Looking Beyond 2010

Jack Smith
National Research Council of Canada  and
the
Telfer School of Management, University of Ottawa
jesmith@telfer.uOttawa.ca;
Discussion Topics

- How do we imagine will society change?
- What will be the drivers of change?
- What do we think will be the future needs of society?

And …. what are your expectations for the future?
Global Demographics

• Declining birth rates in west and newly industrialized world;

• Zero population growth birth rates in North America;

• Age extension, more centurions

• urban dwellers out number rural dwellers

• 2009: 6,848,932,929
• 2050: 9.2B+++++++
• There are more than 72M pet dogs, and 82M pet cats in the U.S.” – 2007 survey

• “Human-robot marriages will become common... (by 2050)” – David Levy

• Potential for conflict or new era of peace?

• Economic boom or more bust ??
U.S. Demographics

US population >65 yrs

2000 (34,991,753) 2030 (71,453,471)
Total population 2010: 310M

Total population 2025: 358M

Total population 2050: 439M
### U.S. Population by Race (2000 – 2050)

**Table 1a. Projected Population of the United States, by Race and Hispanic Origin: 2000 to 2050**

(In thousands except as indicated. As of July 1. Resident population.)

<table>
<thead>
<tr>
<th>Population or percent and race or Hispanic origin</th>
<th>2000</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
<th>2040</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POPULATION TOTAL</strong></td>
<td>282,125</td>
<td>308,936</td>
<td>336,805</td>
<td>363,584</td>
<td>391,946</td>
<td>419,854</td>
</tr>
<tr>
<td>White alone</td>
<td>228,548</td>
<td>244,995</td>
<td>260,629</td>
<td>275,731</td>
<td>289,690</td>
<td>302,626</td>
</tr>
<tr>
<td>Black alone</td>
<td>35,818</td>
<td>40,454</td>
<td>45,365</td>
<td>50,442</td>
<td>55,876</td>
<td>61,361</td>
</tr>
<tr>
<td>Asian Alone</td>
<td>10,684</td>
<td>14,241</td>
<td>17,938</td>
<td>22,580</td>
<td>27,992</td>
<td>33,430</td>
</tr>
<tr>
<td>All other races 1/</td>
<td>7,075</td>
<td>9,246</td>
<td>11,822</td>
<td>14,831</td>
<td>18,368</td>
<td>22,437</td>
</tr>
<tr>
<td>Hispanic (of any race)</td>
<td>35,622</td>
<td>47,756</td>
<td>59,756</td>
<td>73,055</td>
<td>87,585</td>
<td>102,560</td>
</tr>
<tr>
<td>White alone, not Hispanic</td>
<td>195,729</td>
<td>201,112</td>
<td>205,936</td>
<td>209,176</td>
<td>210,331</td>
<td>210,283</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>PERCENT OF TOTAL POPULATION TOTAL</strong></th>
<th>100.0</th>
<th>100.0</th>
<th>100.0</th>
<th>100.0</th>
<th>100.0</th>
<th>100.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>White alone</td>
<td>81.0</td>
<td>79.3</td>
<td>77.6</td>
<td>75.8</td>
<td>73.9</td>
<td>72.1</td>
</tr>
<tr>
<td>Black alone</td>
<td>12.7</td>
<td>13.1</td>
<td>13.5</td>
<td>13.9</td>
<td>14.3</td>
<td>14.6</td>
</tr>
<tr>
<td>Asian Alone</td>
<td>3.8</td>
<td>4.6</td>
<td>5.4</td>
<td>6.2</td>
<td>7.1</td>
<td>8.0</td>
</tr>
<tr>
<td>All other races 1/</td>
<td>2.5</td>
<td>3.0</td>
<td>3.5</td>
<td>4.1</td>
<td>4.7</td>
<td>5.3</td>
</tr>
<tr>
<td>Hispanic (of any race)</td>
<td>12.6</td>
<td>15.5</td>
<td>17.8</td>
<td>20.1</td>
<td>22.3</td>
<td>24.4</td>
</tr>
<tr>
<td>White alone, not Hispanic</td>
<td>69.4</td>
<td>65.1</td>
<td>61.3</td>
<td>57.5</td>
<td>53.7</td>
<td>50.1</td>
</tr>
</tbody>
</table>
Environmental Crises

• Warnings of a global fisheries collapse (by 2050) of all species if fishing continues at its current pace.” – Achim Steiner U.N. Environment Program 2006;
• Ground-based astronomy may become impossible by 2050 because of pollution and climate change.” – Prof. Gerry Gilmore 2006;
• World wide, forests will continue to shrink at a rate of 1 soccer pitch every 2 seconds
• Polar ice cap appears to be melting at a rate of Lake Superior/year
Shifts in Environmental Determinants

- Hydrogen production from algae-bacteria; solar PV;
- Conflicts over water and emerging nano filtration
- Nuclear power or oil ( & fire) power
- Global environmental management corporations
- Arable land becomes salty, while progress is made on saline farming
Global Disease

Key Challenges:
• Water, Alzheimer’s, HIV/AIDS; climate impacts and habitat displacements
• Virus cross-over

• Bio-terror agents are zoonotic

• Since 1985, 38 new human pathogens have emerged
• 1,400 pathogens cause human disease
U.S Top Terror Targets (2009): with High Impacts on Veterinarians

- Attacks to destroy TVA dams
- EPM bombs
- Cyber terrorism

- Attacks on U.S. Oil refineries
- Nerve gas, anthrax, dirty bombs

Bio-terrorism in the food supply system
Technology Timeline: 2012-2020

- Software is trained, self repairing
- Vaccines for viruses
- Sequencing human genome
- Voice synthesis and recognition
- Petaflop computer ($10^{15}$ operations/second)
• Species brought back from extinction

• Location devices implanted in pets

• Drugs delivered in “carbon buckyballs”

• Odour and flavour sensors

• First bacterium assembled from scratch
Technology Timeline: 2012-2020

- Artificial heart etc.
- Medical treatments based on patients DNA
- Quantum computer
- AI technology
- Self diagnostic/self-repairing robots
- Nanotechnology breakthroughs
Technology Timeline: 2020-2030

- Infectious disease may be **eliminated** from the developed world
- Re-engineered amputated limbs

- Artificial insects and small animals
- Genetically engineered electronic toy-pets

- 3D printers
- Thought recognition
- Experience recording technology
- Renewable energy resources should replace fossil carbon
Technology Timeline: 2020-2030

- AI teachers
- Electronic pets could out number organic pets
- Electronic life-form given basic rights
- Remote control devices implanted in pets
- Dream link technology – plug in learning
- Smart bacteria
- Robots used for guiding blind people
Technology Timeline: 2030-2040

- Robots physically and mentally superior
- Nuclear fusion commercially available
- Moon base village-manned MARS mission
- Synthetic protein - protein emulation
- Virus cross-over from machine to human
- New pet standard: “Living” teddy bear?
- Tele-everything may replace most physical travel
“Wild Card” or Shock Events – profound effects on the veterinary profession

- Mega-volcano erupts
- Asteroid hits earth
- Massive solar flare hits earth
- Natural evolution of super bug
- US west coast disaster
- Melted ice caps
- Disease mutation to air born transmission
- Space exploration creates superbug
- Gulf and/or Jet stream shift permanently
- Accidental creation of lethal GM Organism
- Self-aware machine intelligence
- Nano-technology accident/war
Looking Beyond 2010

Jack Smith
National Research Council of Canada and the
Telfer School of Management, University of Ottawa
jesmith@telfer.uOttawa.ca;