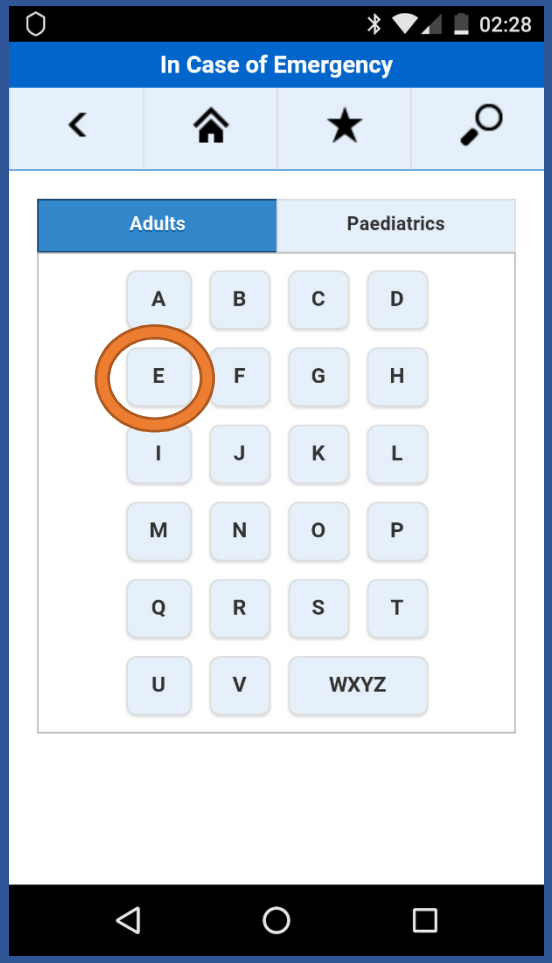
desktop com

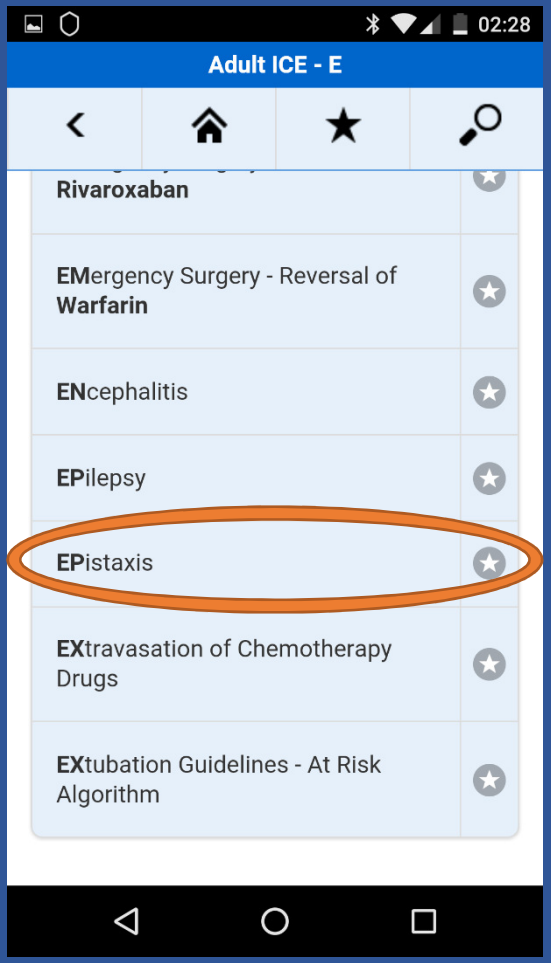
oogle Play

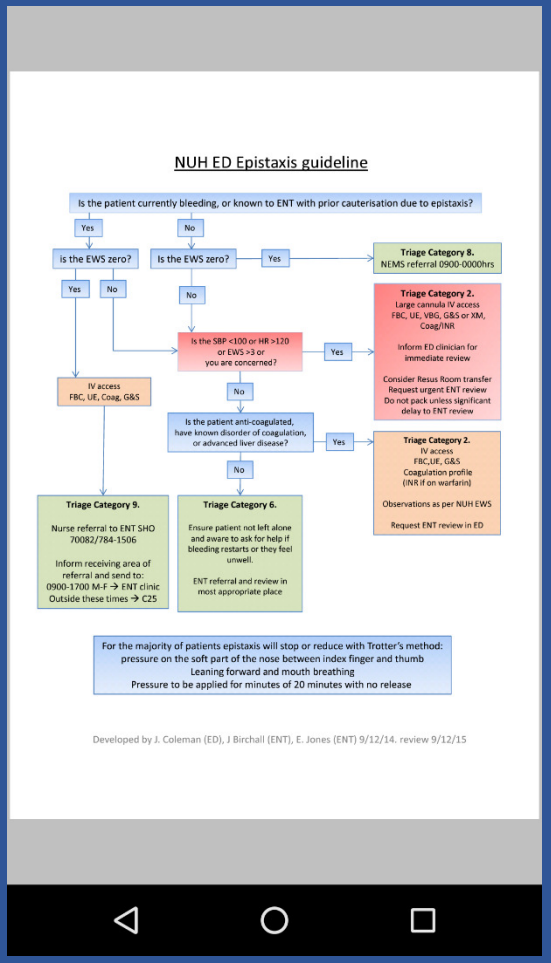


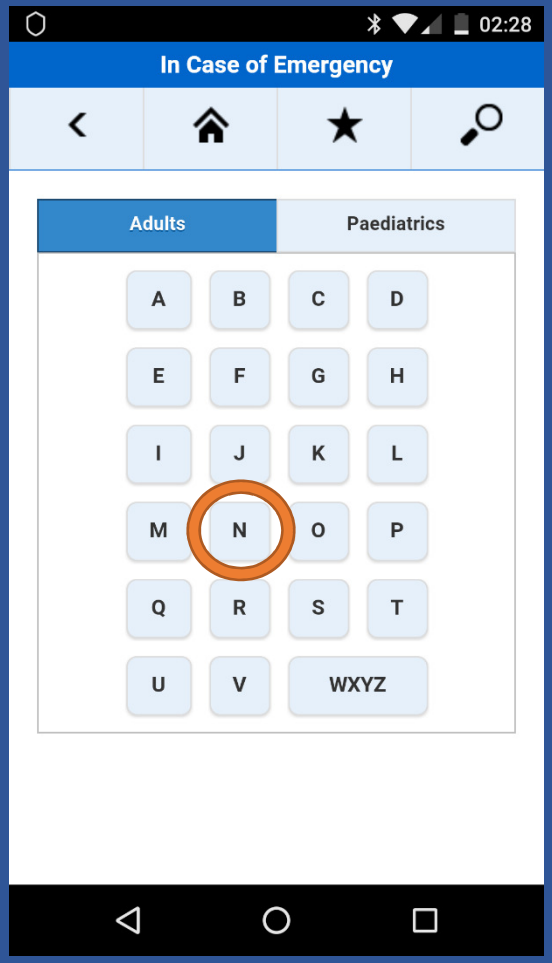
# In Case of Emergency

- List of guidelines for “emergencies”
- Accessible via large on-screen keyboard
- Think of the name of the emergency


02:28
In Case of Emergency
Adults
Paediatrics
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
WXYZ


02:28
Adult ICE - E
Rivaroxaban
EMergency Surgery - Reversal of Warfarin
ENcephalitis
EPilepsy
EPistaxis
EXtravasation of Chemotherapy Drugs
EXtubation Guidelines - At Risk Algorithm


NUH ED Epistaxis guideline
Is the patient currently bleeding, or known to ENT with prior cauterisation due to epistaxis?
Yes
No
Is the EWS zero?
Is the EWS zero?
Yes
Triage Category 8.
NEMS referral 0900-0000hrs
Yes
No
No
Triage Category 2.
Large cannula IV access
FBC, UE, VBG, G&S or XM, Coag/INR
Inform ED clinician for immediate review
Consider Resus Room transfer
Request urgent ENT review
Do not pack unless significant delay to ENT review
Is the SBP <100 or HR >120 or EWS >3 or you are concerned?
Yes
No
IV access
FBC, UE, Coag, G&S
Is the patient anti-coagulated, have known disorder of coagulation, or advanced liver disease?
Yes
Triage Category 2.
IV access
FBC,UE, G&S
Coagulation profile
(INR if on warfarin)
Observations as per NUH EWS
Request ENT review in ED
No
Triage Category 9.
Nurse referral to ENT SHO 70082/784-1506
Inform receiving area of referral and send to:
0900-1700 M-F → ENT clinic
Outside these times → C25
Triage Category 6.
Ensure patient not left alone and aware to ask for help if bleeding restarts or they feel unwell.
ENT referral and review in most appropriate place
For the majority of patients epistaxis will stop or reduce with Trotter's method:
pressure on the soft part of the nose between index finger and thumb
Leaning forward and mouth breathing
Pressure to be applied for minutes of 20 minutes with no release
Developed by J. Coleman (ED), J Birchall (ENT), E. Jones (ENT) 9/12/14, review 9/12/15


