

Cornell Ergonomic Consultants

Hospital Emergency Room Ergonomic Evaluations & Recommendations

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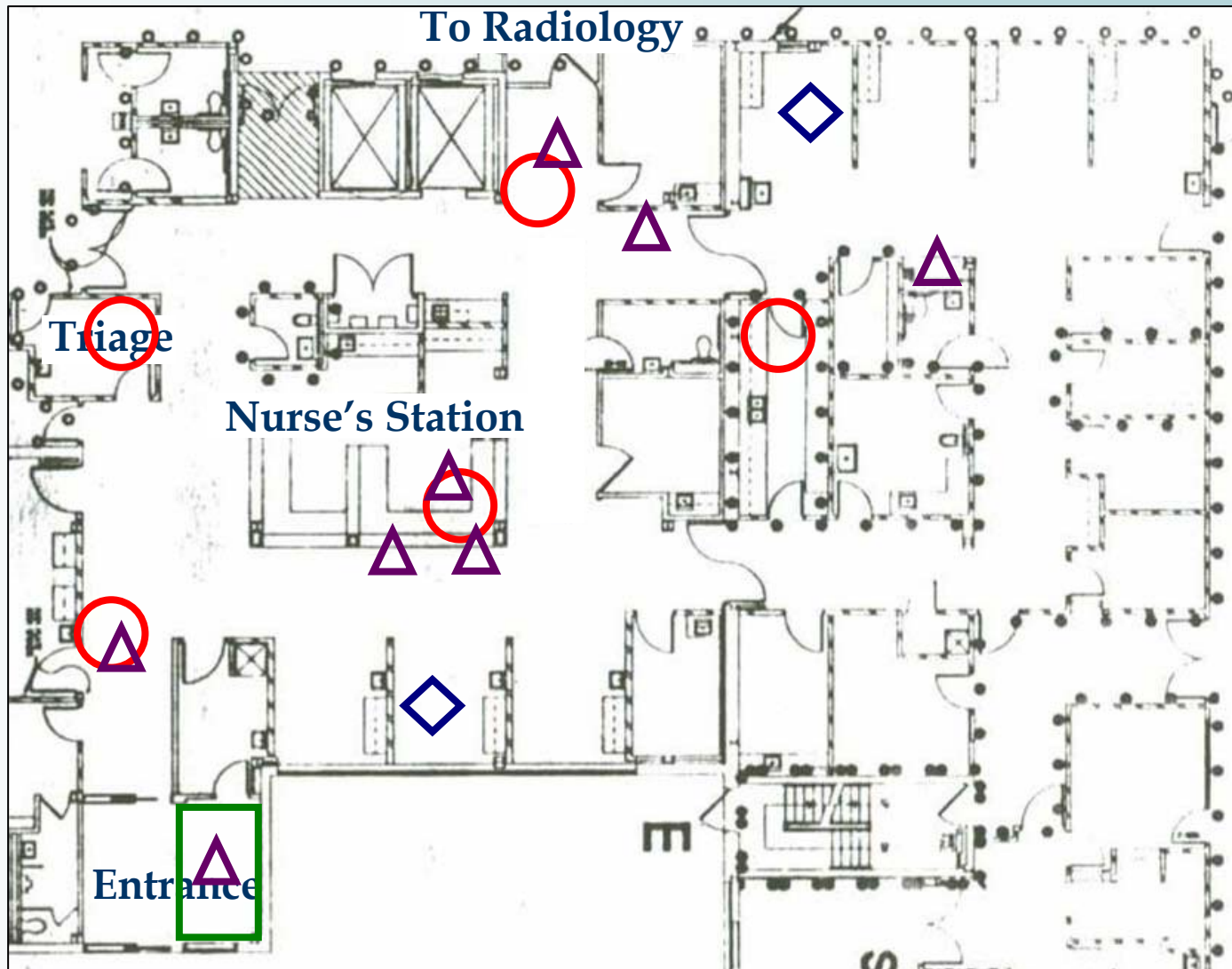
Introduction

