Is the world shrinking or are we getting bigger?

Melanie Alexandre, MS, CPE, L/OTR
Attendees will:

- Obtain an understanding of the scope, severity, and impacts of obesity on today’s and tomorrow’s workforce
- Examine how ergonomics can play an active role in optimizing productivity and comfort for obese workers
- Explore how ergonomists can facilitate improvements for obese children and young adults
Percent of Obese (BMI ≥ 30) in U.S. Adults

http://www.cdc.gov/nccdphp/dnpa/obesity/trend/index.htm
### OBESITY:
The percentage of the population older than 15 with a body-mass index greater than 30.

<table>
<thead>
<tr>
<th>Country</th>
<th>Obese Percentage</th>
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<tbody>
<tr>
<td>USA</td>
<td>31%</td>
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<tr>
<td>Mexico</td>
<td>24%</td>
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<tr>
<td>UK</td>
<td>23%</td>
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<tr>
<td>Slovak Republic</td>
<td>22%</td>
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<td>Greece</td>
<td>22%</td>
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<tr>
<td>Australia</td>
<td>22%</td>
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<td>New Zealand</td>
<td>21%</td>
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<td>Hungary</td>
<td>19%</td>
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<tr>
<td>Czech Republic</td>
<td>15%</td>
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<tr>
<td>Canada</td>
<td>14%</td>
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<td>Spain</td>
<td>13%</td>
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<tr>
<td>Ireland</td>
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<td>Germany</td>
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<td>Portugal</td>
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<td>Finland</td>
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<td>Turkey</td>
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<td>Belgium</td>
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<td>Poland</td>
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<td>Netherlands</td>
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<td>Sweden</td>
<td>10%</td>
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<tr>
<td>Denmark</td>
<td>10%</td>
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<tr>
<td>France</td>
<td>9%</td>
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<tr>
<td>Austria</td>
<td>9%</td>
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<tr>
<td>Italy</td>
<td>9%</td>
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<tr>
<td>Norway</td>
<td>8%</td>
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<tr>
<td>Japan</td>
<td>3%</td>
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<tr>
<td>Korea</td>
<td>3%</td>
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[http://www.wellingtongrey.net/](http://www.wellingtongrey.net/)
In 2005 California obesity costs $21 billion annually and employers pay for $16 billion of that expense in terms of health insurance, workers compensation claims and lost productivity.

**Strategies for Action!**

1. **State Level Leadership and Coordination**
   - Create a central point of contact within state government to serve as lead and liaison in working across and within different sectors such as education, entertainment, employers, health care, and to create active living and healthy eating environments.

2. **Statewide Public Education Campaign**
   - Develop and implement a statewide media campaign that frames healthy eating and active living as California living.

3. **Local Assistance Grants and Multi-sectoral Policy Strategies to Create Healthy Eating and Active Living Community Environments**
   - Support local assistance grants and implement multi-sectoral policy strategies outlined below to improve access to, promotion of, and participation in healthy eating and active living, by creating change in the social and physical environments.

**STATE & LOCAL GOVERNMENT**

- Make prevention a top priority in state and local health programs.
- Encourage full and equitable access to public facilities, community centers, schools, government buildings that could house programs and services that increase the amount of physical activity for each community member.
- Develop and disseminate state model policies that promote access to facilities for healthy eating and physical activity.
- Ensure local assistance programs provide healthy foods.

**INCENTIVES AND FUNDING**

- Consider incentives for businesses to offer physical activity, healthy food options, and taxation accommodations for employees.
- Consider incentives for the development of physical activity facilities, improved availability of grocery stores, farmers markets, and other retail outlets for healthy foods, particularly in disadvantaged communities.
- Identify existing funding sources for maintenance, rehabilitation, and development programs, including community gardens and neighborhood parks, and recreation facilities in all neighborhoods.

**PLANNING, LAND USE, AND TRANSPORTATION**

- Adopt and implement walkable community plans and local transportation plans to provide safe and convenient travel options for walking, bicycling, or using accessible vehicles, such as wheeled slots.
- Use planning and zoning processes to promote appropriate design and land use that support access to healthy foods and encourage walking and cycling in all communities.
- Ensure that community facilities, supermarkets, and transit routes are close to where people live and work, as well as accessible from public transit routes.