02:28
In Case of Emergency
Adults
Paediatrics
A
B
C
D
E
F
G
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K
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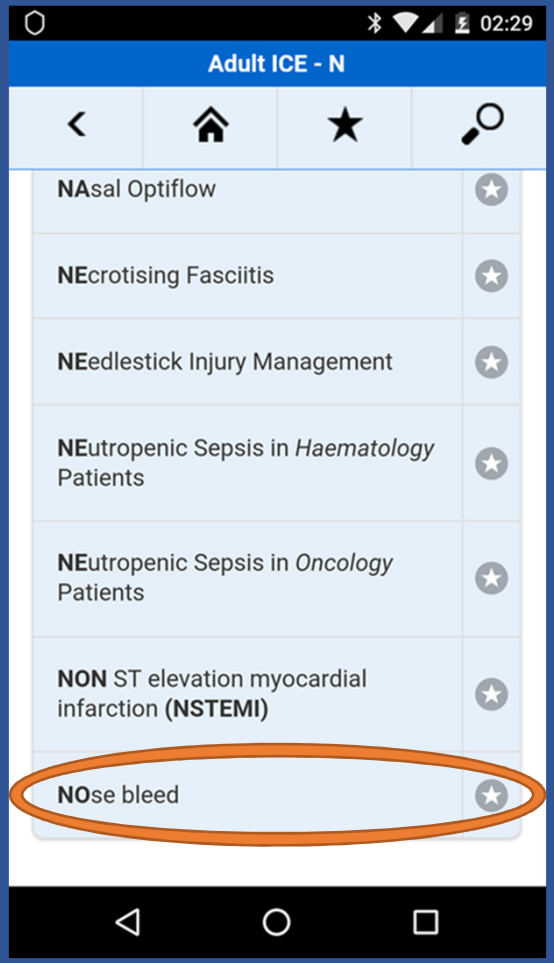
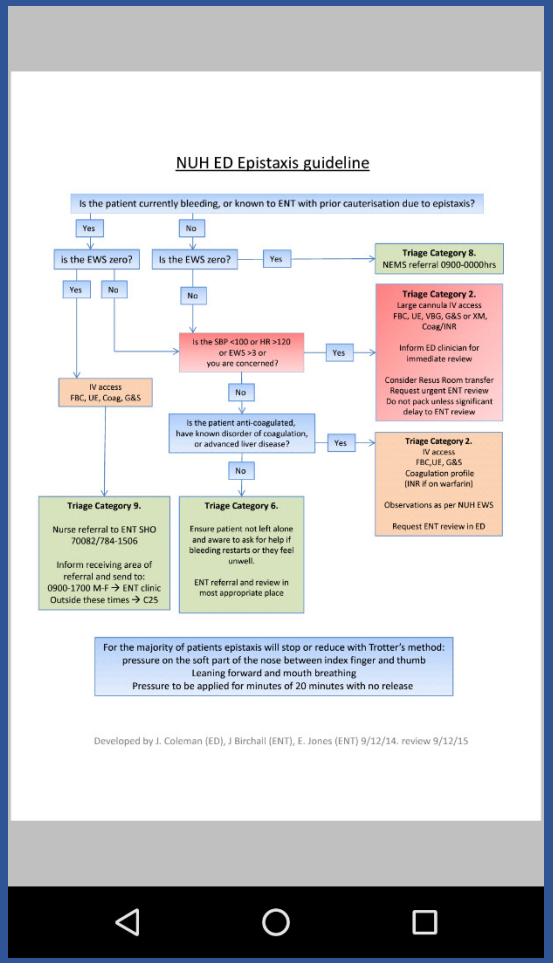
WXYZ


