Cornell Ergonomic Consultants

Hospital Emergency Room
Ergonomic Evaluations & Recommendations

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Course taught by Professor Alan Hedge
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Introduction

Computers & Seating

Gurneys

Backboards

Work Patterns

Action Items and Conclusion
Introduction

Key Issues

- Computers & Seating
- Gurneys
- Backboards
- Work Patterns

Level of Importance

- ★ Low
- ★★★ Medium
- ★★★★ High
Computers & Seating

Key Issue

- Computers & Seating

- Triage

- Nurse’s Station

- Entrance

To Radiology
Computers & Seating - Triage

Current Issues

• Monitor and keyboard offset in relation to desk
• Trash bin location

• Awkward relationship between patient chair and desk
• Keyboard and mouse too high – causes wrist extension
Computers & Seating - Triage

Recommendations

- Users eyes 2”- 3” below top of monitor casing, facing keyboard and monitor straight on
- Monitor placed approximately arm’s-length
- Tilt-down keyboard and mouse tray
- Computer stand placed 28”-30” above floor to replace desk
- Separate stand for phone and files, could swivel into place
- Position stand 90° from current desk position to face patient
- Use tablet PC or laptop to minimize space
Computers & Seating – Movable Computer

Current Issues

- Monitor distance and keyboard placement create neck flexion
- Need to use while standing
- Wheels difficult to lock and unlock
  - Leads to nurses using one foot to stabilize and the other to stand (see next slide)
- Difficult to adjust height
- Requires 31.5 lbs of force
Computers & Seating – Movable Computer

Recommendations

- With this computer stand:
  - Suggested typing course
  - Permanent placement in examination rooms so that wheels can always be locked

- Other options:
  - Different type of stand with
    - Locking wheels
    - Adjustable height
    - Leg space to allow user to sit down comfortably
  - Carry laptop, tablet PC, PDA around; use with permanent desks/stands
Computers & Seating – Nurse Work Room

Current Issues

- Desk space decreases available space for printer
- Printer under desk does not allow room for chair
- Tray does not fit keyboard
- Positive keyboard tilt leads to compression on wrists
- Neck tilted to right
Recommendations

Create opportunity for nurses to be seated to provide a brief rest:

- Align monitor directly in front of seated employee at an arm’s length away
- Remove wooden structure to allow printer and tower to be moved to the left of the monitor
- Install new negative tilting keyboard and mouse tray, which will help prevent carpal tunnel syndrome
- Provide seating as outlined in following slides by removing printer
Computers & Seating – Seating

Current Issues

- No available arm rests
- Seat pan is too deep, which causes compression behind the knees and does not allow feet to rest evenly on the floor. This then leads to inadequate lumbar support.
- Difficult to adjust – should be able to adjust in seated position
Computers & Seating – Seating

Recommendations

• Chair dimensions will accommodate widest possible range of employees by meeting these criteria:
  - Seat pan width: 18.3” plus 1” for clothing on each side
  - Back rest width: 20.6”
  - Depth of seat pan: 16”
  - Height of chair: 14.5” – 19”

• Chair height should be easily adjustable while user is seated. User should be able to firmly place their feet on the ground and their legs should be parallel with the ground.

• Comfortable cushioning on seat pan and proper lumbar support

• Backrest should recline so the angle between upper and lower body is 110°
Key Issue

- Gurneys

Diagram:

- Triage
- Nurse’s Station
- Entrance
- To Radiology

Cornell Ergonomic Consultants
Gurneys

Current Issues

- Awkward grip to push backrest down
- High force needed to maneuver
  - Approximately 40lbs without a patient
- Awkward balance to lock wheels
  - High force needed approximately 50lbs with a patient
- Dimensions
  - Width: 29”
  - Length: 70.5”
- Patient weight capacity up to approximately 300lbs
- According to REBA calculations risk is high and action is necessary soon
**Gurneys**

**Recommendations**

- Maneuverability
  - Hydraulic Mechanical lift: to raise and lower, also for backrest
  - Better grips
  - Hand mechanism to lock wheels
- Suggested dimensions
  - Width: 37"
  - Length: 70”-80”
  - Patient weight capacity up to 1000 lbs
Key Issue

☐ Backboards

Backboards

To Radiology

Triage

Nurse’s Station

Entrance
Backboards – Pro-Lite Spineboard

Current Issues

Specifications:
• Weight 11.5 lbs: Unlimited single-patient weight capacity
• 72" long
• 16" wide: Tapers from 16" to 14" at foot end
• 2-1/4" thick
• Contour grip offers rescuer comfort on all 16 of the 2" x 5-1/4" holds
• One of the more expensive options
• Specifications are standard

To be Improved:
• Height is 2” longer than adult average
• Width is 2.3” shorter than adult average
• Grip does not offer enough clearance when there is person wider that 16”
Backboards – Pro-Lite Spineboard

Recommendations

• To improve:
  • Off-set grip to allow for maximization of hold on the backboard
  • Should be easily stored and maneuvered – possibly foldable
  • Suggested dimensions to accommodate 99th percentile
    • Men
      • Shoulder width: 20.6”
      • Hip width (hip sit): 16.9”
      • Height: 75.6”
    • Women
      • Shoulder width: 18”
      • Hip width: 16.8”
      • Height: 69.8”
Work Patterns – Emergency Room

Key Issue
△ Work Patterns

Nurse’s Station  △△△
Triage  △
Entrance  △

To Radiology  △
Work Patterns

Current Issues

• Lack of work surfaces at appropriate heights
• High Traffic areas used as storage areas
  • Lack of storage space
• Inefficient space use
Work Patterns

Recommendations

• **Radial layout** - Everything is centrally located

• Minimal movement because of central proximity to patient areas and work areas with visual access to all rooms

• Core area contains: nurses station, charting, lab, clerical, supplies

• Increases efficient of space utilization and traffic flow

• Increased work surfaces at two heights that can accommodate both sitting and standing
Work Patterns

Recommendations

• Anti-fatigue mats
  • Reduce fatigue and discomfort in legs and back
  • Increase blood flow and amount of oxygen reaching the heart
  • Allows for frequent changes and variability of body orientation
  • Polypropylene stain-resistant surface for ease of maintenance
Action Items and Conclusion

Issues Key

- Computers & Seating
- Gurneys
- Backboards
- Work Patterns

To Radiology

Triage

Nurse’s Station

Entrance
## Action Items and Conclusion

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<td>• Rearrange work area</td>
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