What should one do to live to 100?

What do we do differently since many will live to 100?

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Financial Disclosure

Dr. Siu is an employee of academic medical center, and he is a Medicare participating physician.

Dr. Siu is on the Board of Directors of the Visiting Nurse of New York and of VNS Choice which operates a Medicare Advantage plan.

Overview

Sustained improvement in longevity

Explanations for longevity improvement

Lessons for sustaining longevity

Societal response to longevity

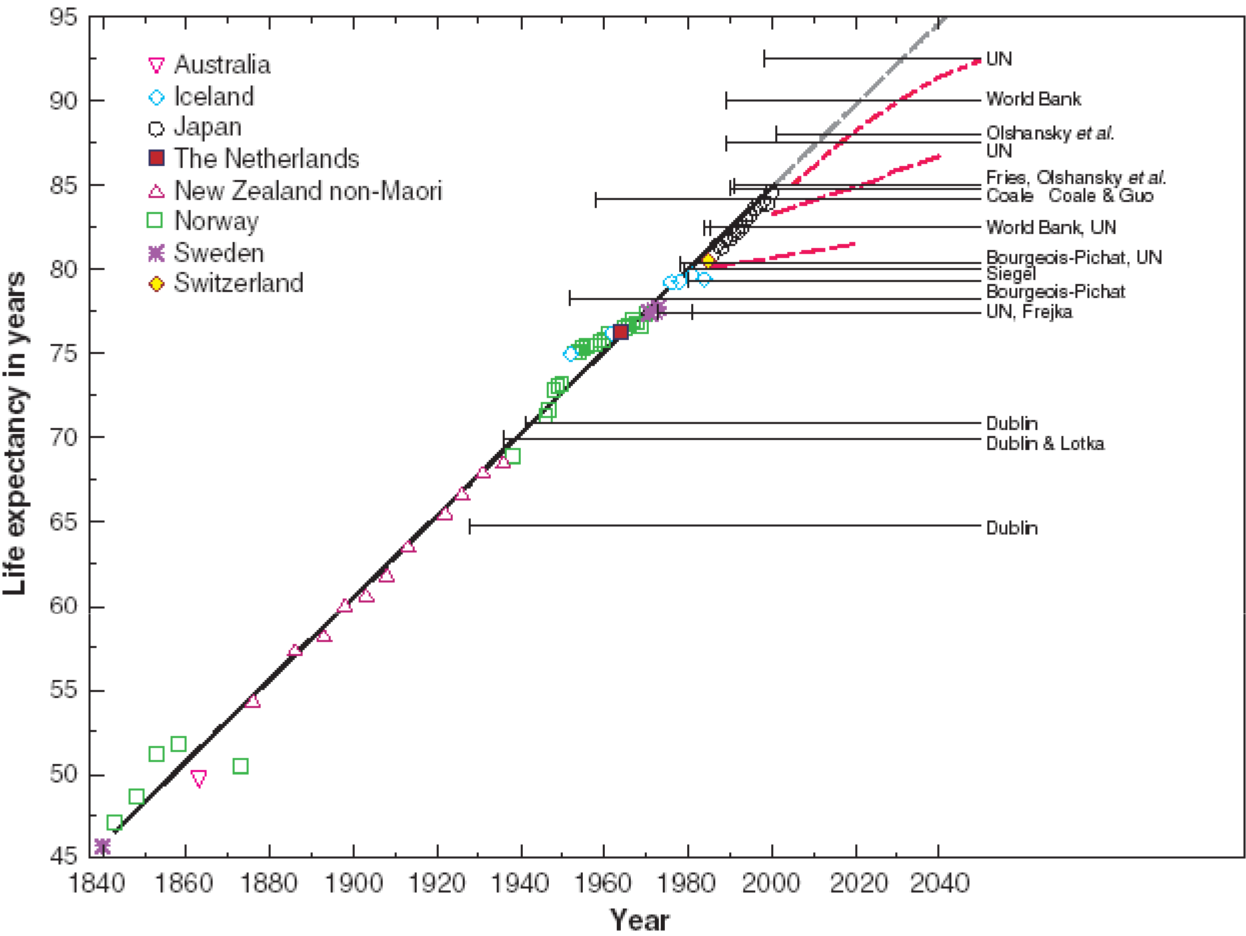
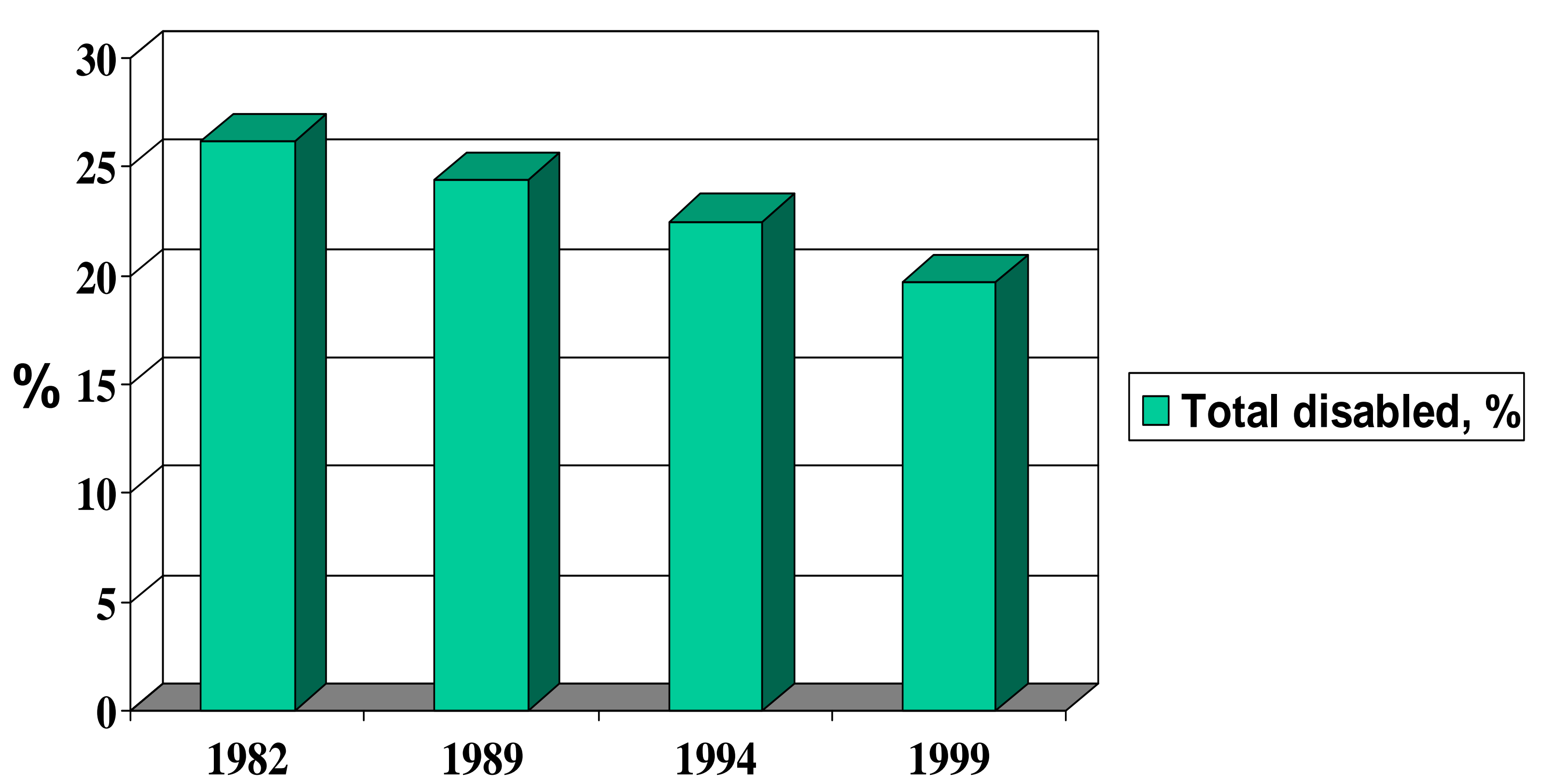