Key Issues

- Computers & Seating
- ◇ Gurneys
- Backboards
- △ Work Patterns

Level of Importance

- ★ Low
- ★★ Medium
- ★★★ High

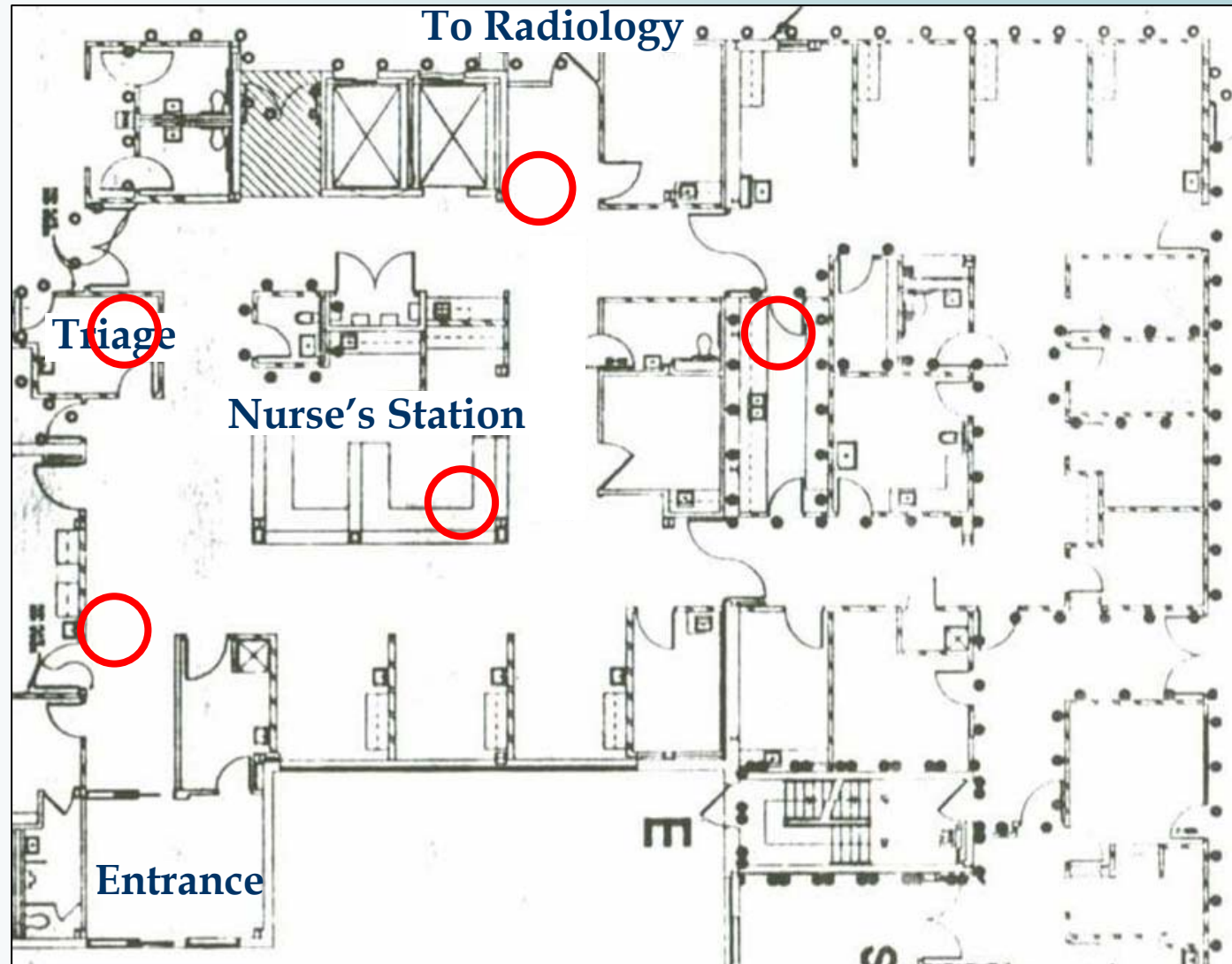




Computers & Seating

Key Issue

○ Computers & Seating

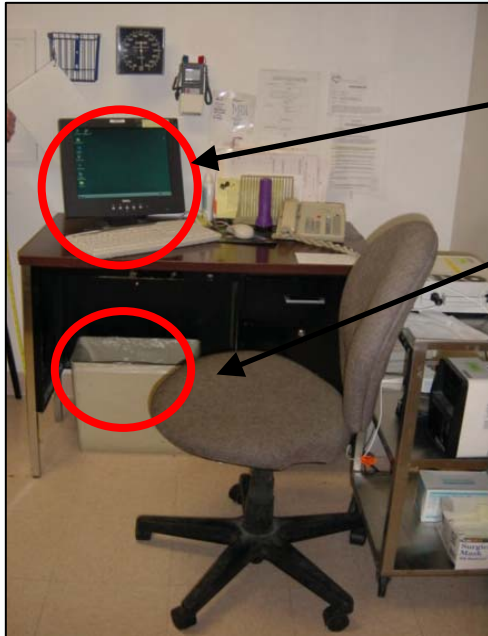




Computers & Seating - Triage

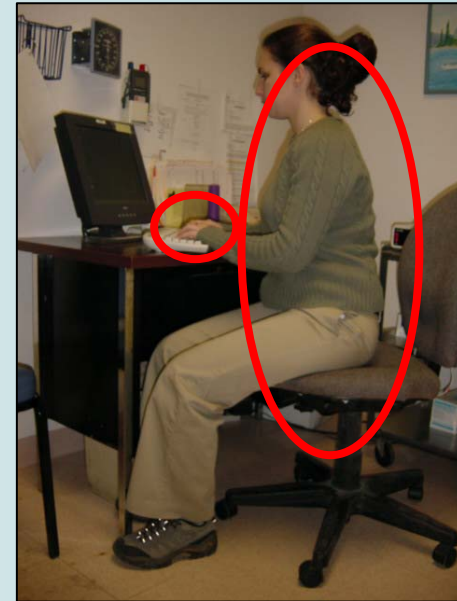


Current Issues



- 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

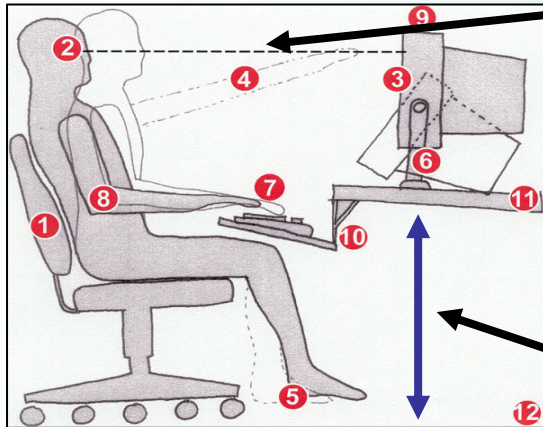




