Ambulance Transport Safety Summit
Bridging the gap between what we do and what is known
EMS Subcommittee of the TRB Ambulance Transport Safety Summit
October 29th, 2009

Goal of the Summit
“Enhancing ambulance transport safety through shared knowledge of technical data”

Usability – Human Factors
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Outline
Presentation overview
• Framework to consider human factors.
• Defining your population of users.
• Designing for operational paramedic tasks.
• Understanding how paramedics access, use & restow equipment.
• Balancing item accessibility with prevention of strike hazards.
• Design challenges.

Framework – Occupant Protection
Human factors design requirements should be considered in the context of fundamental occupant protection “rules”.

Seating
Forward or rearward facing in the moving ambulance.

Side facing seats not acceptable
….unless ambulance is stationary.

Framework
Restraining objects
Objects to be restrained to
10 G in 6 directions (EN)
20 G forward & 10 G sideways (AS)
**User Population**

Who will use the ambulance

- Female participation rates of up to 30 to 40%.
- Standing height difference between a 5th percentile female & 95th percentile male is approximately 16” / 400 mm.
- seating height differences / seats fixed height
- variable reach capacity
  (implies priority positioning for equipment or seat / equipment mobility)

**User Population**

Implications for design

- User size needs to be accommodated in design
  - for comfort
  - access to the patient & equipment...
  - ...often with static seating features.
- Balancing head, torso, shoulder & arm clearances with reach distances.
- Anthropometry.
- Referencing within the ambulance.

**User Population**

Other users

- What is the height, weight and “size” range of patients that are to be restrained on the stretcher.
**Task Analysis**

Defining what paramedics / EMTs do

- Gain access to equipment
- Prepare it
- Use it to treat the patient
- Discard used elements
- Restow items
- Manipulate, control or operate other items (eg. communications)

**Task Analysis**

Record & analyse this information

- These & other tasks should be described.
- Description will often extend beyond clinical instructions.
- First, simply define the relationship or interaction between the position of the paramedic & equipment.
- Then analyze & assess relative to these defined tasks.
- This should be result in a very long list!
- Relational databases can be helpful, for expanded use.
- Task frequency is relative but not the only determinant of priority for positioning (eg. criticality re clinical needs).

**Layout Implications**

Balancing item accessibility with prevention of strike hazards

- Prioritise the placement of equipment & resources around the critical seating positions.

- Forward facing seat – needs to move forward & sideways for access to the patient, equipment & to improve clearance along compartment wall.

- Rear facing seat – needs to move forward for patient & equipment access. Foot clearance can be limited with this seat.
Summary

• Define what paramedics do to better understand their interaction with the patient & equipment.
• Acknowledge that to do this well you need resources, expertise & collaboration.
• Use this information to define ambulance layout requirements to "try" & balance body clearances with functional & safe reach capabilities (across 5th%ile female to 95%ile + males).

Questions??

• Please raise your hand
• or type in the message box
• or send your questions via this link