Fig. 1. Record female life expectancy from 1840 to the present [suppl. table 2 (*1*)]. The linear-regression trend is depicted by a bold black line (slope = 0.243) and the extrapolated trend by a dashed gray line. The horizontal black lines show asserted ceilings on life expectancy, with a short vertical line indicating the year of publication (suppl. table 1). The dashed red lines denote projections of female life expectancy in Japan published by the United Nations in 1986, 1999, and 2001 (*1*): It is encouraging that the U.N. altered its projection so radically between 1999 and 2001.

Decline in Disability in the U.S. Population Above 65, 1982-99



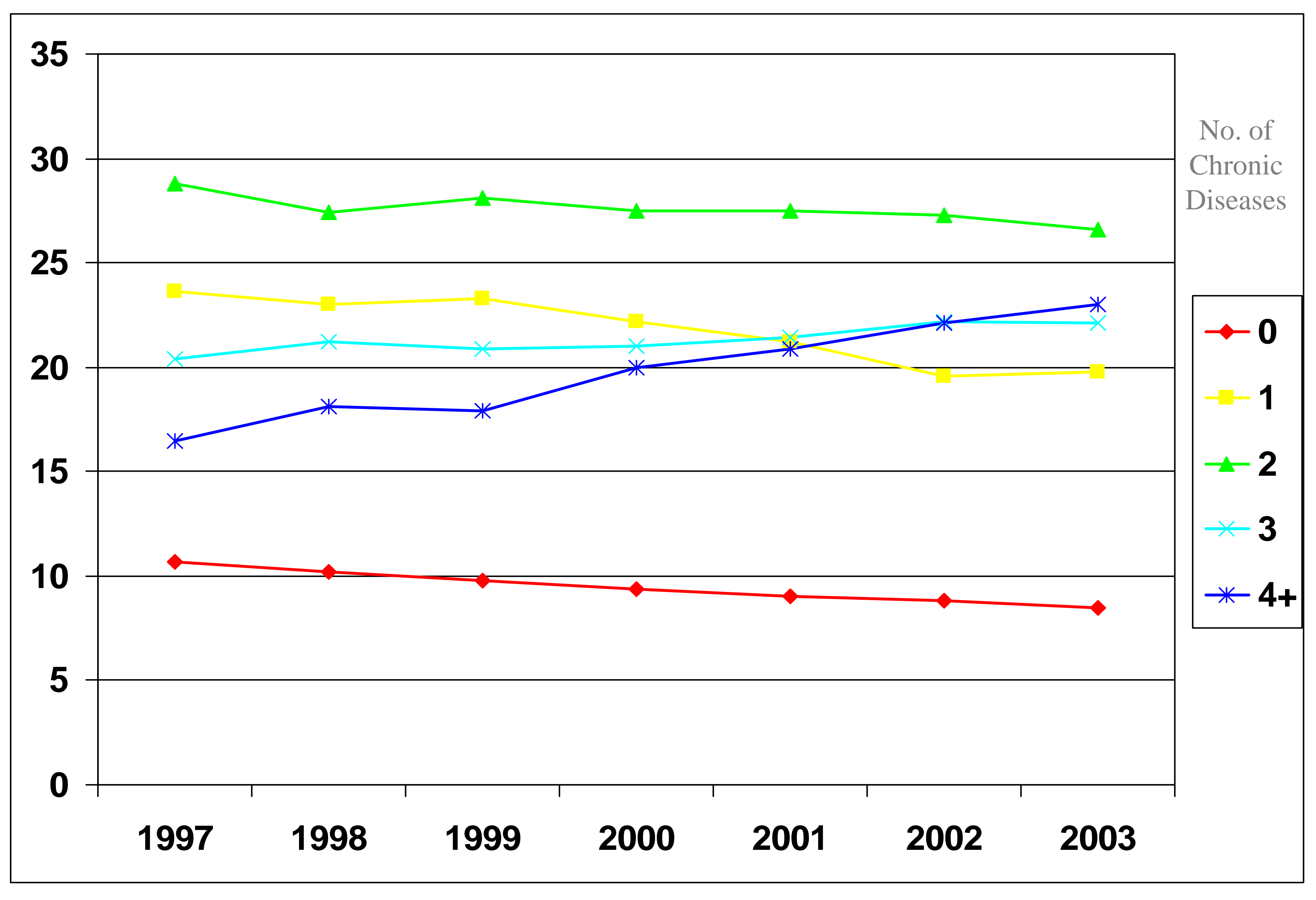
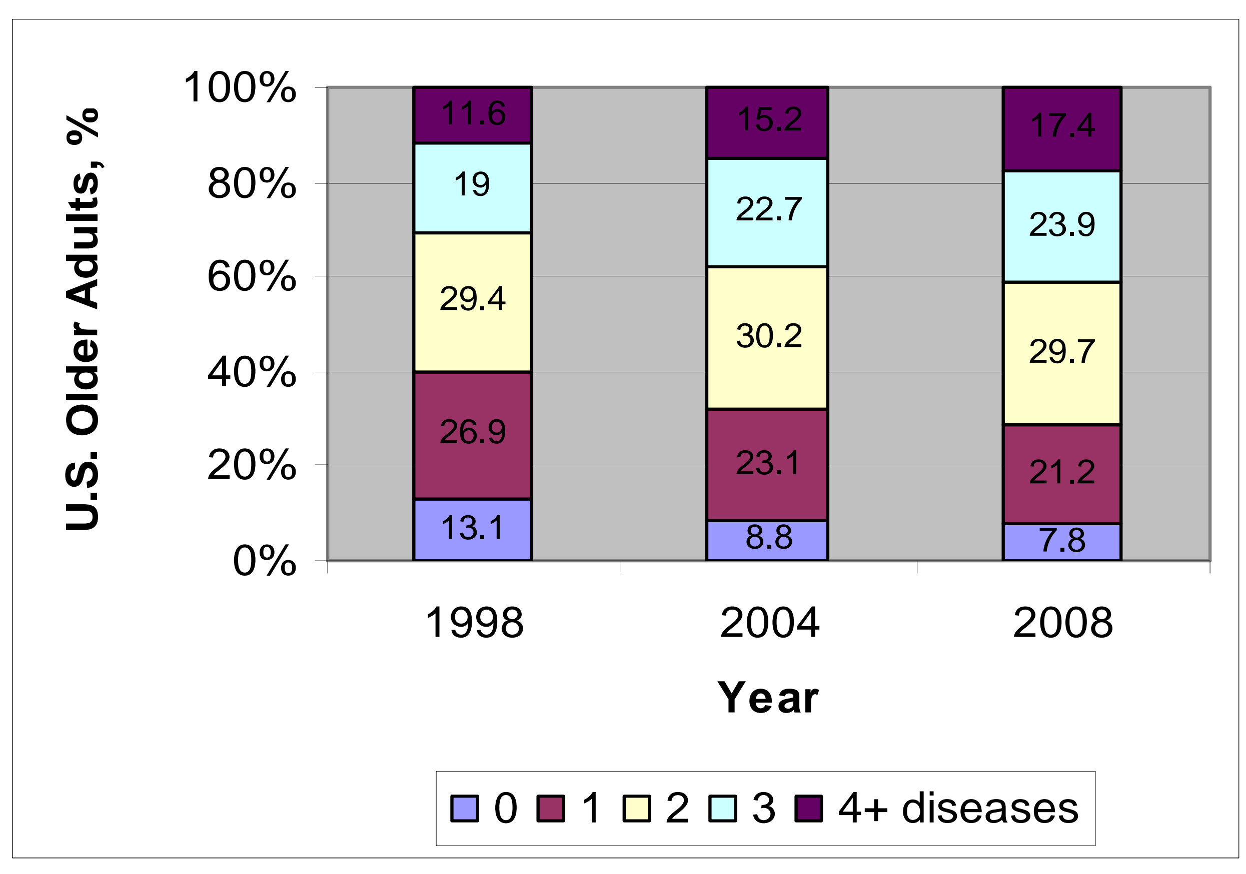
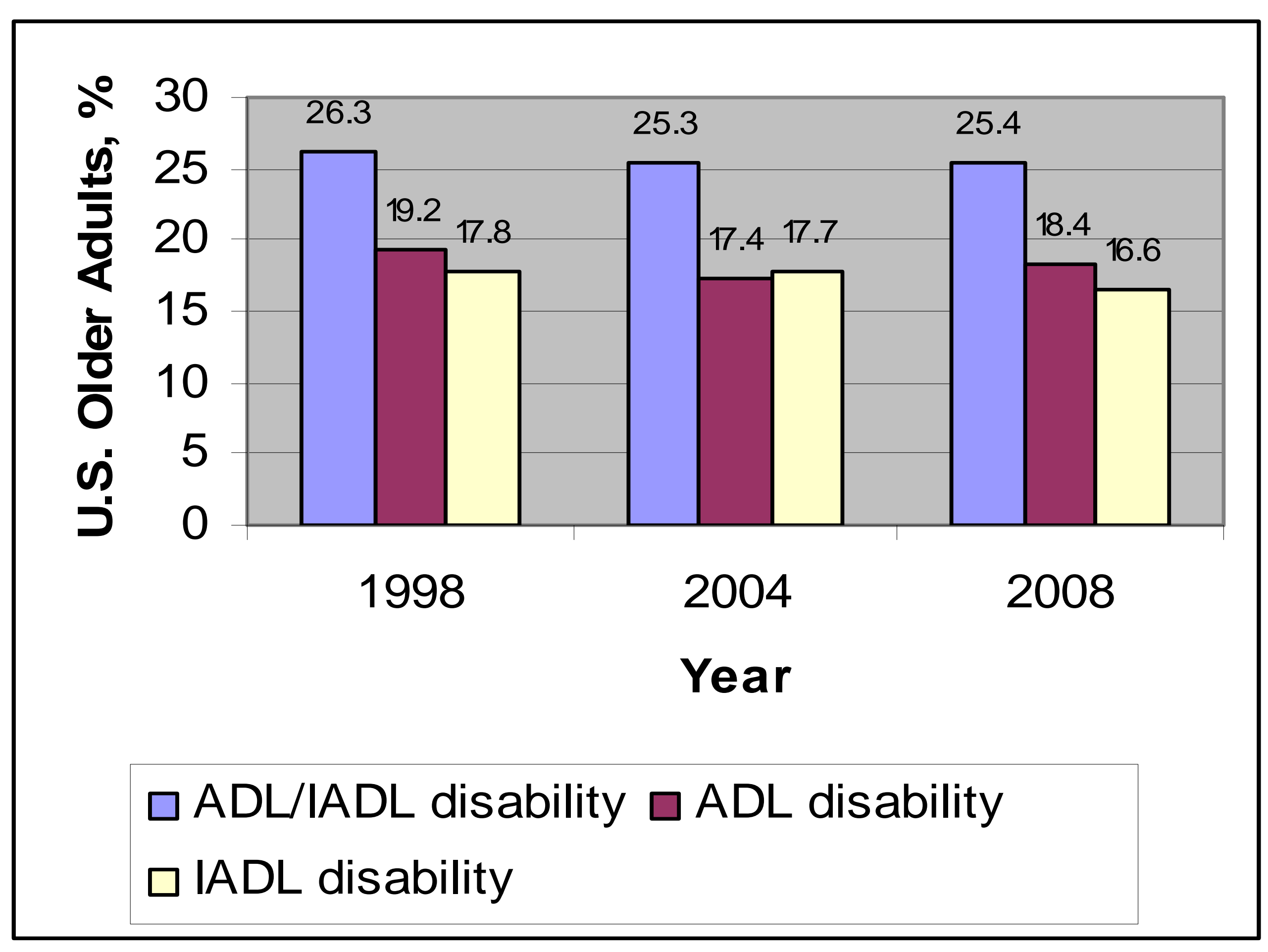