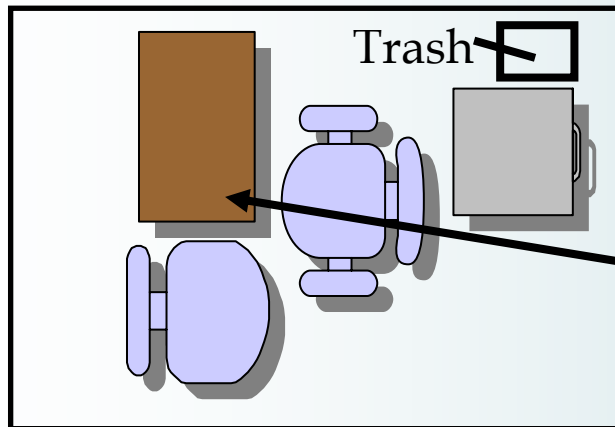
Computers & Seating - Triage



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



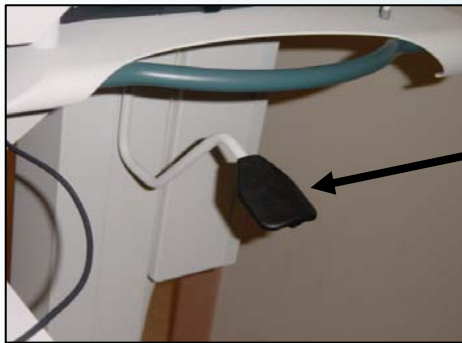
Computers & Seating - Movable Computer



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

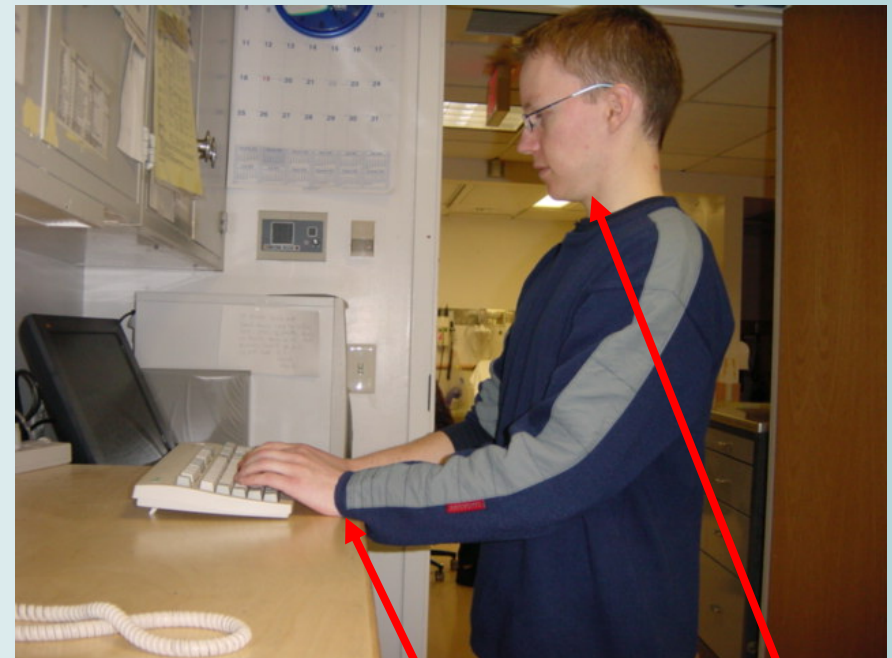




Computers & Seating - Nurse Work Room



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



Computers & Seating - Nurse Work Room