02:29
Adult ICE - N
NAsal Optiflow
NEcrotising Fasciitis
NEedlestick Injury Management
NEutropenic Sepsis in *Haematology* Patients
NEutropenic Sepsis in *Oncology* Patients
NON ST elevation myocardial infarction (NSTEMI)
NOse bleed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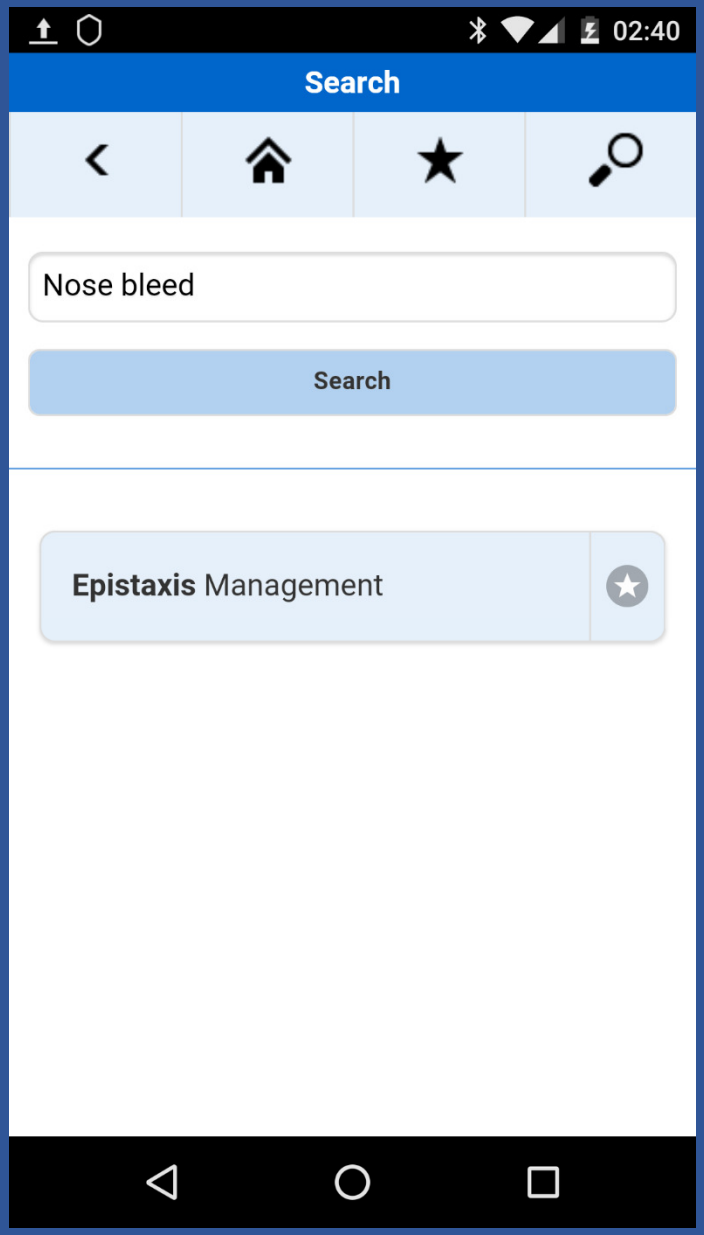
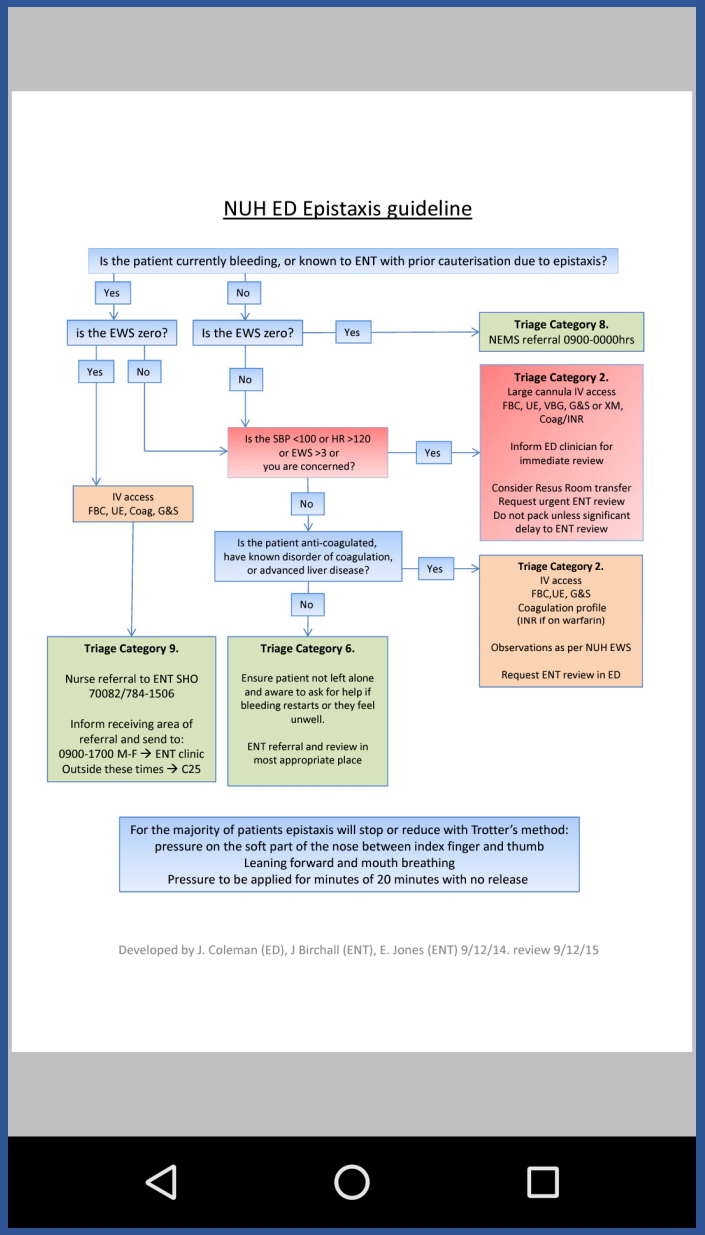
# Search function

