

# *Obesity in the Workplace: Ergonomic Design for a Special Population*

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*Nancy says Hi!*



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# *Disclaimer*

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# Objectives

- Review obesity trends among U.S. adults
- Discuss special considerations in workplace design for obese employees
- Share best practices to meet the needs of this population

# *Body Mass Index (BMI)*

BMI = weight (kg) / height squared (m<sup>2</sup>)

or

BMI = [weight (lb) / height squared (in<sup>2</sup>)] x 703

Overweight

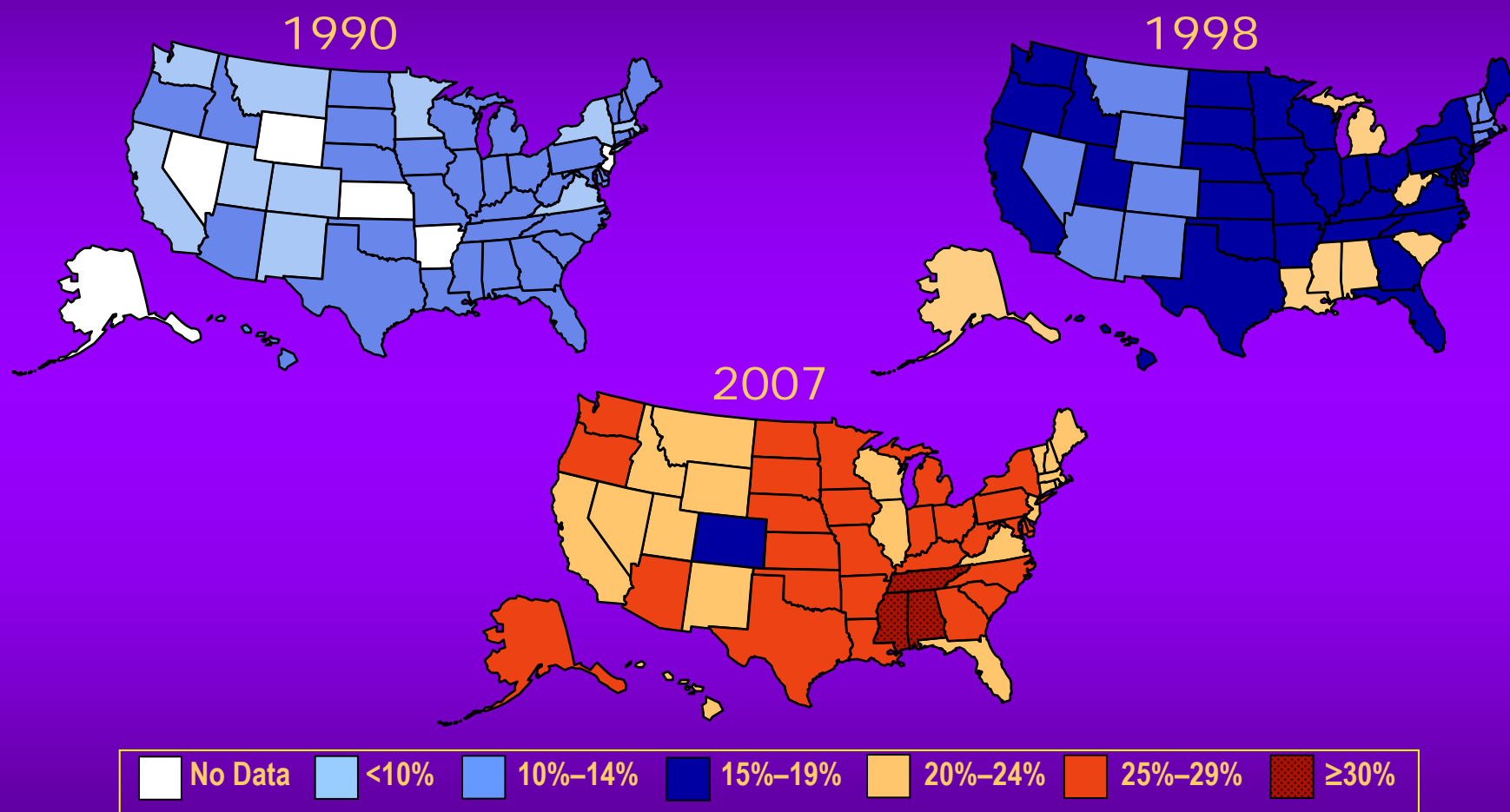
BMI 25.0 – 29.9

Obese

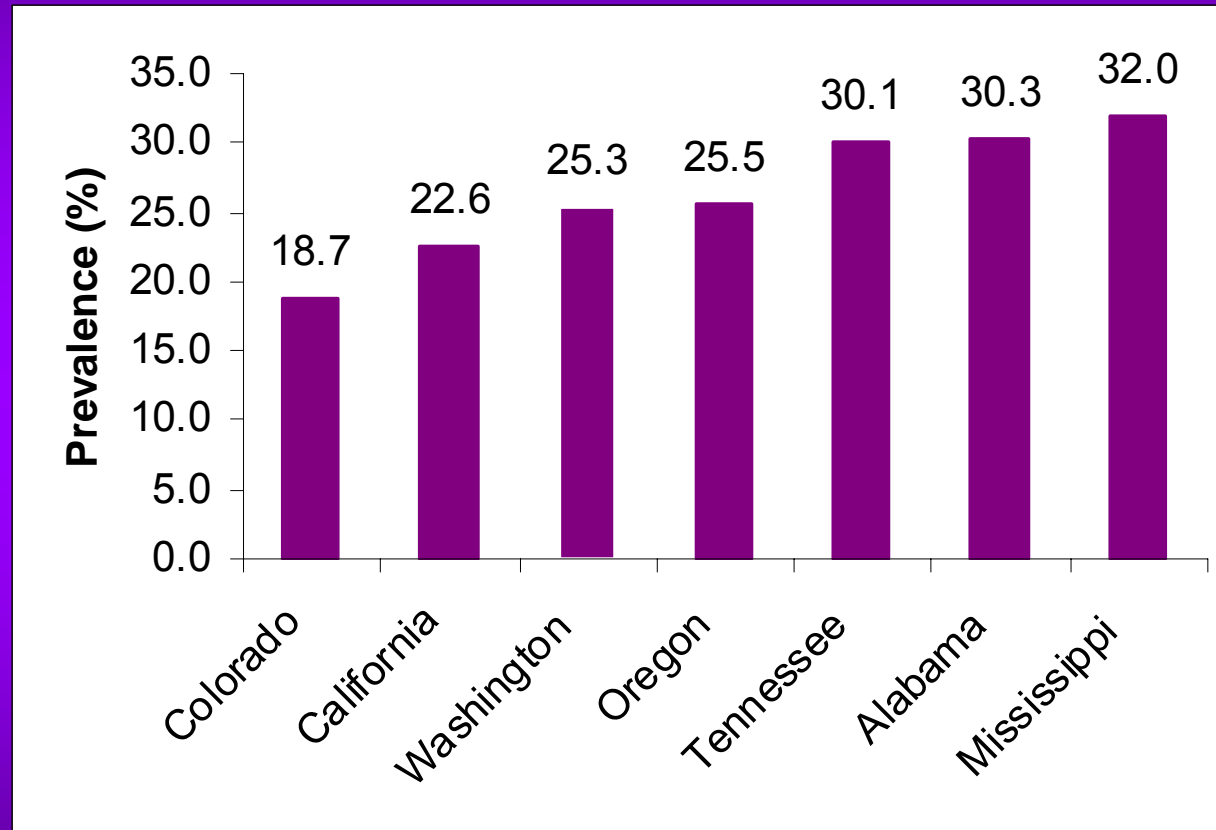
BMI ≥ 30.0

A person 5' 7" (1.70 m) tall weighs 195 lbs (89 kg).  
Is this person obese?