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



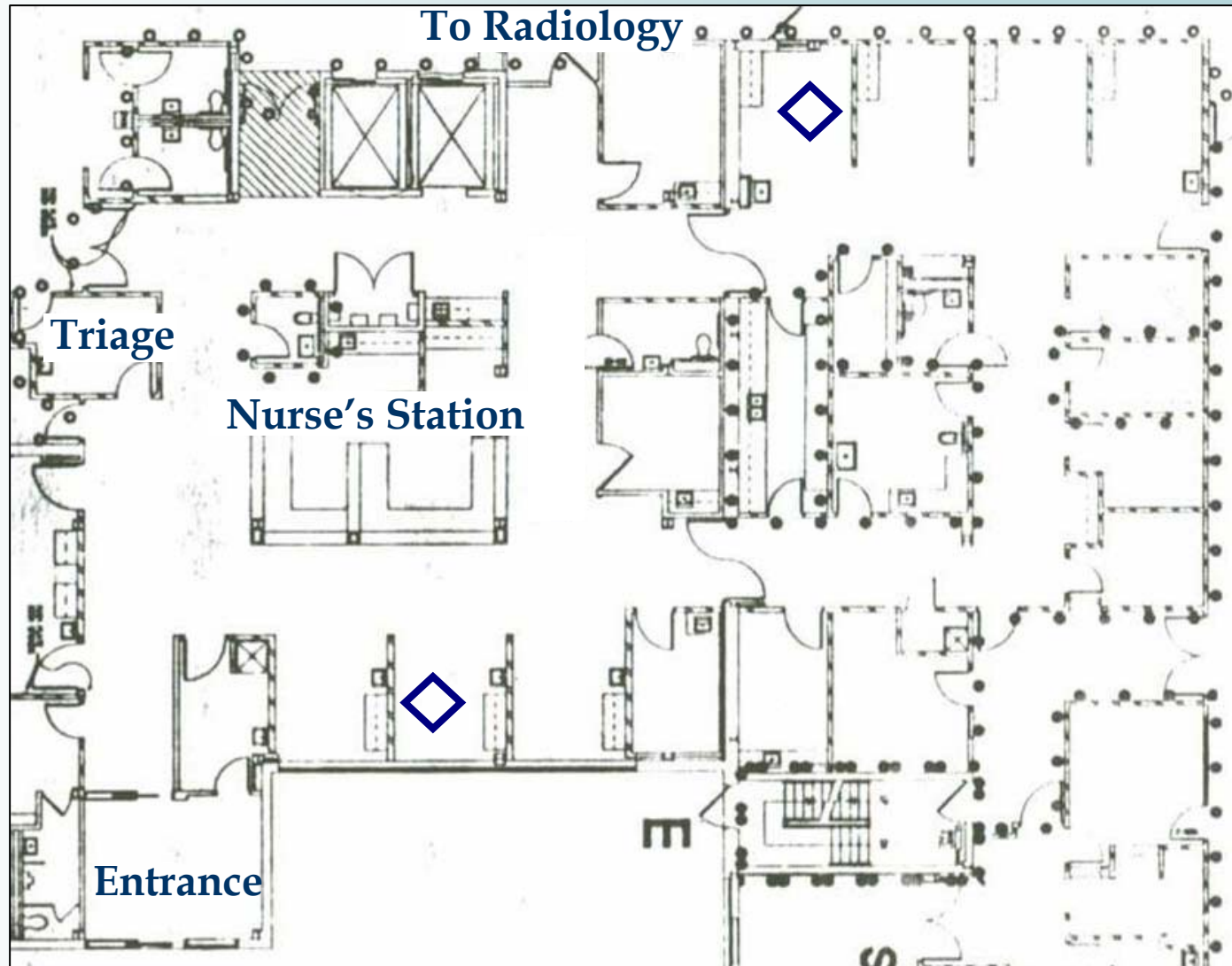
- Chair dimensions will accommodate widest possible range of employees by meeting these criteria:
 - Seat pan width: 18.3" plus 1" for clothing on each side
 - Back rest width: 20.6"
 - Depth of seat pan: 16"
 - Height of chair: 14.5" - 19"
- Chair height should be easily adjustable while user is seated. 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°