- All guidelines searchable using keywords
- Manually tagged to each document
- Very labour-intensive for existing guidelines
- Must cater for all staff groups


02:40
Search
Nose bleed
Search
Epistaxis Management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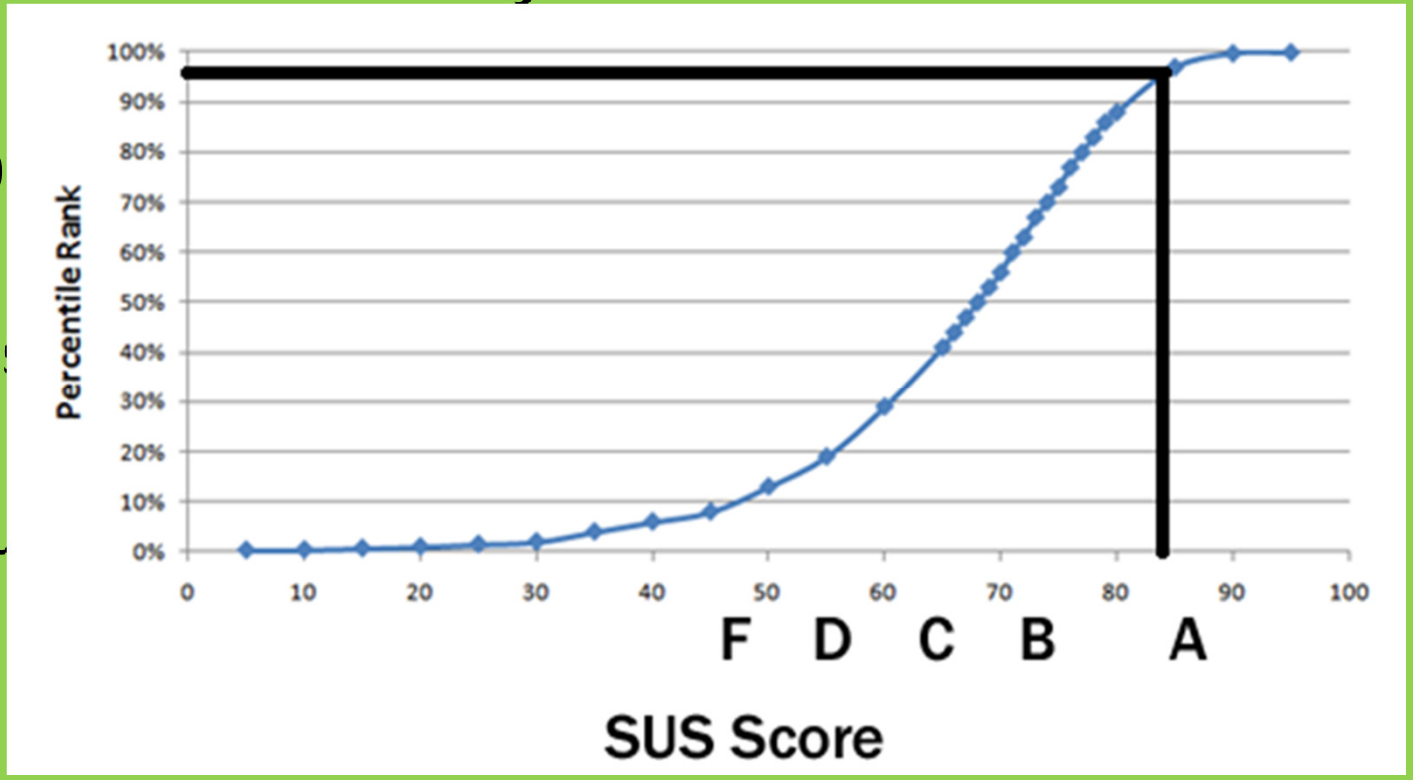
# System Usability Scale