# Obesity Trends Among U.S. Adults



# Obesity Prevalence Examples





# *Why design for the minority?*

- Obesity prevalence of 20-30% among U.S. adults
- Another 30% is overweight
- Are these people working?
- Improving the work environment helps them do the job and stay on the job
- Decreased injuries and illnesses
- Increased productivity



# Obesity in Healthcare Employees



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## **TS Uniforms for healthcare professionals, up to 5X**

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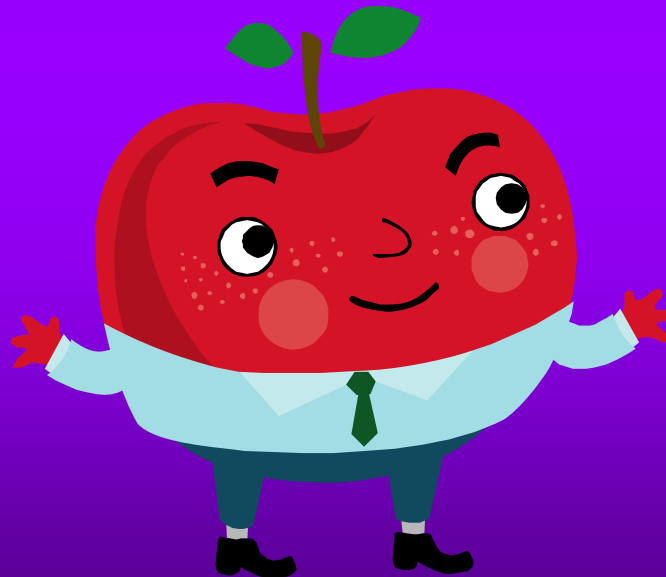
Quality made scrubs in whimsical prints and solids for medical professionals. Lab coats, jackets, caps, and shoes too. Popular brands, Embroidery and logo service; FREE shipping on orders above \$75

*What else matters in design  
other than BMI?*

*Body shape*

# *Apple Body Shape*

- Waist to hip ratio  $\geq 0.8$  for women or 1.0 for men
- Upper body and abdominal obesity
- Visceral fat



# *Pear Body Shape*

- Waist to hip ratio  $< 0.8$  for women or 1.0 for men
- Lower body and gluteal-femoral obesity
- Subcutaneous fat