Gurneys

Key Issue

◇ Gurneys

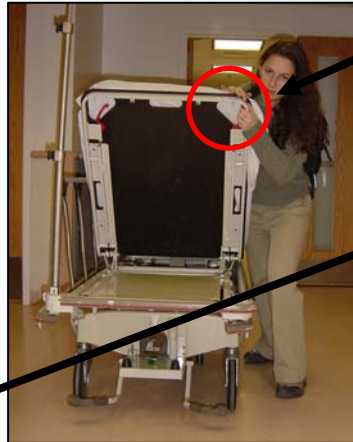




Gurneys



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



Gendron 1190

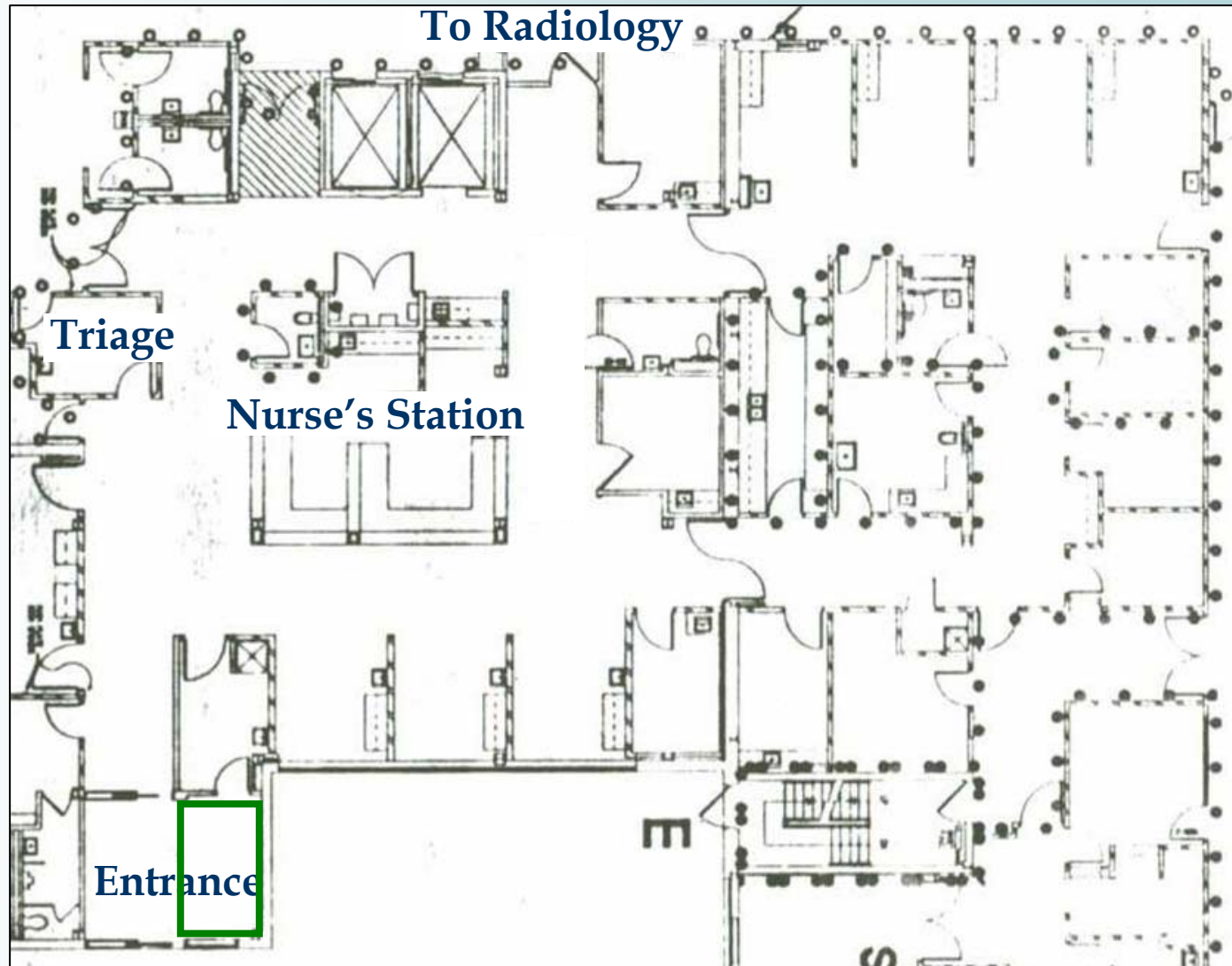
- Maneuverability
 - Hydraulic Mechanical lift: to raise and lower, also for backrest
 - Better grips
 - Hand mechanism to lock wheels
- Suggested dimensions
 - Width: 37"
 - Length: 70"-80"
 - Patient weight capacity up to 1000 lbs



