AGING, DIVERSITY AND TECHNOLOGY APPLICATIONS

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OVERVIEW

• Pose some issues and challenges for the design and research community.

• Present some data on the increasing diversity of the older adult population and examples of the implications for technology systems and applications.

• Discuss the role of technology for family caregivers.
ISSUES/CHALLENGES FOR THE RESEARCH AND DESIGN COMMUNITY

• Given the changing face of aging what strategies can we use to minimize digital disparities and ensure that vulnerable older adult populations have “meaningful access” to technology applications that meet their needs and enhance their quality of life?

• How do we design/implement technology so that technology applications help maintain functioning and independence without negatively impacting on the performance potential and social relationships/interactions of individuals?

• What types of technology applications best support family caregivers and in what capacity?

• What types of research strategies are optimal for evaluating the efficacy and effectiveness of technology solutions?
WHO ARE OLDER ADULTS?

• Current and future populations of older adults are and will be characterized by increased diversity:
  – Age (2012)
    • 65-74: 24 million people
    • 75-84: 13.3 million people
    • 85+: 5.9 million people
    • 100+: 61,985 people (↑ 93% since 1980)
  – Ethnicity/Culture
    • Racial/Ethnic Minorities
      – 2012: 21% of the 65+ population
      – 2030: 28% of the 65+ population
        » Hispanics ↑ 155%
        » African Americans ↑ 104%
        » Asian ↑ 119%
        » American Indian and Native Alaskans ↑ 116%
  – Living Arrangements
    – Live with spouse: 57%
    – Live alone: 28%
    – Institutional Settings: 3.5%
    – Senior Housing: 2.7%
    – Rural areas: 21.6%
WHO ARE OLDER ADULTS?

– Education
  • High School Education: 83%
  • College Degree or Higher: 25%

– Income
  • Less than $15,000: 34%
  • $15,000 – $35,000: 38%
  • Greater than $35,000: 28%

– Literacy
  • Below Basic Prose Literacy: 26%
  • Below Basic Health Literacy: 29%
  • Basic Health Literacy: 30%
  • Intermediate Health Literacy: 38%

– Health Status
  • Visual impairments: ~ 16%
  • Hearing impairments: ~ 26%
  • One Chronic condition: 80%
  • At least two chronic conditions: 50%
  • ADL Limitations: 28%
  • IADL Limitations: 12%
  • Mental Health Concerns: 20%

– Cognitive Impairments
  • Normative age-related decline in fluid abilities
  • Report memory loss: ~ 13%
  • MCI: ~10-20%
  • Alzheimer’s Disease: 11%
IMPLICATIONS FOR TECHNOLOGY APPLICATIONS

• User Needs and Preferences
  – What types of technologies best:
    • Compensate for age-related declines or disabilities
      – Assistive technologies
    • Prevent further declines of disabilities
      – Monitoring systems; disease management systems
    • Improve well-being
      – Social networking; educational applications; support ADL/IADL tasks

• Interface Design
  – Cultural/language issues
    • Translation; cultural differences in communication, health beliefs
  – Complexity
    • Literacy demands
    • Cognitive demands – learnability, memorability, cost of adoption
  – Accessibility
    • Changes in sensory-motor functions
    • Disabilities
How to get drug coverage

Medicare offers prescription drug coverage to everyone with Medicare. If you decide not to join a Medicare Prescription Drug Plan when you're first eligible, and you don't have other creditable prescription drug coverage, or you don't get Extra Help, you'll likely pay a late enrollment penalty.

To get Medicare drug coverage, you must join a plan run by an insurance company or other private company approved by Medicare. Each plan can vary in cost and drugs covered.

2 ways to get drug coverage

1. Medicare Prescription Drug Plan (Part D). These plans (sometimes called "PDPs") add drug coverage to Original Medicare, some Medicare Cost Plans, some Medicare Private Fee-for-Service (PFFS) Plans, and Medicare Medical Savings Account (MSA) Plans.

2. Medicare Advantage Plan (Part C) (like an HMO or PPO) or other Medicare health plan that offers Medicare prescription drug coverage. You get all of your Medicare Part A (Hospital Insurance) and Medicare Part B (Medical Insurance) coverage, and prescription drug coverage (Part D), through these plans. Medicare Advantage Plans with
CAUTION: High glucose results
If your test result is higher than 180 mg/dL, it may mean hyperglycemia (high blood glucose). If you are uncertain about this test result, consider re-testing. Your healthcare professional can work with you to determine what actions, if any, you should take if your results are higher than 180 mg/dL.

If your meter displays HI, you may have a very high blood glucose level (severe hyperglycemia) exceeding 600 mg/dL. Re-check your glucose level. If the result is HI again, this may indicate a severe problem with your blood glucose control, and it is important you obtain and follow instructions from your healthcare professional without delay.

CAUTION: Repeated unexpected glucose results
If you continue to get unexpected results, check your system with control solution. See Control solution testing, pages 28–32.

