Title
Is the world shrinking or are we getting bigger?

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Is the world shrinking or are we getting bigger?

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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

![Maps showing the percent of obese individuals in the U.S. in 1994 and 2007.](http://www.cdc.gov/nccdphp/dnpa/obesity/trend/index.htm)

<table>
<thead>
<tr>
<th>Height</th>
<th>Weight Range</th>
<th>BMI</th>
<th>Considered</th>
</tr>
</thead>
<tbody>
<tr>
<td>5' 9&quot;</td>
<td>124 lbs or less</td>
<td>Below 18.5</td>
<td>Underweight</td>
</tr>
<tr>
<td></td>
<td>125 lbs to 168 lbs</td>
<td>18.5 to 24.9</td>
<td>Healthy weight</td>
</tr>
<tr>
<td></td>
<td>169 lbs to 202 lbs</td>
<td>25.0 to 29.9</td>
<td>Overweight</td>
</tr>
<tr>
<td></td>
<td>203 lbs or more</td>
<td>30 or higher</td>
<td>Obese</td>
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</tbody>
</table>

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.

USA  Mexico  UK  Slovak Republic  Greece  Australia  New Zealand  Hungary  Czech Republic
31%  24%  23%  22%  22%  22%  21%  19%  15%

Canada  Spain  Ireland  Germany  Portugal  Finland  Turkey  Belgium  Poland
14%  13%  13%  13%  13%  13%  12%  12%  11%

Netherlands  Sweden  Denmark  France  Austria  Italy  Norway  Japan  Korea
10%  10%  10%  9%  9%  9%  8%  3%  3%
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 health, education, employers, law enforcement – to create active living and healthy eating environments.

2. **State-wide 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 changes in the social and physical environments.

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**STATE & LOCAL GOVERNMENT**

<table>
<thead>
<tr>
<th>Priorities for Prevention</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>Make prevention a priority in state and local government.</td>
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<tr>
<td></td>
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<tr>
<td>Ensure full and equitable access to public facilities, community centers, schools, government buildings that could house programs and services that increase the amount of daily physical activity for each community member.</td>
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<tr>
<td></td>
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<tr>
<td>Develop and disseminate state model workforce policies that provide access to options for healthy eating and physical activity.</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Ensure food assistance programs provide healthy choices.</td>
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</tbody>
</table>

**INCENTIVES AND FUNDING**

| Consider incentives for businesses to offer physical activity, healthy food options, and taxation accommodations for employers. |
|                                                                                                                      |
| Consider incentives for the development of physical activity facilities, improved nutrition, grocery stores, farmers markets, and other retail outlets for healthy foods, particularly in low-income communities. |
|                                                                                                                      |
| Identify and apply for funding sources for maintenance, rehabilitation, and development of parks, including community gardens and neighborhood parks, and recreation fields in all neighborhoods. |

**PLANNING, LAND USE, AND TRANSPORTATION**

| Adopt and implement sustainable community policies and put path networks to provide safe and convenient travel options for walking, bicycling, or using public transit, such as walkways. |
|                                                                                                                      |
| Use planning and zoning processes to promote appropriate design and land uses that support access to healthy foods and encourage walking and bicycling in all neighborhoods. |
|                                                                                                                      |
| Ensure that public recreational facilities, supermarkets, and convenience stores are close to where people live and work so as to be accessible from public transit stops. |
|                                                                                                                      |
| Consider requiring that new city/county general plans contain a recreation element that includes access to, and availability of, facilities and park land. |

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**ALL EMPLOYERS**

| Extension guidelines for serving healthy foods at meetings and events and encourage their use. |
|                                                                                                                      |
| Provide incentives to employees who walk, bike, or use public transportation to commute to and from work and for work-related travel. |
|                                                                                                                      |
| Encourage physical activity by promoting physical activity breaks, providing bike racks, lockers and showers, and setting the time or breaks for physical activity. |
|                                                                                                                      |
| Encourage workforce to offer an array of alternative, healthy choices in their prepared and vendor provided meals. |
|                                                                                                                      |
| Maximize the use of local and regional vendors in food service operations. |
|                                                                                                                      |
| Meet and exceed organizational policies that support federal nutrition and physical activity guidelines for health services and employee benefits. |
|                                                                                                                      |
| Encourage health plans to include prevention and wellness initiatives such as counseling, education, and access to weight loss, weight maintenance, and physical activity programs. |

**HEALTH CARE INSURERS AND PROVIDERS**

| Promote prevention as the first step in responding to the obesity epidemic rather than surgical, medical, and pharmaceutical practices that contribute to over weight, particularly for children. |
|                                                                                                                      |
| Support new initiatives in support of exclusive breastfeeding which protects against childhood obesity. |
|                                                                                                                      |
| Avoid and implement preventive strategies in care that support and require physical activity and healthy eating in a manner sensitive to culture, age, and abilities. |
|                                                                                                                      |
| Provide continuing education credits for health practitioners participating in training in nutrition, physical activity, and breastfeeding education. |