- Consider requiring that new city-county general plans contain a recreation element that includes access to, and availability of, facilities and parks land.

**ALL EMPLOYERS**

- Develop guidelines for offering healthy food at meetings and events and encourage their use.
- Provide incentives to employers who adopt, like, or use public transportation to commute to and from work and for workplace-level programs.
- Encourage physical activity by promoting activity breaks, providing bike racks, lockers and showers, and extending lunch time or breaks for physical activity.
- Encourage workers to offer an array of alternative, healthy choices in their prepared and vending machine meals.
- Maximize the use of local and regional foods in food service operations.
- Invest and maintain organizational policies that support benchmarks for health and wellness programs.
- Ensure health plans that include prevention and wellness activities such as counseling, education, and access to weight loss, weight maintenance, and physical activity programs.

**HEALTH CARE INSURERS AND PROVIDERS**

- Promote policies as the first step in responding to the obesity epidemic, rather than barriers to physical activity, health care, and pharmaceuticals that undermine the health, productivity and quality of life for all California citizens.
- Adopt and implement evidence-based policies that create healthy eating and physical activity environments that are readily available to all California citizens.

- Support worksite health promotion programs that promote healthy eating and activity, specifically for employees.
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**FOOD AND BEVERAGE INDUSTRY**

- Advertise and promote healthy foods and beverages in schools and work sites using brochures, print and electronic media, product specials, such as healthy recipes, healthy snacks, and healthy foods.
- Advertise and promote healthy foods and beverages on school grounds and at worksites in healthy food environments.
- Support worksite health promotion programs that promote healthy eating and activity, specifically for employees.

**SCHOOLS**

- Ensure that children receive quality physical education that meets minimum state standards for duration and frequency.
- Support physical activity and physical education programs that promote healthy eating and physical activity environments.
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**ENTERTAINMENT AND PROFESSIONAL SPORTS**

- Encourage the availability of affordable healthy foods and beverages at sports, movie, and other entertainment venues.
- Support physical activity and physical education programs that promote healthy eating and physical activity environments.
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**FOOD MANUFACTURERS AND RETAILERS**

- Advertise and promote healthy foods and beverages to children and youth using brochures, print and electronic media, product specials, such as healthy recipes, healthy snacks, and healthy foods.
- Advertise and promote healthy foods and beverages on school grounds and at worksites in healthy food environments.
- Support worksite health promotion programs that promote healthy eating and activity, specifically for employees.

**FOOD PROCESSORS AND RESTAURANTS**

- Ensure that all food processors and retail outlets provide a variety of healthy foods and beverages, including healthy snacks, meals, and beverages.
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**RETAIL SOURCES**

- Promote healthy foods and beverages to children and youth using brochures, print and electronic media, product specials, such as healthy recipes, healthy snacks, and healthy foods.
- Advertise and promote healthy foods and beverages on school grounds and at worksites in healthy food environments.
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**4. Statewide Tracking and Evaluation System**

Create and implement a statewide tracking and evaluation system to monitor health impacts, population trends, and assess program performance and impact.
Possible contributing factors

Industrialization/assembly work

Transportation

Technology

Passive leisure pursuits
Taking “no wasted motion” a bit too far

A low tech bluetooth alternative
PROTESTING AGAINST NEW TECHNOLOGY - THE EARLY DAYS
Lessons learned while researching for this presentation

• Lots of literature (and controversy) about what is obesity, what is causing it, and what we should do about it
  – Health care industry has many resources aimed at accommodating the larger population
    • May be motivated by patient safety and risks to nursing staff
  – Is obesity covered under the Americans with Disabilities Act?
    • Should healthcare facilities be required to obese patients?