# *Apple and Pear in a Chair*



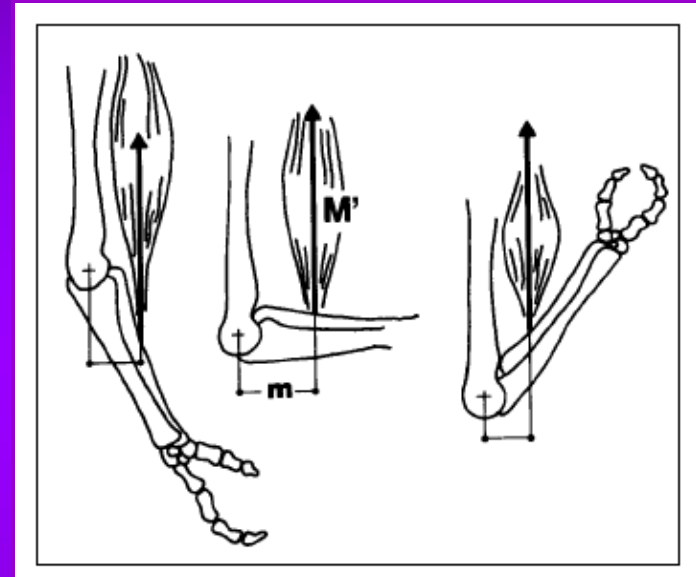
Apple



Pear

# *Anthropometrics and Biomechanics*

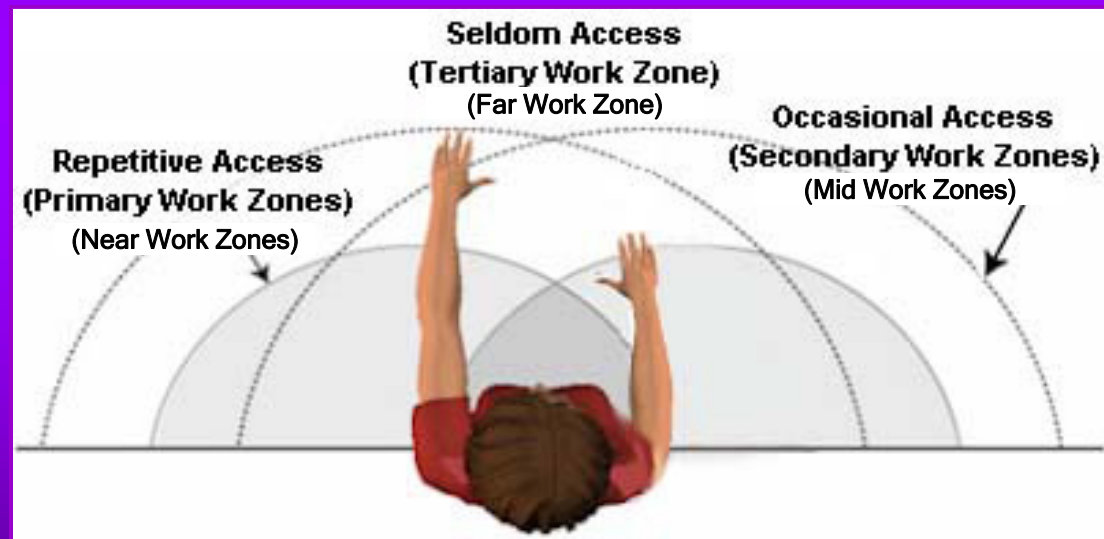
- The larger the body size, the farther the load from the spine
- The heavier the whole body or the limb, the higher the static muscle force needed to maintain stability



Torque  $T = mM$ ,  
where  
 $m$  = Lever arm  
 $M$  = Muscle force

# Anthropometrics and Reach

- The larger the body size, the more often the arm may be extended beyond a comfortable reach in order to access frequently used equipment