Backboards

Key Issue

 Backboards





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 than 16"



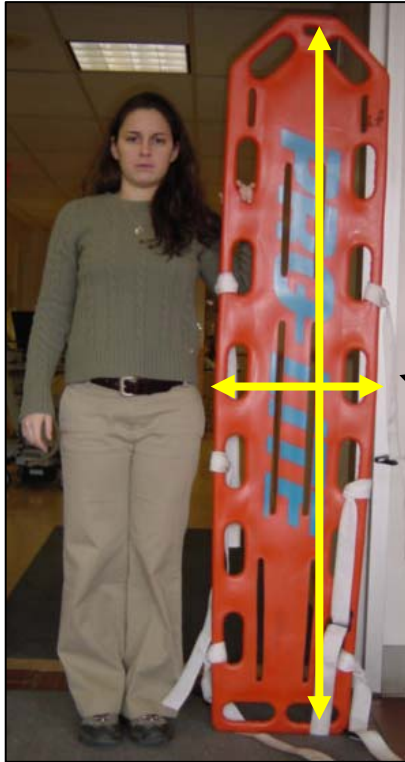


Backboards - Pro-Lite Spineboard

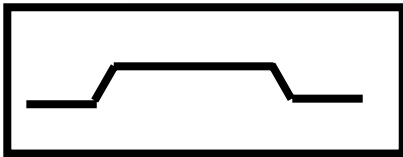


Recommendations

- 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"