Prevalence of Multiple Chronic Conditions in Medicare Beneficiaries
35
30
25
20
15
10
5
0
1997
1998
1999
2000
2001
2002
2003
No. of Chronic Diseases
0
1
2
3
4+

Table 1. Descriptive statistics of adults aged 65 and over in the Health and Retirement Study (HRS) in 1998, 2004 and 2008.

Chronic diseases, % (95%CI)					
Hypertension	59.7	52.5	60.5	65.0	<0.001
Heart conditions	31.4	30.7	31.9	31.6	0.20
Diabetes	19.3	15.2	19.3	22.7	<0.001
Cancer	17.4	14.6	18.1	19.1	<0.001
Chronic lung disease	11.6	10.8	11.6	12.3	0.01
Arthritis	65.5	59.1	67.7	68.8	<0.001



U.S. Older Adults, %
100%
80%
60%
40%
20%
0%
11.6
19
29.4
26.9
13.1
15.2
22.7
30.2
23.1
8.8
17.4
23.9
29.7
21.2
7.8
1998
2004
2008
Year
0
1
2
3
4+ diseases


U.S. Older Adults, %
30
25
20
15
10
5
0
26.3
19.2
17.8
25.3
17.4
17.7
25.4
18.4
16.6
1998
2004
2008
Year
ADL/IADL disability
ADL disability
IADL disability

How have longevity improvements come about?

Occurrence of improvements over span of 150 plus years argues against a single specific medical or public health intervention

Improvements probably due to combination of prosperity, education, and access to improved medical care

Prosperity has led to investment in biomedical advances and medical care, and education has led to wiser health and medical choices

What should one do to live to 100?

"Stay the course" by continuing to do what has brought about striking sustained improvements in longevity in Western nations

- Biomedical research and translation to speed discovery to bedside
- Education with a renewed focus on health literacy

Take advantage of opportunity to address "new" challenges in health care delivery

- "Manage" biomedical knowledge, disseminating information, and messaging to affect health behaviours
- Improve quality of care by striving to improve use of effective care while reducing interventions that are known to be ineffective

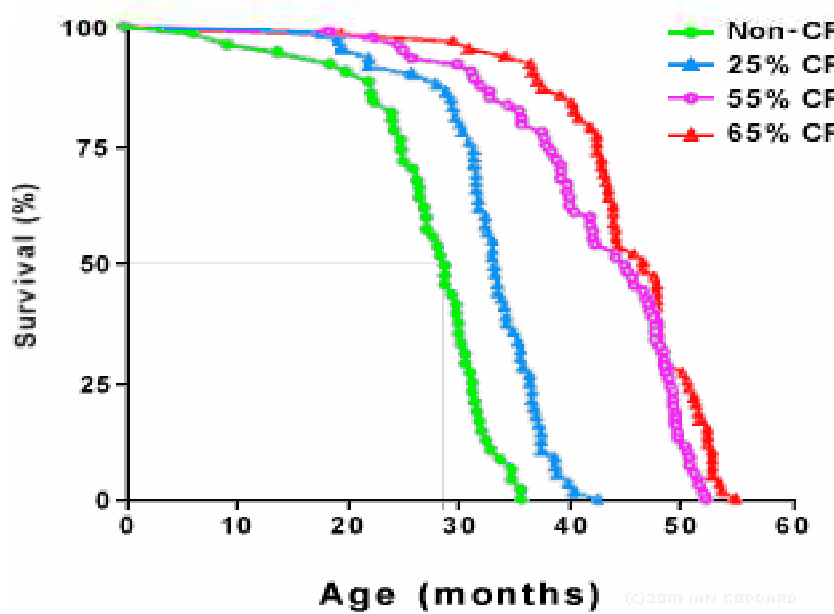
CR Society INTERNATIONAL

Welcome to the Calorie Restriction (CR) Society *International*

Our goal is to help people of all ages live longer and healthier lives simply by:

- *eating fewer calories*
- *maintaining adequate nutrition*

Graph adapted from: Weindruch R, et al. (1986). "The retardation of aging in mice by dietary restriction: longevity, cancer, immunity and lifetime energy intake." Journal of Nutrition, April, 116(4), pages 641-54.



Since the 1930s extensive scientific research has shown that calorie restricted (CR) diets improve health and ***extend lifespans*** *of nearly every species tested, including worms, spiders, rodents, dogs, cows and monkeys. We believe it is likely that people who* ***carefully adopt a CR diet*** *will see similar results.*

The CR Society supports the efforts of people who practice CR for current health, future longevity, or

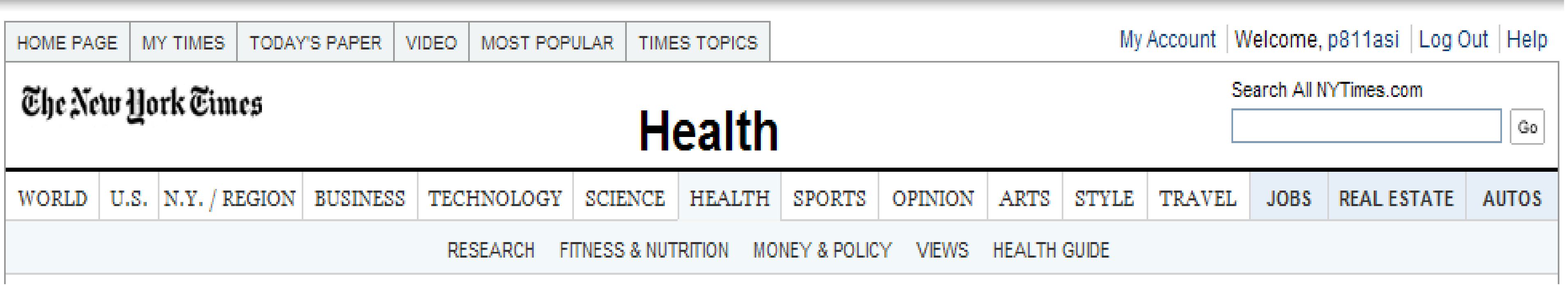
Adapting caloric restriction

Protein restriction

- Inconsistent results in animal studies restricting dietary protein, tryptophan, or methionine