- 10
- As
- NU
  - Score = 83
  - “Excellent”



# Usage

- Version 1 launched at the end of July 2014
- Over 8000 downloads
- Average 50 users per day (and rising)
- Roughly tripled number of access to guidelines (intranet and app) since launch

# How to improve accessibility to guidelines **at your Trust**

Consider **redesigning your guidelines system**

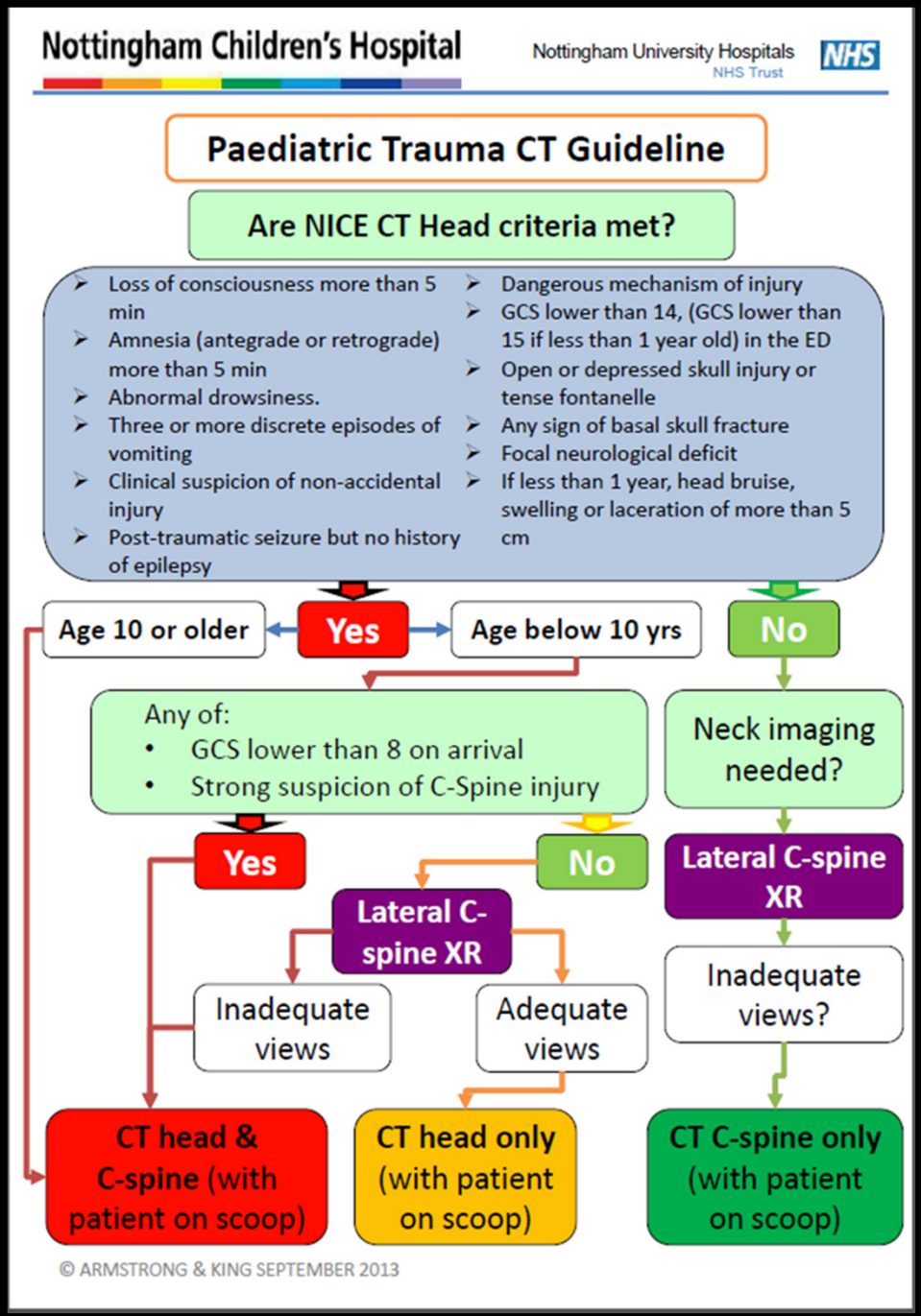
Remember **who** you are designing it for and **how** they normally access guidelines