Possible Grip Design

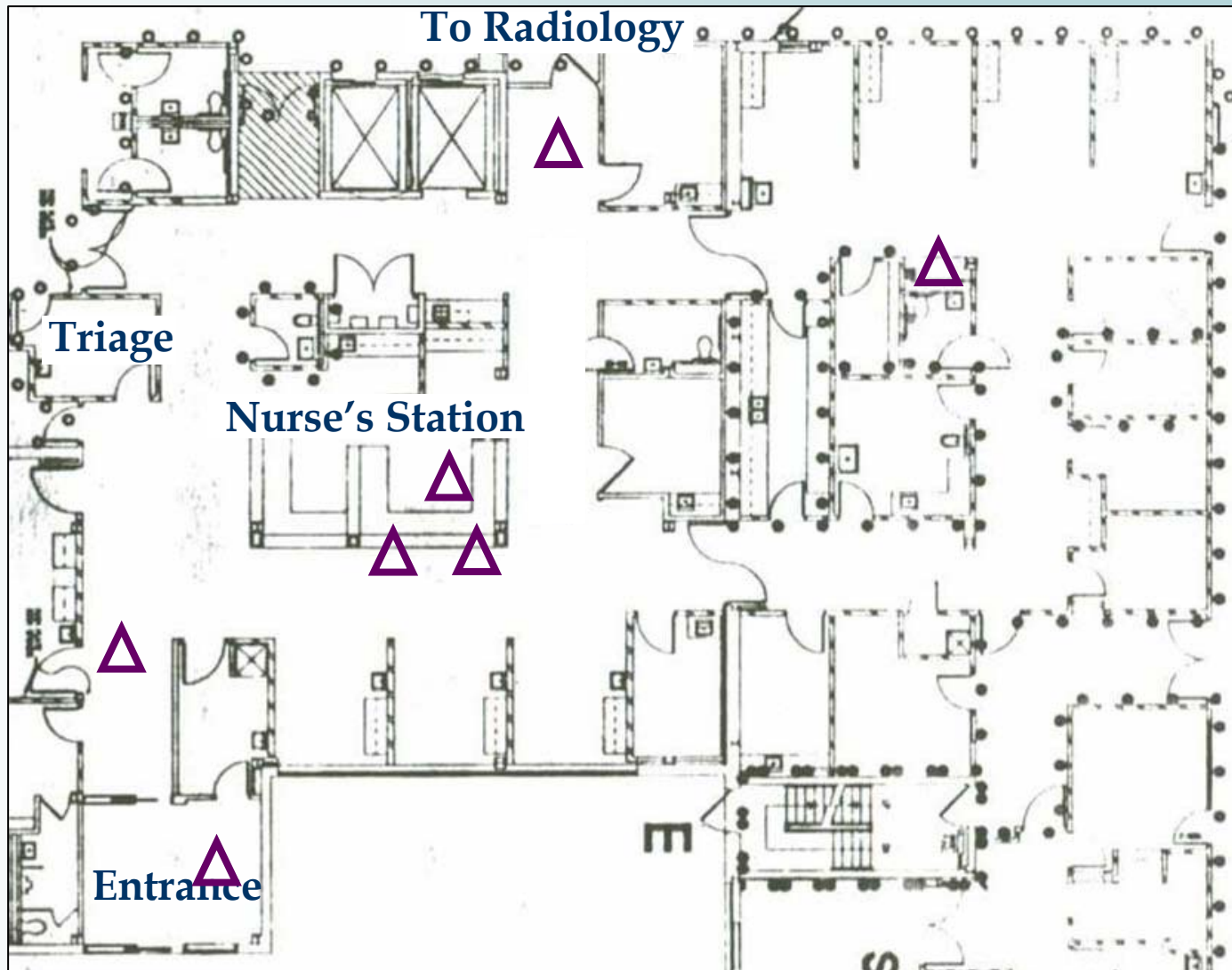




Work Patterns - Emergency Room

Key Issue

△ Work Patterns





Work Patterns

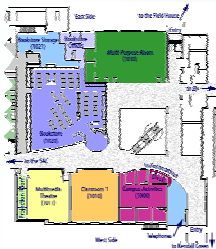


Current Issues



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





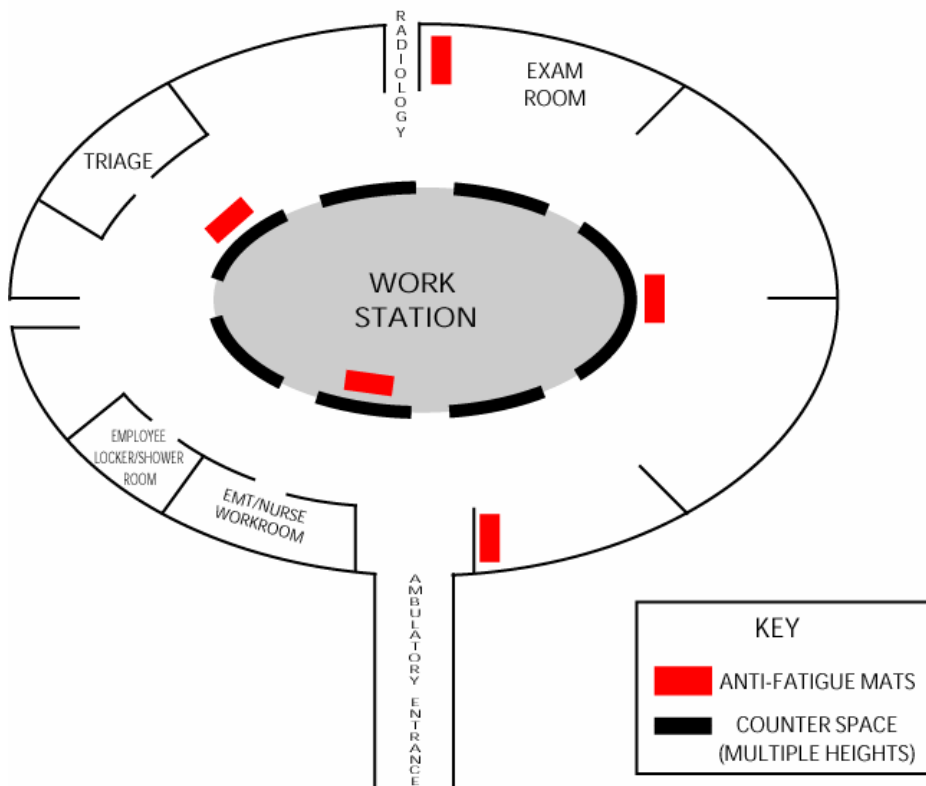
Work Patterns



Recommendations

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

POSSIBLE DESIGN FOR RADIAL LAYOUT



- 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

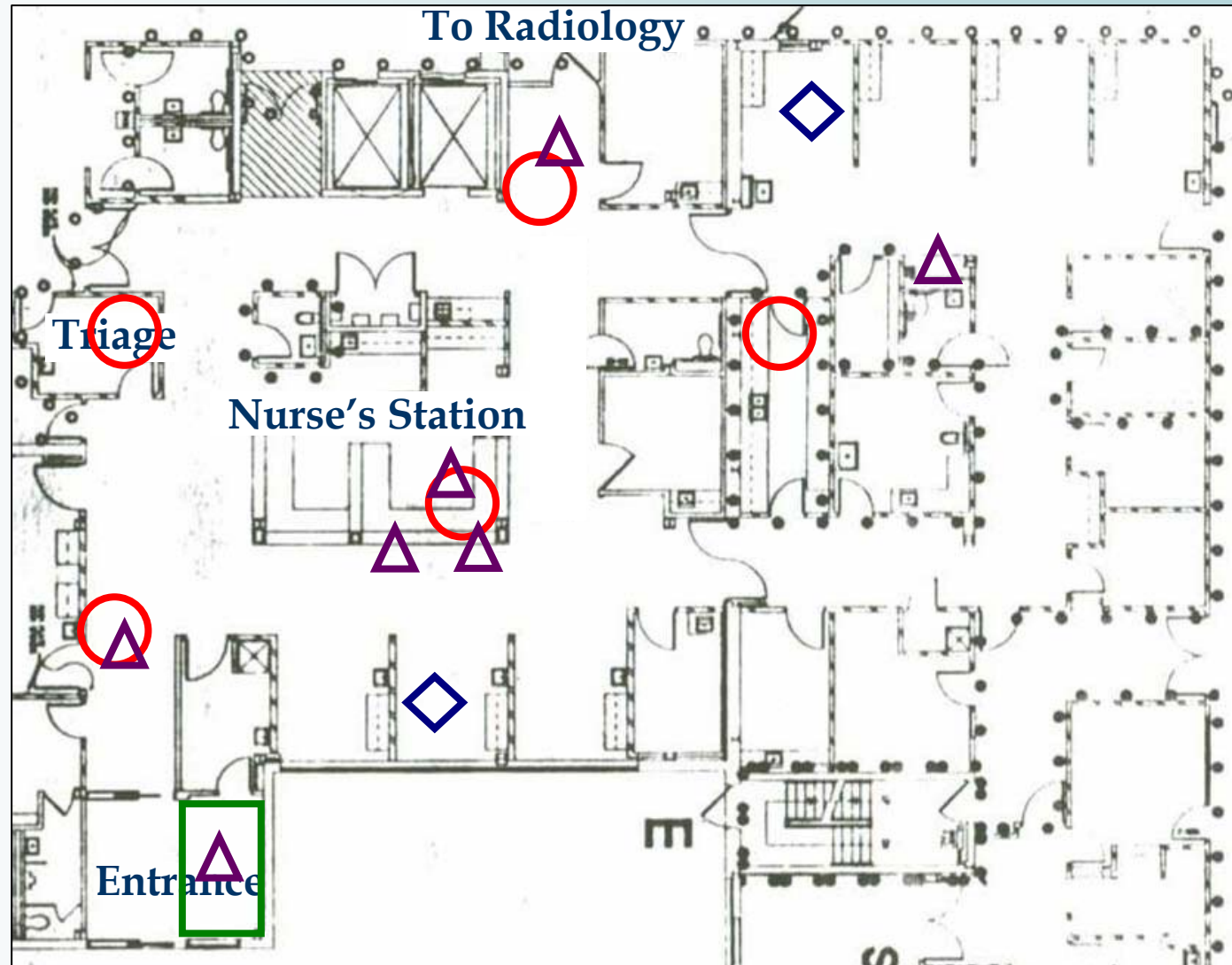




Action Items and Conclusion

Issues Key

- Computers & Seating
- ◇ Gurneys
- Backboards
- △ Work Patterns





Action Items and Conclusion

Issue	Level of Importance	Action
Computers		
Triage	★★	• Rearrange work area
Moveable Computer	★★	• Improve stand usage • Tablet computers
Nurse Work Room	★★	• Rearrange work area
Seating	★★	• Easily adjustable • Proper support
Gurneys	★★★	• Improved maneuverability • Increased dimensions
Backboards	★	• Increase size • Improved grip
Work Patterns	★★★	• Radial Layout • Anti-Fatigue mats