Intermittent fasting

- A few human studies show short-term benefits (e.g., pulmonary function or insulin sensitivity) of 30-50% caloric restriction for 2-3 weeks
- But “weight cycling” may increase mortality



Scientists Find Clues to Aging in a Red Wine Ingredient's Role in Activating a Protein

By NICHOLAS WADE
Published: November 26, 2008

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A new insight into the reason for aging has been gained by scientists trying to understand how resveratrol, a minor ingredient of red wine, improves the health and lifespan of laboratory mice. They believe that the integrity of chromosomes is compromised as people age, and that resveratrol works by activating a protein known as sirtuin that restores the chromosomes to health.

The finding, published online Wednesday in the journal Cell, is from a group led by David Sinclair of the Harvard Medical School. It is part of a growing effort by biologists to understand the sirtuins and other powerful agents that control the settings on

What should one do to live to 100?
Pharmacologic alternatives to caloric restriction - 1

Activators of sirtuins (a family of proteins thought to modulate cellular energy status)

- Resveratrol (a polyphenol found in red wine) increases longevity in short-lived organisms (e.g., yeast) and delays aging-related problems (e.g., cognitive performance) in mice.
- Human studies have focused on potential to mitigate negative effects of poor health habits, but convincing evidence of effects in humans is lacking
- Synthetic sirtuin activators developed and being tested

What should one do to live to 100?

Pharmacologic alternatives to caloric restriction - 2

Antioxidants

- Therapies based on theory that aging process is driven by highly reactive by-products of cellular metabolism
- Meta-analyses of studies have shown no health benefits from supplementation with vitamins A, C, or E or beta-carotene

Agents acting on glucose and insulin homeostatis

- Therapies based on finding that aging is associated with insulin resistance and decreased glucose tolerance
- 2-deoxy-D-glucose can mimic some of the benefits observed with caloric restriction but it is cardiotoxic
- Metformin mimics some benefits of caloric restriction (in gene expression and increased insulin sensitivity) but more studies needed on effects on lifespan

What should one do to live to 100?
Pharmacologic alternatives to caloric restriction - 3

Reducing advanced glycation end products (AGEs)

- Therapies based on finding that glycosylated proteins found in aging tissues
- Reducing dietary AGEs extend lifespan in mice and improve aging-related biomarkers in patients with diabetes
- AGE inhibitors (e.g., aminoguanidine) have shown vascular and immune benefits in mice, but drugs are poorly tolerated in humans

Agents acting on mTOR signaling pathway

- Therapies based on manipulating pathways sensing cellular energy and nutrient levels
- Rapamycin inhibit mTOR and may be useful in some neuro-degenerative conditions and cancer but effects on lifespan unknown

What do we do differently since many will live to 100?

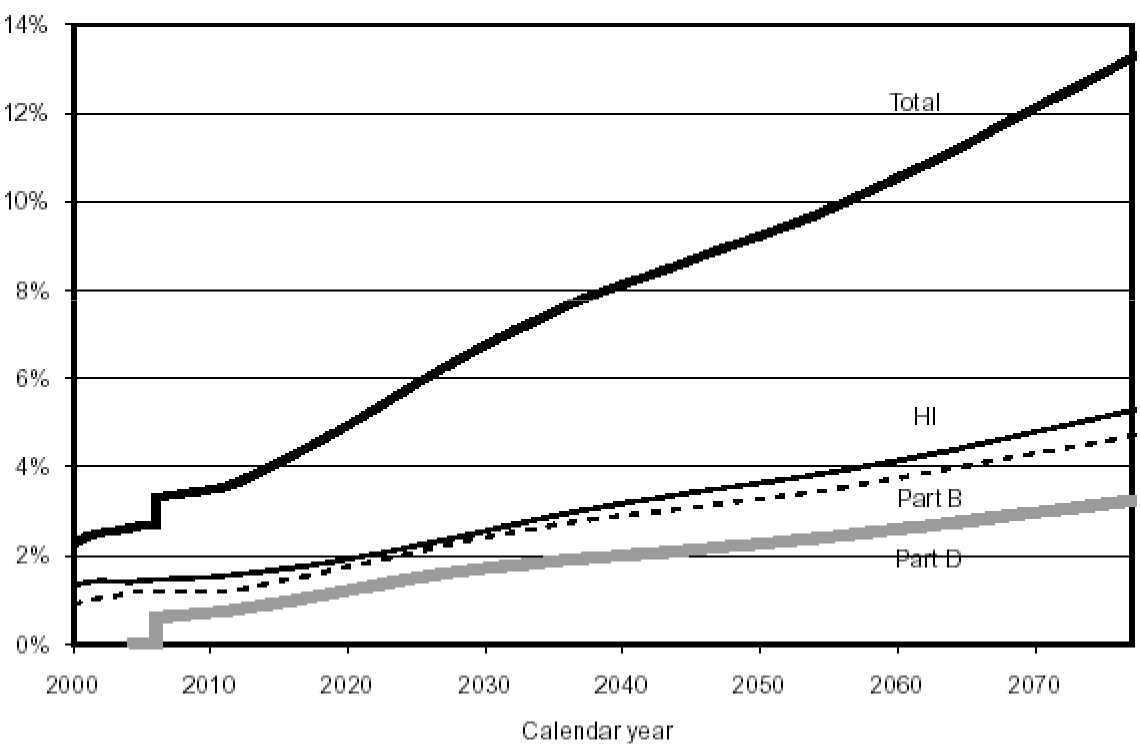
Figure 2
Impact of Medicare Burden on Workers, 2002-2035
(in 2003 dollars)

Year	Per Worker GDP	Per Worker-Adjusted Medicare Burden
2002	$69,034	$67,478
2005	$73,134	$71,497
2010	$78,326	$76,471
2015	$83,441	$81,206
2020	$88,641	$85,883
2025	$94,282	$90,850
2030	$100,319	$96,120
2035	$106,903	$101,910

$120,000
$100,000
$80,000
$60,000
$40,000
$20,000
$0

Source: 2003 Trustees Report

Figure II.D1.—Medicare Expenditures as a Percentage of the Gross Domestic Product