Clinical input **essential for successful implementation**

Consider **breaking up "Do-It-All" guidelines**

Use **concise and relevant guideline titles**

Beware of **The Wall of Words**


Nottingham Children's Hospital
Nottingham University Hospitals
NHS Trust
NHS
Paediatric Trauma CT Guideline
Are NICE CT Head criteria met?
Loss of consciousness more than 5 min
Amnesia (antegrade or retrograde) more than 5 min
Abnormal drowsiness.
Three or more discrete episodes of vomiting
Clinical suspicion of non-accidental injury
Post-traumatic seizure but no history of epilepsy
Dangerous mechanism of injury
GCS lower than 14, (GCS lower than 15 if less than 1 year old) in the ED
Open or depressed skull injury or tense fontanelle
Any sign of basal skull fracture
Focal neurological deficit
If less than 1 year, head bruise, swelling or laceration of more than 5 cm
Age 10 or older
Yes
Age below 10 yrs
No
Any of:
GCS lower than 8 on arrival
Strong suspicion of C-Spine injury
Neck imaging needed?
Yes
No
Lateral C-spine XR
Lateral C-spine XR
Inadequate views
Adequate views
Inadequate views?
CT head & C-spine (with patient on scoop)
CT head only (with patient on scoop)
CT C-spine only (with patient on scoop)
© ARMSTRONG & KING SEPTEMBER 2013

Head injury: assessment and early management | 1-recommendations | Guidance and guidelines | NI - Windows Internet Explorer
http://www.nice.org.uk/guidance/cg176/chapter/1-recommendations
nice head injury guideline paediatric
Favorites
Web Slice Gallery
Head injury: assessment and early management |...
Page
Safety
Tools

- Paraesthesia in the upper or lower limbs.
- A definitive diagnosis of cervical spine injury is needed urgently (for example, before surgery).
- The patient is having other body areas scanned for head injury or multi-region trauma.
- There is strong clinical suspicion of injury despite normal X-rays.
- Plain X-rays are technically difficult or inadequate.
- Plain X-rays identify a significant bony injury.

The scan should be performed within 1 hour of the risk factor being identified. A provisional written radiology report should be made available within 1 hour of the scan being performed. **[new 2014]**

1.5.12 For children who have sustained a head injury and have neck pain or tenderness but no indications for a CT cervical spine scan (see recommendation 1.5.11), perform 3-view cervical spine X-rays **before** assessing range of movement in the neck if either of these risk factors are identified:

- Dangerous mechanism of injury (that is, fall from a height of greater than 1 metre or 5 stairs; axial load to the head, for example, diving; high-speed motor vehicle collision; rollover motor accident; ejection from a motor vehicle; accident involving motorised recreational vehicles; bicycle collision).
- Safe assessment of range of movement in the neck is not possible (see recommendation 1.5.10).

The X-rays should be carried out within 1 hour of the risk factor being identified and reviewed by a clinician trained in their interpretation within 1 hour of being performed. **[new 2014]**