# Reaching

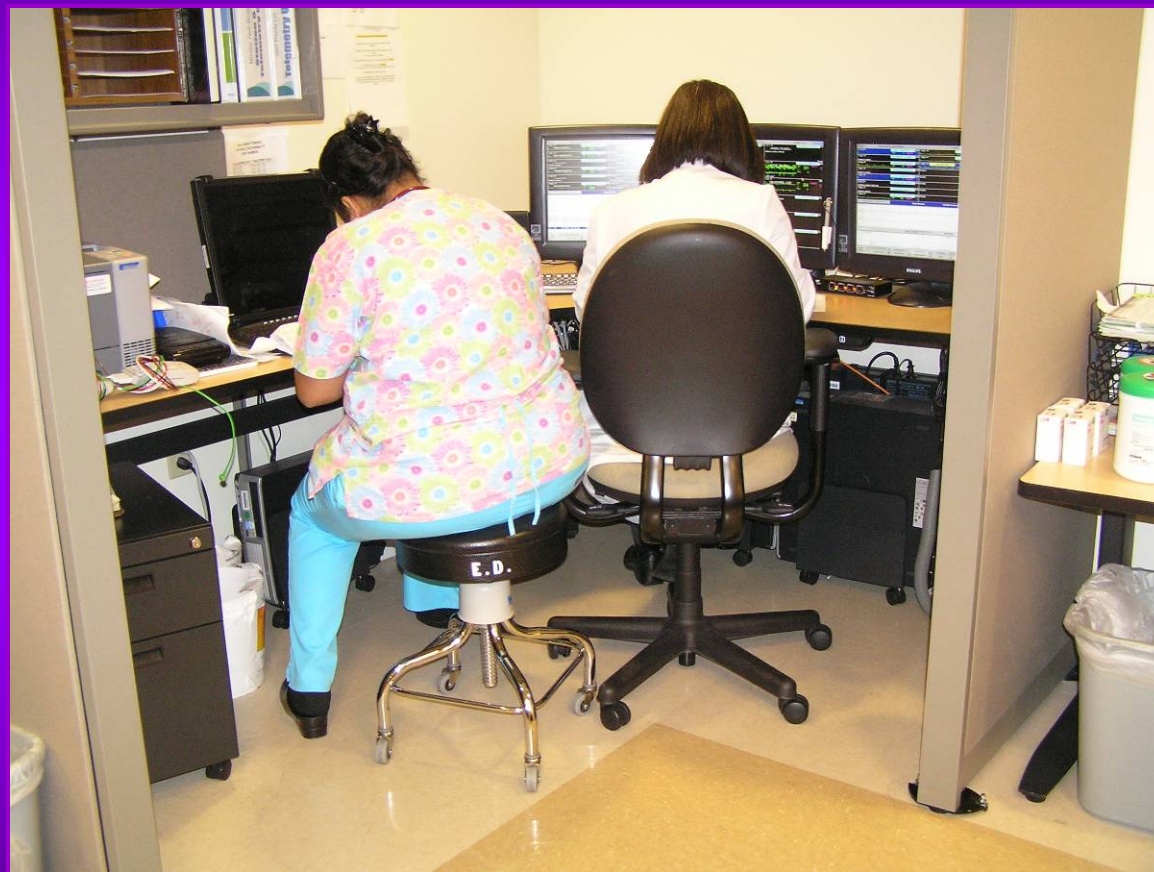


Office



Housekeeping

*What's wrong with this picture?*



# *Chair Size Makes a Difference*



Seat pan width 19¼"



Seat pan width 23"