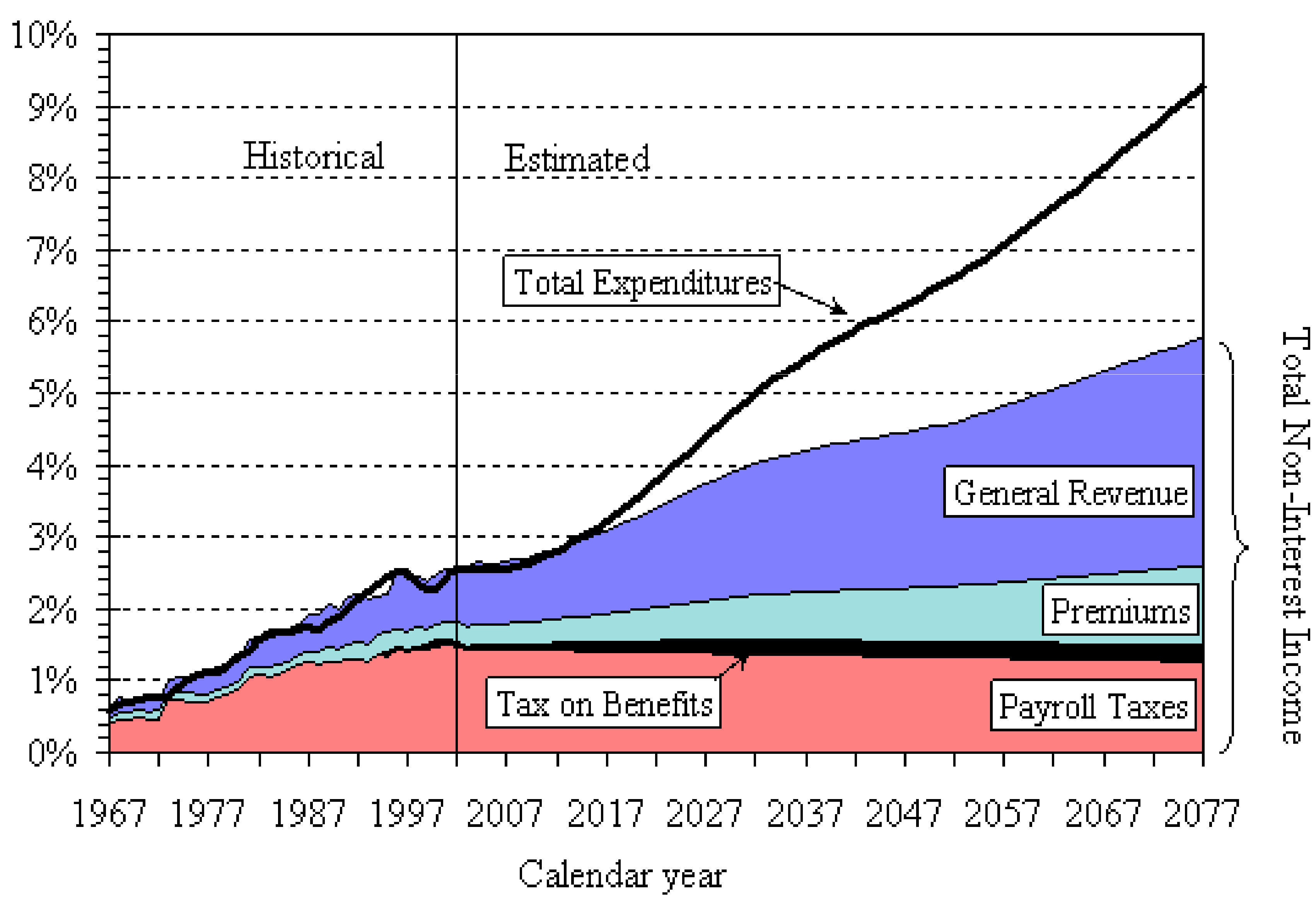


Chart C-Medicare Expenditures and Non-Interest Income by Source
as a Percent of GDP
10%
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
Historical
Estimated
Total Expenditures
General Revenue
Premiums
Tax on Benefits
Payroll Taxes
Total Non-Interest Income
1967
1977
1987
1997
2007
2017
2027
2037
2047
2057
2067
2077
Calendar year

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Greenspan Urges Action on Social Security and Medicare

By THE ASSOCIATED PRESS

Published: March 2, 2005

Filed at 12:34 p.m. ET

WASHINGTON (AP) -- Federal Reserve Chairman Alan Greenspan urged Congress Wednesday to move quickly to fix the financing problems in Social Security and Medicare, arguing that delay will only make the country's budgetary problems more severe.

Greenspan again endorsed the key part of President Bush's Social Security overhaul to set up private accounts. But he said Congress needed to do other things to put Social Security and Medicare on a more sound financial footing given the impending retirement of 78 million baby boomers.

Chip Somodevilla/Reuters

Federal Reserve Chairman Alan Greenspan urged Congress today to move quickly to fix the financing problems in Social Security and Medicare.

While saying that Congress should move quickly to consider possible benefit cuts for Social Security and

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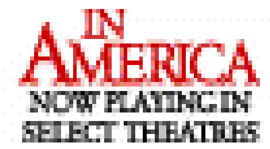

February 26, 2004

To Trim Deficit, Greenspan Urges Social Security and Medicare Cuts

By EDMUND L. ANDREWS

WASHINGTON, Feb. 25 — Alan Greenspan, the Federal Reserve chairman, told lawmakers on Wednesday that Congress should rein in the federal deficit through reductions in spending — including cuts in entitlement programs like Social Security — rather than through tax increases.

The Legislative Remedy

"The program could be brought into actuarial balance over the next 75 years by an immediate 122 percent increase in the payroll tax (from 2.9 percent to 6.44 percent), or an immediate 51 percent reduction in program outlays or some combination of the two."