• This is a hard subject to talk about with individuals/groups
  – No one wants to be a part of the ‘obese club’
  – Choose gentler words… larger population, larger than average
Challenges for ‘larger than average’ population

- Chairs
  - Weight capacity
  - Comfort
- Toilet seats/ stalls
- Booths in restaurants
- Personal Protection Equipment (PPE)
  - Aprons
  - Body armor
  - Respirators
- Airplane seats
- Work stations
  - Ability to get close
  - Chair comfort
Challenges for ‘larger than average’ population

- Lifting/carrying
  - Difficulty getting load close to body during manual material handling

- Clothing

- Cars seats and seat belts
  - Larger population more likely to die in a crash

- Turnstiles

- Hospitals
  - Larger beds, commodes, and wheelchairs

- Public seating
  - Movie theatre seats
    - Seats that turn into two seats
  - Amusement park seats
  - Stadium seats
How obesity can effect work life

• 79% thought their weight affected their employment
  – 58% negative effect
• 50% had taken time off for health problems which they attributed to their weight
• 30% had difficulty wearing PPE
• 25% had difficulty wearing uniforms
• 21% had problems attending training courses
• 17%
  – Had difficulty with transportation/getting to work
  – Were unemployed/ on social security benefits
  – Had difficulty getting around at work
• 13%
  – Thought their weight affected their promotion prospects
  – Had difficulty arranging their desk/computer set up
  – Attending emergency drills
Certain jobs may have higher instances of obesity

Call centers/ dispatch

Catering/ Food Service

Shift workers
Call center study results

% of Population Experiencing Discomfort

% of Population Experiencing Elbow Discomfort

% of Population Experiencing Hand / Wrist Discomfort

http://www.atlasergo.com/whitePapers/CallCenterObesity020907.pdf
Obesity and Ergonomics Research

• Obesity can effect:
  – Elbow, hand and wrist postures
    • Higher reports of discomfort
  – Increased pressure on low back discs
  – Knee injuries
  – Truck forward flexion
    • Restricted in both sitting and standing
• Hip/thigh circumferences and chest/waist circumferences had the largest correlation coefficients with BMI
  – This info may be helpful for determining anthropometric data to use in designs
• Other studies include:
  – Abdominal fat on performance in back belt users
  – Effect of BMI on vertical vibration absorption of seating
  – BMI as a risk factor for carpal tunnel syndrome in car assembly workers
  – Obesity as a variable in an injury profile for sonographers
  – BMI impact on preferred height of lumbar supports
Example of how we have already adapted

• Clothing
  – Yesterday’s size 12 is now a size 8
  – Larger sized children's clothing
  – 1980’s Levi Strauss and Gap changed sizes without changing numbers
    • Regular, easy, loose and baggy fit
Do standards/guidelines apply to the larger than average population?

• ANSI/BIFMA standards X5.1-2002-for office chairs
  – Beginning process for heavy duty office chairs

• Anthropometry
  – 95% male

• Maximum Acceptable Weight Limit (MAWL)
    • Found the existing MAWL data accommodates general and obese workers
What about the children?

- 17% of children in England under 10 are obese
- 16%/ over 9 million of children (ages 6-19) in U.S.A are overweight

- British government recommendations for children
  - 1 hour of physical activity/day
  - Set a goal 85% of 5-16 year olds spending two hours per week physical education/sports
Obesity and Children/Adolescents

Prevalence of Obesity* Among U.S. Children and Adolescents
(Aged 2 – 19 Years)
National Health and Nutrition Examination Surveys

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<tbody>
<tr>
<td>Aged 2-5 years</td>
<td>17.0%</td>
<td>11.3%</td>
<td>5.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Aged 6-11 years</td>
<td>17.6%</td>
<td>10.5%</td>
<td>6.5%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Aged 12-19 years</td>
<td>12.4%</td>
<td>7.2%</td>
<td>6.0%</td>
<td>6.1%</td>
</tr>
</tbody>
</table>

*Sex- and age-specific BMI ≥ 95th percentile based on the CDC growth charts.