# *Chair for the Larger Users*



- Criterion® Plus chair seat width 23"
- Tested for users of up to 500 lbs

# *Simple Workstation Adjustments*



- Seat height
- Armrest height
- Keyboard height and tilt

# *Another Chair for Larger Users*



- Employee 6' 4" tall
- Leap<sup>®</sup> chair with seat pan at 20" high





# *Elbow Support*



Unsupported elbow



1/4"-gel pad support

# *What's wrong with this picture?*





# Keyboards

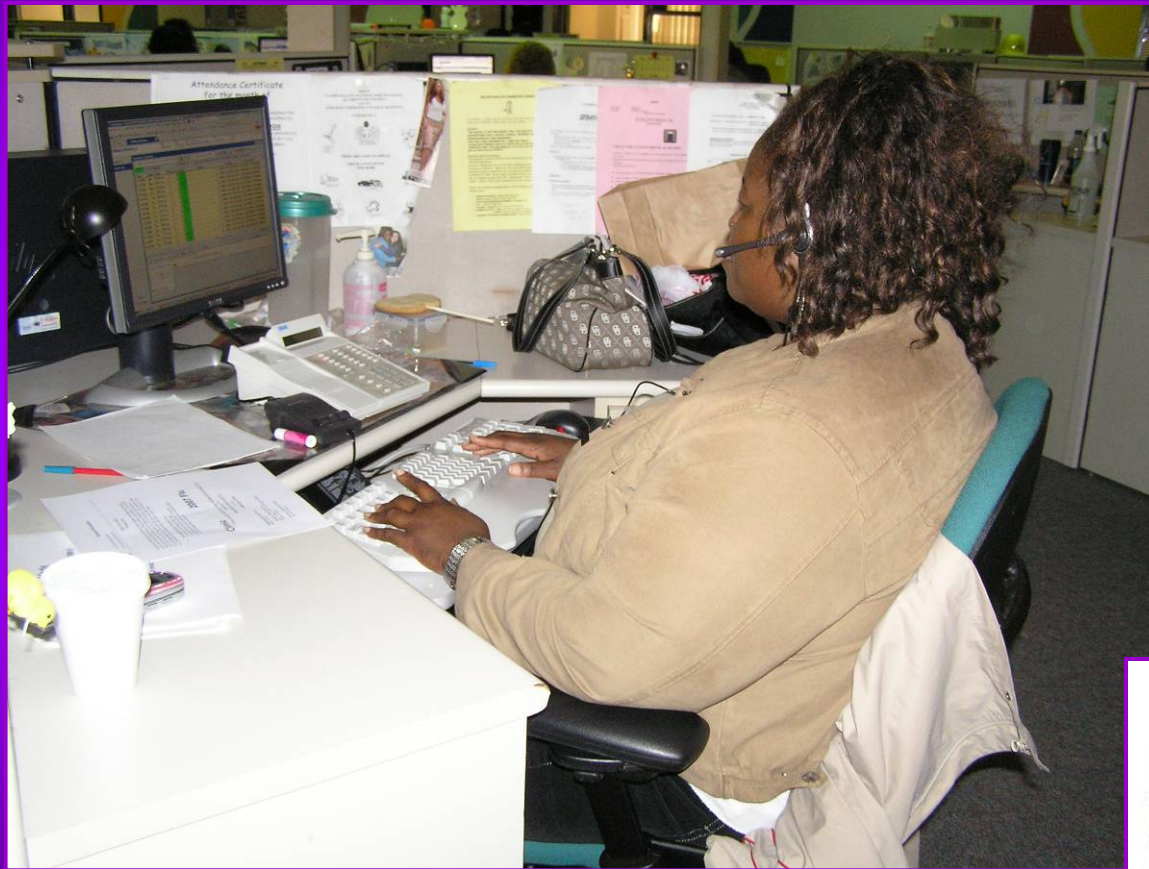


Standard

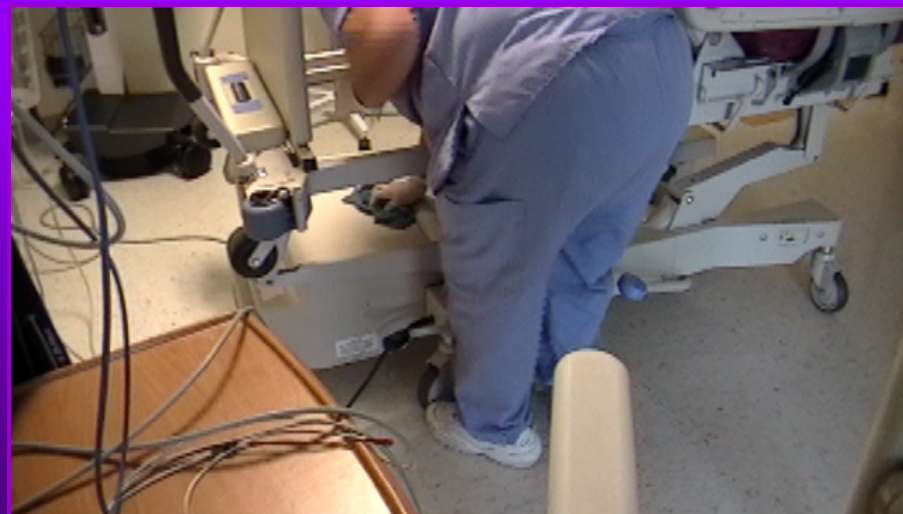


Split

# *Split Keyboard*



# *Bending and Squatting*





# *Telescopic Tools*



# *“Confined” Space*



Access to  
critical equipment



Passage for  
routine tasks

# Space Considerations



More space  
makes the work easier



# *The Standing / Walking Tasks*





# *What is your recommendation?*



Taking blood pressure

- Sitting versus standing
- Lowering sphygmomanometer
- Redesigning desk
- Habit training



# About Task Requirements

From an employee's own experience . . .

- Amount of walking depends on facility design
- Percentage of private rooms affects frequency of trash pickup
- Working in new facility creates positive psychological effect
- More physical exercise at work has good physiological outcome and promotes healthy lifestyle at home



# *Food for Thought*

What would you do if the “ideal” furniture or equipment for the obese employee is not available in the market or not approved for purchase at your facility due to bureaucracy or budget constraints?

- Be resourceful and creative
- Do not yield to the bureaucracy
- If the situation becomes a safety issue, raise it to a higher level of management



# Conclusion

- Obese employees are becoming more and more common in the workplace
- Workplace design for this population should pay special attention to:
  - Body weight, size, and shape
  - Selection of furniture, equipment, and tools
  - Task assignments
- Best practices apply the principles of ergonomics and universal design

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