Prospects for Medical Advances Affecting the Elderly

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Acknowledgements

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Health Care Spending is Rising as a Share of Economic Output

Health care spending as a percentage of GDP

On Average, Spending Is Worth It

Infant mortality

Cardiovascular disease

Note: Infants are under 1 year; Cardiovascular disease includes diseases of the heart and cerebrovascular diseases.

But Will Emerging Technologies Be Worth the Cost?

The Left Ventricular Assist Device

Source: Rose et al, New Engl. J. of Med., 345(20);2001, Figure 1.
Research Objectives

- Identify the key biomedical innovations and health trends likely to affect the elderly over the next 30 years
- Model the effects on:
  - Spending
  - Disease
  - Functional status
Convened Panels of Experts from Around the Country

- Identified key breakthroughs in 3 clinical areas:
  - Cardiovascular disease
  - Neurological disorders
  - Cancer / biology of aging*

- Fourth panel of geriatricians and social scientists

*Combined since cancer is now closely linked with the aging process at the cellular level.
### Example: Intraventricular Defibrillators

| Target:                                | 50% of patients with heart failure  
|                                       | 50% of patients post AMI  
|                                       | 20% of patients with cardiomyopathy  
| Likelihood:                            | 30% in 10 yrs  
|                                       | 30-40% in 20 yrs  
| Impact:                                | Life expectancy of people with heart failure increases 6-10 months  
|                                       | No impact on hospitalizations  
| Cost:                                  | $35,000 - $40,000 per case  

~3.5 million in 2004
Our Model Tracks **Individuals** Over Time

100,000 Medicare beneficiaries (age 65+) in 2005

- **Survivors**
- **Deceased**

New 65 year-olds in 2006

- Health & functional status, 2006
  - **Survivors**
  - **Deceased**

New 65 year-olds in 2007

- Health & functional status 2007
  - **Survivors**
  - **Deceased**

2005 costs

2006 costs

2007 costs

Etc.
Example 1: Compound to Extend Lifespan

- Overwhelming biomedical evidence that reducing caloric intake of animals by 30% increases life expectancy by 25%
  - Chemical compounds can mimic this behavior in rodents

- Such a pill could emerge for humans
  - Taken by everyone at a cost similar to nutritional supplements ($1/day)
  - Hazard of death decreases by 63% (equivalent to extending life by 15 years)
Aged Population Would Grow by 13 Million by 2030

Total Number of Elderly (65+)

Year

Population (millions)
"Status Quo"

"Compound"

Population (millions)
84
71
Much More Heart Disease

![Graph showing the increase in the percentage of people with heart disease from 2000 to 2030. The graph compares the Status Quo and a Compound condition. The percentage for the Status Quo starts at around 40% in 2000 and increases to 44% in 2030. For the Compound condition, the percentage starts at around 52% in 2000 and increases to 55% in 2030.](image-url)
Health Care Spending Would Be 70% Higher in 2030

Elderly Health Care Spending

- **Status Quo**
- **Compound**

Billions of 1998 dollars

Year


934

621
## Society Faces Substantial Technological Risk In Elderly Medical Spending

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<td>Anti-aging compound (healthy)</td>
<td>13.8</td>
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<td>70.4</td>
<td>29,785</td>
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*Increase in 2030 health care spending relative to status quo without the technology.

Source: Goldman et al, *Health Affairs*, forthcoming
Example 2: Intraventricular Cardioverter Defibrillators

- Currently used to treat patients with life-threatening arrhythmias
  - Shocks heart to restore natural rhythm
  - 26,000 procedures in 1988
  - $35,000 per procedure

- Scenario would expand their use
  - Implant in 50% of patients with heart failure or myocardial infarction
  - Reduces risk of death by 10%

- Panel told us 35% chance of such an expansion
Will Reach 350,000 Procedures Annually by 2030
Will Add About $20 -$25 Billion Annually to Health Spending in Steady-State
Little Change in Functional Status for the Elderly Population

Elderly With Any Functional Impairment

Prevalance (%)

Year


ICD
Status Quo
# Society Faces Substantial Technological Risk In Elderly Medical Spending

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<td>Cancer vaccines</td>
<td>0.4</td>
<td>18,236</td>
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<td>Treatment of acute stroke</td>
<td>0.4</td>
<td>21,905</td>
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<td>Telomerase inhibitors (cancer)</td>
<td>0.5</td>
<td>61,884</td>
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<td>Implantable cardio-defibrillators</td>
<td>3.7</td>
<td>103,095</td>
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<tr>
<td>Antiangiogenesis (cancer)</td>
<td>8.0</td>
<td>498,809</td>
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<td>Left ventricular assist devices</td>
<td>2.3</td>
<td>511,962</td>
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<td>Pacemaker for atrial fibrillation</td>
<td>2.3</td>
<td>1,403,740</td>
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Key Findings

• Substantial technological risk in Medicare
  – Not just demographic risk caused by the aging of baby boomers

• Living longer is valuable, but not because it saves money
  – Curing any one disease will not fix the problem
  – Obesity may be an important exception

• Challenge is to figure out how we get treatment to the patients who most need it