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<thead>
<tr>
<th>Weight Status Category</th>
<th>Percentile Range</th>
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</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>Less than the 5th percentile</td>
</tr>
<tr>
<td>Healthy weight</td>
<td>5th percentile to less than the 85th percentile</td>
</tr>
<tr>
<td>Overweight</td>
<td>85th to less than the 95th percentile</td>
</tr>
<tr>
<td>Obese</td>
<td>Equal to or greater than the 95th percentile</td>
</tr>
</tbody>
</table>

http://www.cdc.gov/nccdphp/dnpa/obesity/childhood/prevalence.htm
Obesity and Children/Adolescents

Trends in Child and Adolescent Overweight

Note: Overweight is defined as BMI >= gender- and weight-specific 95th percentile from the 2000 CDC Growth Charts.
Source: National Health Examination Surveys I (ages 8-11) and III (ages 12-17), National Health and Nutrition Examination Surveys I, II, III and 1999-2002, NIH/NCI/NCHS, CDC.
Research shows...

- Generation of couch potato kids
  - 4 ½ hrs/day
    - TV/videos
    - Internet
    - Computer games
- Computer games > 1hr/day
  - Increases mental stress
Research shows...

- Daily computer use and discomfort
  - Neck pain
  - Upper extremity pain
  - Increased with
    - Being overweight
    - Use of glasses

www.kid-computers.com
In 2004 the House of Commons Select Committee determined “obesity would supersede tobacco as the greatest cost of premature death”

Obesity is rapidly overtaking smoking as the leading cause of preventable deaths according to Centers of Disease Control and Prevention

– http://news.bbc.co.uk/2/hi/health/7791820.stm
No, not our pets!!!!

25% of U.S cats and dogs are obese
What can and should ergonomists do?
What can we do?

- Help determine when accommodations for the larger population should be integrated into one design or kept separate
  - Do not forget this population!
- Partner with companies to promote more physical activity at the workplace
- Justify ergonomic solutions to meet the needs for employees’ comfort
What can we do?

• Evaluate business decisions in terms of workplace and product design

• Flexible designs
  – How do we get workers to take advantage of built in flexibility?

• Design work for workers with back discomfort
What can we do?

• Provide resources for products with appropriate weight capacities

• Space planning for maneuverability and access

• Justify added costs in terms of safety and productivity

http://cost-estimating.net/
What can we do?

• Health care industry is leading the way in accommodating all employees
  – Have products, equipment policies, procedures for safe handling and care of obese patients
  – Use current statistics to reflect ratio of obese patients (waiting room chairs, beds, ID bands, gowns, oxygen masks, blood pressure cuffs, bed pans, slippers, and surgical equipment

• Multi-purpose equipment
  – Hospital beds with telescoping rails
  – Stretcher to wheelchair
  – Eliminate the need to lift/transport
What can we do?

• Share your ergo knowledge with schools, students, and parents

• Utilize year circle of influence to have decision making include considerations of diverse sizes of students
Specific health care examples

- Patient handling assessment criteria and decision algorithms
- Back injury training program
  - Varied results
- No lift policies
- Patient lift teams
  - Similar height and strength
- Walking belt and mechanical hoist combo yielded 50% reduction in injuries

- Friction reducing devices
- State legislation efforts for safe patient handling
Medical Resources

Invacare Reliant Plus

Amsco Table
Extensions by STERIS

AmpleWear Gown
from Graham

Heavy Duty folding walker by Guardian

Website resources
http://www.medicalproductsdirect.com/barprod.html
http://www.alcosales.com/
http://www.newcaretherapies.com/
Chair resources

Soma
Up to 500#

Bodybilt

Neutral Posture
Up to 500 & 750 #
Office Resources

http://www.morencyrest.com

http://www.goldtouch.com/

http://www.kinesis-ergo.com/freestyle.htm
Other Resources

- www.amplestuff.com
- www.livingx1.com
Standards/Guideline Resources

• Anthropometry
References

References

- Michael, R (June 12, 2002). User anthropometry not always considered in crash safety testing. Ergonomics Today. www.ergoweb.com
- Straker, L. (2001) Are children at more risk of developing musculoskeletal disorders from working with computers or with papers?