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**FAMILIES**

| Eat at least one healthy meal a day together as a family. |
|                                                                                                                      |
| Choose fruits and vegetables, whole grains, beans, nuts and seeds, and low-fat dairy products such as milk, cheese, and yogurt. |
|                                                                                                                      |
| Lift calorie taxes by restricting portion size, limiting soft drinks and sweetened beverages, and limiting foods with high amounts of sugar and fat. |
|                                                                                                                      |
| Reduce TV viewing and sedentary computer gaming time, especially for children and youth. |
|                                                                                                                      |
| Participate in a multisectoral project every day. |
|                                                                                                                      |
| Warehouse in fun physical activity — playing, running, biking, sports — as a family. |

**SCHOOLS**

| Ensure that children receive quality physical education that meets minimum state standards for duration and frequency. |
|                                                                                                                      |
| Some schools recreational facilities available for after-school use by the community, especially in neighborhoods that lack park and recreational facilities. |
|                                                                                                                      |
| Include healthy food and beverage standards for all meals, snacks, and beverages available in preschool, schools, and school programs. |
|                                                                                                                      |
| Advertise healthy foods and beverages on school grounds and use tastemakers in foods in teaching, nutrition, and other programs. |
|                                                                                                                      |
| Maximize the availability of fresh and regional foods through initiatives such as farm-to-school programs. |
|                                                                                                                      |
| Provide nutritious breakfasts utilizing the federal School Breakfast Program in all schools. |

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**FOOD AND BEVERAGE INDUSTRY**

| Advertise and promote healthy foods and beverages to children and youth using broadcast, print and electronic media, product takes such as toys, sports and entertainment company’s entertainment, and other advertisements. |
|                                                                                                                      |
| Provide food and beverage options that are consistent with nutrition, physical activity, and breastfeeding education. |
|                                                                                                                      |
| Reduce the prevalence of childhood obesity in food service operations in health care facilities. |
|                                                                                                                      |
| Designate the use of fresh and regional foods in health care facilities food service operations. |
|                                                                                                                      |
| Provide incentives to health plan members who participate in wellness and prevention activities. |

**ENTERTAINMENT AND PROFESSIONAL SPORTS**

| Encourage the availability of affordable healthy foods and beverages at sports, movie, and other entertainment venues. |
|                                                                                                                      |
| Encourage the availability of affordable healthy foods and beverages at sporting events, movie, and other entertainment venues. |
|                                                                                                                      |
| Ensure the participation of professional athletes and facility program administrators in promoting physical activity by providing facilities, equipment, and personnel for community use. |

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**FOOD MANUFACTURERS AND RETAILERS**

| Advertise and promote healthy foods and beverages to children and youth using broadcast, print and electronic media, product takes such as toys, sports and entertainment company’s entertainment, and other advertisements. |
|                                                                                                                      |
| Reduce the prevalence of childhood obesity in food service operations in health care facilities. |
|                                                                                                                      |
| Designate the use of fresh and regional foods in health care facilities food service operations. |
|                                                                                                                      |
| Provide incentives to health plan members who participate in wellness and prevention activities. |

**FOOD PROCESSORS AND RESTAURANTS**

| Ensure that packaged store-bought foods, beverages, and meals contain no more than one standard portion size per package. |
|                                                                                                                      |
| Limit fat and sugar and use fruit and vegetables, especially in children's meals. |
|                                                                                                                      |
| Post written information on serving all meals and menus boards at restaurants and encourage health food options as an option. |

**RETAIL OUTLETS**

| Reduce pressure and other stress, healthy foods in low-income neighborhoods and economically isolated diverse communities. |
|                                                                                                                      |
| Encourage quality, quantity and affordable pricing of foods and other items foods in neighborhoods throughout California. |
|                                                                                                                      |
| Assist with access to grocery stores for seniors, people with disabilities, and low-income communities with limited transportation options. |
|                                                                                                                      |
| Encourage more healthy choices and use “smart-food” placement at grocery checkout counters. |

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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.

http://www.cdph.ca.gov/programs/Pages/CO-OP.aspx
Possible contributing factors

Industrialization/assembly work

Transportation

Technology

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

A low tech bluetooth alternative

It could be worse!
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

http://www.nhs.uk/Pages/homepage.aspx
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)
  - Singh, W, et al (2009) conducted a study examined whether MAWL applied to obese and non-obese people
    - 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

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

<table>
<thead>
<tr>
<th>Weight Status Category</th>
<th>Percentile Range</th>
</tr>
</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>
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 6-11) and II (ages 12-17), National Health and Nutrition Examination Surveys I, II, III and 1999-2000. 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](http://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
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 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.livingxl.com
Standards/Guideline Resources

• Anthropometry
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