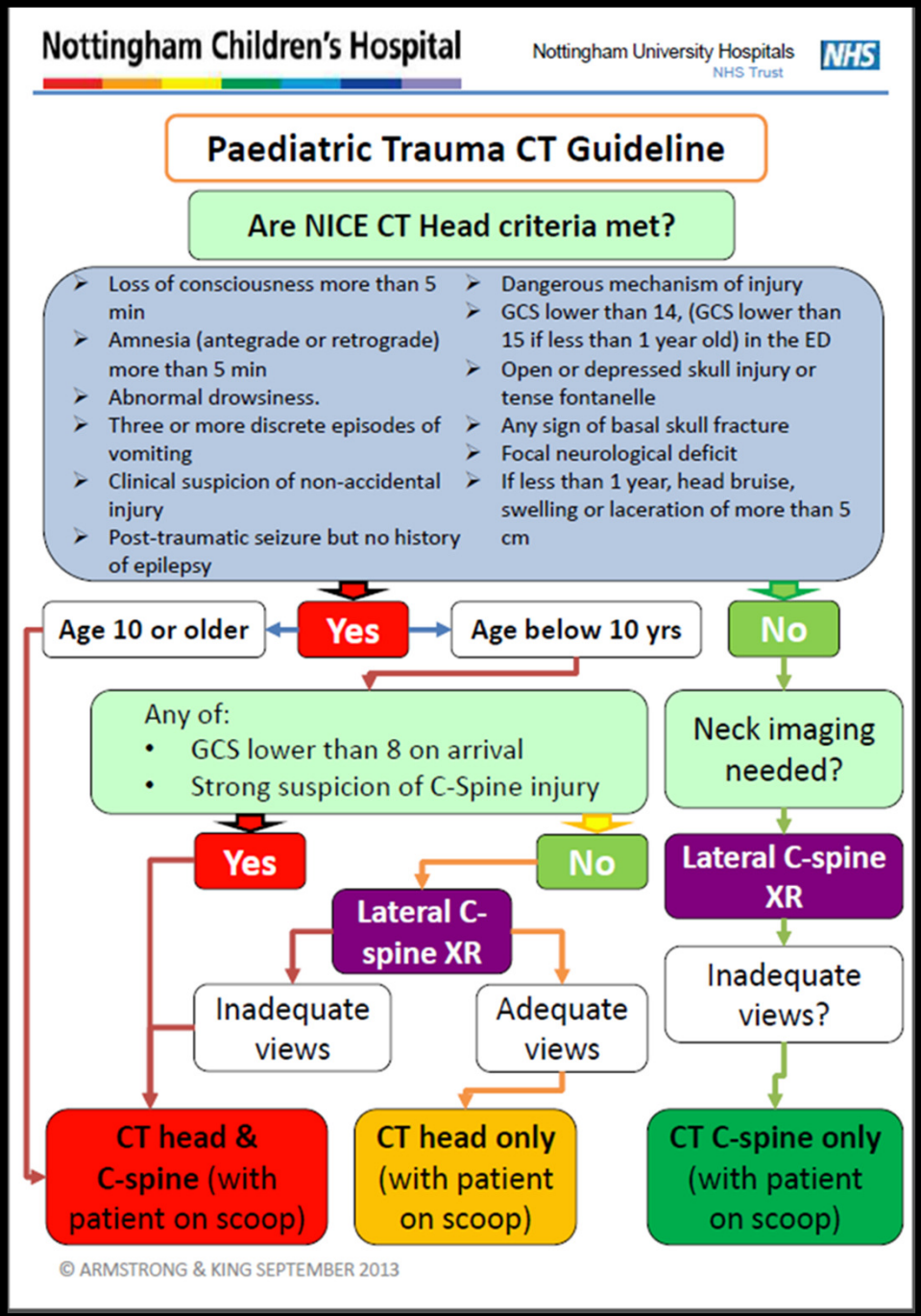
1.5.13 If range of neck movement can be assessed safely (see recommendation 1.5.10) in a child who has sustained a head injury and has neck pain or tenderness but no indications for a CT cervical spine scan, perform 3-view cervical spine X-rays if the child cannot actively rotate their neck 45 degrees to the left and right. The X-rays should be carried out within 1 hour of this being identified and reviewed by a clinician trained in their interpretation within 1 hour of being performed. **[new 2014]**

1.5.14 In children who can obey commands and open their mouths, attempt an odontoid peg view. **[2003, amended 2014]**

## 1.6 Information and support for families and carers

1.6.1 Staff caring for patients with a head injury should introduce themselves to family members or carers and

Internet | Protected Mode: Off
100%
Start
Head injury: assess...
2.11.15 notes [Read-...
Inbox - Adrian.Kwa2...
27 - Paint
01:20
03/11/2015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CT head & C-spine (with patient on scoop)
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Ask **me!**

# NUH Guidelines app team

- **Project Lead and App Design**
  - Dr Adrian Kwa
- **App Development Team**
  - Duane Page
  - Mark Carter
  - Tony Wilson
- **Human Factors Adviser**
  - Dr Michael Brown
- **Business Support**
  - East Midlands Academic Health Science Network
- **Special Thanks to**
  - All staff at NUH
  - Prof Bryn Baxendale
  - Giulia Miles
  - Nottingham Hospitals Charity

Nottingham University Hospitals NHS
NHS Trust

Nottingham University Hospitals NHS
NHS Trust

TRENT SIMULATION & CLINICAL SKILLS CENTRE at QMC

NUH Guidelines


# Dr Adrian Kwa

**www.nuh.nhs.uk/nuh-guidelines-app**

**@NUHApp**

**adrian.kwa2@nuh.nhs.uk**

**07841-629645**


Guidelines **at your fingertips**

*We are here for you*