If you are experiencing symptoms that are not consistent with your blood glucose results and you have followed all instructions in this booklet, call your healthcare professional. Never ignore symptoms or make significant changes to your diabetes control program without speaking to your healthcare professional.

CAUTION: Unusual red blood cell count
A hematocrit (percentage of your blood that is red blood cells) that is either very high (above 55%) or very low (below 30%) can cause false results.
**IMPLICATIONS FOR TECHNOLOGY APPLICATIONS**

- **Taha, Czaja, Sharit & Morrow (2013):**
  - Evaluated the ability of a sample of lower SES middle-aged and older adults to use a simulated version of the Epic patient portal to perform routine health management tasks:
    - A significant percentage of the sample had difficulty performing the tasks
    - Cognitive abilities (e.g., reasoning, memory) and numeracy skills were significant predictors of performance
    - There were significant discrepancies between self-ratings and objective ratings of numeracy

- **Czaja, Zarcadoolas, Vaughan et al (in Press)**
  - Evaluated the ability of a lower SES sample of adult patients to use the three currently available PHRs.:
    - The majority of participants:
      - had difficulty performing the tasks
      - reported usability problems (e.g., complex language)
      - perceived PHRs as potentially valuable
IMPLICATIONS FOR TECHNOLOGY APPLICATIONS

• Training, Instructional Support and Technical Support
  – How to best train
  – Design of instructional materials
  – What if the system breaks down?

• Security and Privacy Issues

• Cost and Payment

• Access
  – Awareness
  – Perceived utility and value
  – Acceptance
  – Usability
  – Keeping abreast with changes in system design
USA INTERNET USE BY AGE 2000-2013

# Internet, Broadband, and Tablet Adoption Among Seniors

% of seniors (ages 65 and older) who ...

<table>
<thead>
<tr>
<th></th>
<th>Go online</th>
<th>Broadband at home</th>
<th>Tablet computer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total for all 65+</strong></td>
<td>59%</td>
<td>47%</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65-69</td>
<td>74</td>
<td>65</td>
<td>23</td>
</tr>
<tr>
<td>70-74</td>
<td>68</td>
<td>55</td>
<td>18</td>
</tr>
<tr>
<td>75-79</td>
<td>47</td>
<td>34</td>
<td>20</td>
</tr>
<tr>
<td>80+</td>
<td>37</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school grad or less</td>
<td>40</td>
<td>27</td>
<td>11</td>
</tr>
<tr>
<td>Some college</td>
<td>69</td>
<td>57</td>
<td>19</td>
</tr>
<tr>
<td>College graduate</td>
<td>87</td>
<td>76</td>
<td>31</td>
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<tr>
<td><strong>Household Income</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>&lt;$30,000</td>
<td>39</td>
<td>25</td>
<td>8</td>
</tr>
<tr>
<td>$30,000-$49,999</td>
<td>63</td>
<td>51</td>
<td>16</td>
</tr>
<tr>
<td>$50,000-$74,999</td>
<td>86</td>
<td>73</td>
<td>28</td>
</tr>
<tr>
<td>$75,000+</td>
<td>90</td>
<td>82</td>
<td>39</td>
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Pew Research Center’s Internet Project July 18-September 30, 2013 tracking survey.

PEW RESEARCH CENTER
### Cell phone and smartphone adoption among seniors

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<th>Smartphone</th>
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<td><strong>Total for all 65+</strong></td>
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<td>80+</td>
<td>61</td>
<td>5</td>
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<tr>
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Pew Research Center’s Internet Project July 18-September 30, 2013 tracking survey.

PEW RESEARCH CENTER
Tablet ownership over time (2010-2013)

% of American adults ages 18+ who own a tablet computer, over time.

Tablet Ownership by Age Group

Source: Pew Research Center’s Internet & American Life Project tracking surveys, May 2010 – May 2013. May 2013 data is from the Pew Research Center’s Internet & American Life Project’s April 17-May 19, 2013 Tracking Survey of 2,252 adults ages 18 and older. Interviews were conducted in English and Spanish and on landline and cell phones. The margin of error on the sample is +/- 2.3 percentage points.

http://pewinternet.org~/media//Files/Reports/2013/PIP_Tablet%20ownership%202013.pdf
US Smartphone ownership in 2013 by age and income, with income groups shown in dollar ranges of <30,000, 30-75,000, 75,000+. Data from Smith (2013).
FAMILY CAREGIVERS

• Technology can aid Family Caregivers
  – Delivery of intervention programs and services
  – Communication
    • Other family members
    • Other caregivers
    • Healthcare Professionals
  – Access to Information
  – Monitoring of Patient
  – Assessment of patient and caregiver
  – Respite

• Issues
  – What technology applications best meet caregiver needs
  – Cost-effectiveness
  – Integration with other aspects of healthcare systems and day-to-day lives
  – Need for more rigorous research and evaluation