2008 Report of Social Security and Medicare Board of Trustees

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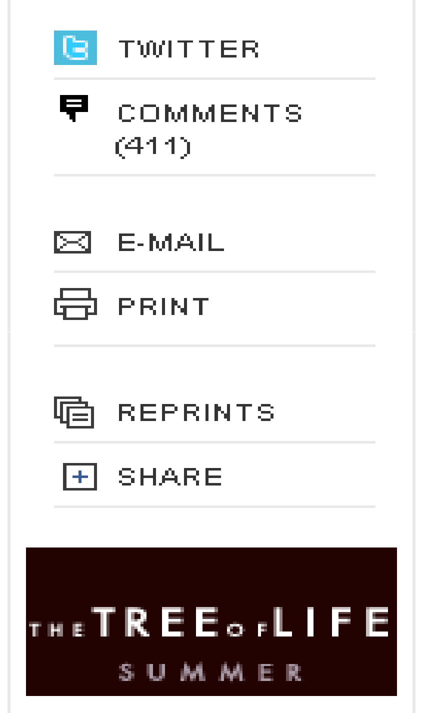
G.O.P. Blueprint Would Remake Health Policy

By ROBERT PEAR
Published: April 4, 2011



WASHINGTON — The proposal to be unveiled by House Republicans on Tuesday to rein in the long-term costs of Medicaid and Medicare represents a fundamental rethinking of how the two programs work, an ambitious effort by conservatives to address the nation's fiscal challenges, and a huge political risk.

Related

Obama Invites Republicans to Meet on Budget (April 5, 2011)

Related in Opinion

David Brooks: Moment of Truth (April 5, 2011)

ROOM FOR DEBATE

Can Private Insurers Fix Medicare?

The Republican budget proposal

House Republican aides said the budget blueprint to be issued by the chairman of the Budget Committee, Representative Paul D. Ryan of Wisconsin, would slice more than $5 trillion from projected federal spending in the coming decade. Health care accounts for much of the savings.

But while saving large sums for the federal government, the proposals on Medicaid and Medicare could shift some costs to beneficiaries and to the states.

The New York Times

The Opinion Pages

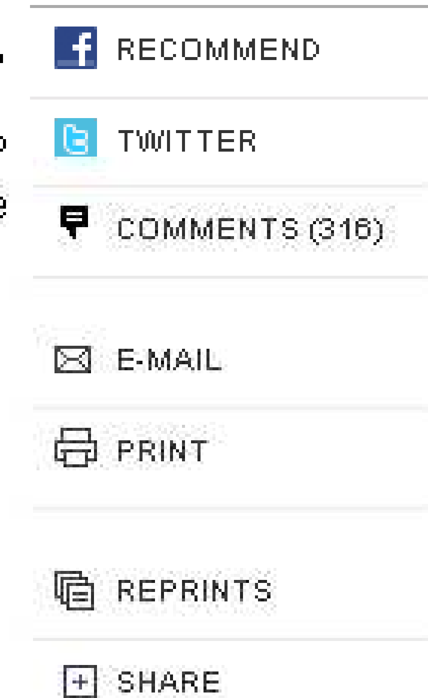
OP-ED COLUMNIST

Messing With Medicare

By PAUL KRUGMAN

Published: July 24, 2011

At the time of writing, President Obama's hoped-for "Grand Bargain" with Republicans is apparently dead. And I say good riddance. I'm no more eager than other rational people (a category that fails to include many Congressional Republicans) to see what happens if the debt limit isn't raised. But what the president was offering to the G.O.P., especially on Medicare, was a very bad deal for America.

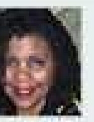


Specifically, according to many reports, the president offered both means-testing of Medicare benefits and a rise in the age of Medicare eligibility. The first would be bad policy; the second would be terrible

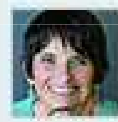
What Medicare Services to Cut, Now

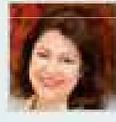
Limit prostate cancer screening, mammograms, some hip replacement surgeries. Also, get rid of administrators whose job is to pad bills.

Debaters


Stop Aggressive Therapies
Cheryl Woodson

Over 75? No P.S.A.
Kevin Pho


Three Items, Right Off the Bat
Jane Gross


'Dual Eligibles,' Doubly Expensive
Grace-Marie Turner

Make 'Medically Necessary' Less Murky
Carole Levine

Outsource Evaluation to the British
Robin Hanson

Rely on Hospice
Rick Mayes

Cost-Effective Tradeoffs
Liam Yore

Eliminate Unneeded Overhead
David Himmelstein

Don't Let Oncologists Make All the Decisions

Stop Aggressive Therapies

June 1, 2011

Cheryl Woodson has taught and practiced geriatric medicine for 30 years, spending 10 of those years also caring for a parent with Alzheimer's disease. She is the author of "To Survive Caregiving: A Daughter's Experience, A Doctor's Advice."

I think Medicare (and all other health insurance providers) should stop paying for CPR, dialysis and other aggressive therapies when patients have no chance for cure or recovering function.

C.P.R. is not the treatment for terminal cancer, heart failure or other chronic illnesses. Dialysis won't change the course for someone who is dying of lung failure, and feeding tubes won't cure dementia.This is not just about aging; we will have to make these difficult decisions on 25-week-old babies as well.

> Death is not optional: When we insist on assaulting people with futile technology, we prolong their dying.

Death is not optional. When we insist on assaulting people with futile technology, we not only fail to prolong their lives; we actually prolong their dying. Hospice is a wonderful alternative to this assault; it allows us keep people comfortable and love them ... to death.

Topics: Health, Medicare, health care

Chronic Disease Prevalence and Annual Costs

No. of Chronic Conditions	% Medicare Beneficiaries	% Medicare Expenditures
0	24.5	3.5
1	22.5	8.2
2	20.6	14.3
3	13.8	15.6
>4	18.6	58.4
Overall age group	100.0	100

Note: Individuals with 0 conditions accounted for 25% of population but 3.5% of costs. Individuals with ≥2 conditions accounted for 53% of population but 88% of costs.

Models for Re-engineering Chronic Care

Chronic Care Model – Practices organized to enable team care, case management, patient self-management, and clinical use of IT

Hospital at Home - Program to treat acute illnesses at home with RN & MD monitoring

Palliative Care – Programs designed to improve pain and symptom control, to provide psycho-social support, and to help with goals of care

Acute Care for the Elderly – Redesigned hospital units with protocols to improve elder care

Hospital Elder Life Program – Hospital protocols to enhance orientation, feeding, mobilization, sleep, & adaptation to sensory deficits

Transition Services – Programs developed to link hospital and home follow up

Examples of Model Programs and Estimates of Impact

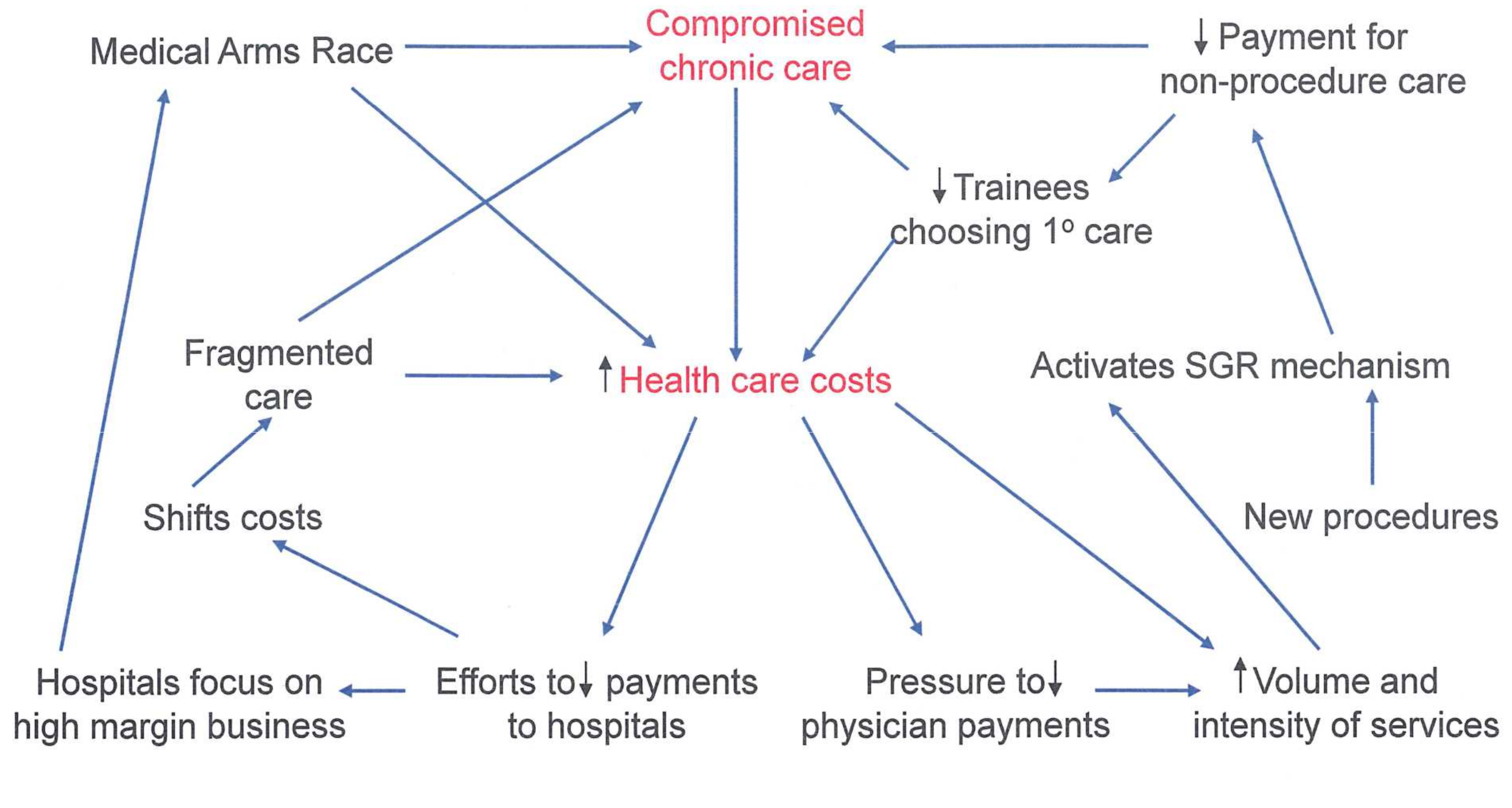
Program & Characteristics	Impact on Value
Hospital at Home: ED identification of patients for hospital level care at home with MD daily visits and 24 hour nursing.	Quality: Patients treated at home had shorter periods of acute service use (3.2 vs. 4.9 days) and equivalent or better quality outcomes. Cost: Mean costs $2399 or 32% lower per case ($489/day lower).
Hospital Elder Life Program (HELP): team plus inpatient intervention protocols to prevent delirium.	Quality: Program prevents delirium in up to 40% of cases. Cost: Savings of $831/patient ($2,500 per avoided case of delirium).
Palliative Care: inpatient consult services that improve pain, symptom management, and communication.	Quality: Cost: Decedents with LOS of $\geq$15 days receiving palliative care consultation in one hospital had a 1.9 day LOS reduction (compared to matched controls). For decedents with LOS of $\geq$21 days, LOS decreased 5.1 days.
The Care Transitions Program: 4 week support by Transition Coach pre and post discharge to support self management.	Quality: 30% reduction in readmission rates within 30 days (8.3 vs.11.9%)Overall impact estimated as 47% reduction in readmissions as compared to national average rates for Medicare (from 19% to 10%)

What do Chronic Care Model, ACE, Hospital at Home, Palliative Care, Hospital Elder Life Program, and Transition Services have in common?

1. Evidence of improvements in care
2. Evidence of possible cost savings
3. No formal reimbursement mechanism

Current Reimbursement System Provides the Wrong Incentives

- Current incentives drive volume and intensity of services
- Hospital payments create financial incentives for hospitals to invest mainly in relatively profitable surgical conditions
- Need incentives that will capitalize on potential of EHR, comparative effectiveness, and chronic care innovations



Medical Arms Race
Compromised chronic care
↓ Payment for non-procedure care
↓ Trainees choosing 1° care
Fragmented care
↑ Health care costs
Activates SGR mechanism
Shifts costs
New procedures
Hospitals focus on high margin business
Efforts to ↓ payments to hospitals
Pressure to ↓ physician payments
↑ Volume and intensity of services
INPATIENT
AMBULATORY CARE

Move Inpatients Through the System Safely and Efficiently:
ACE/HELP
NICHE
Palliative Care

Keep some patients with acute illness out of the hospital :
Hospital at Home

Prevent Readmissions:
Care Transition Program

Provide patient-centered, coordinated care:
PCMH
(e.g. GRACE)

Need Payment Model Not Driven by More Hospitalizations and Procedures

Pay more for non-procedure care, transition services and care coordination

Pay for Performance

Accountable Care Organizations

Bundled payment with bonuses for performance

Shared accountability for resource use with shared savings

Conclusions

- Improvement in longevity has been striking and sustained over a century
- Longevity improvement is likely due to a combination of factors (prosperity, education, biomedical advances, and improved access to care)
- To sustain longevity, we need to continue investment in science, education, and in access to care
- Improvement in longevity also require societal responses to accommodate long life