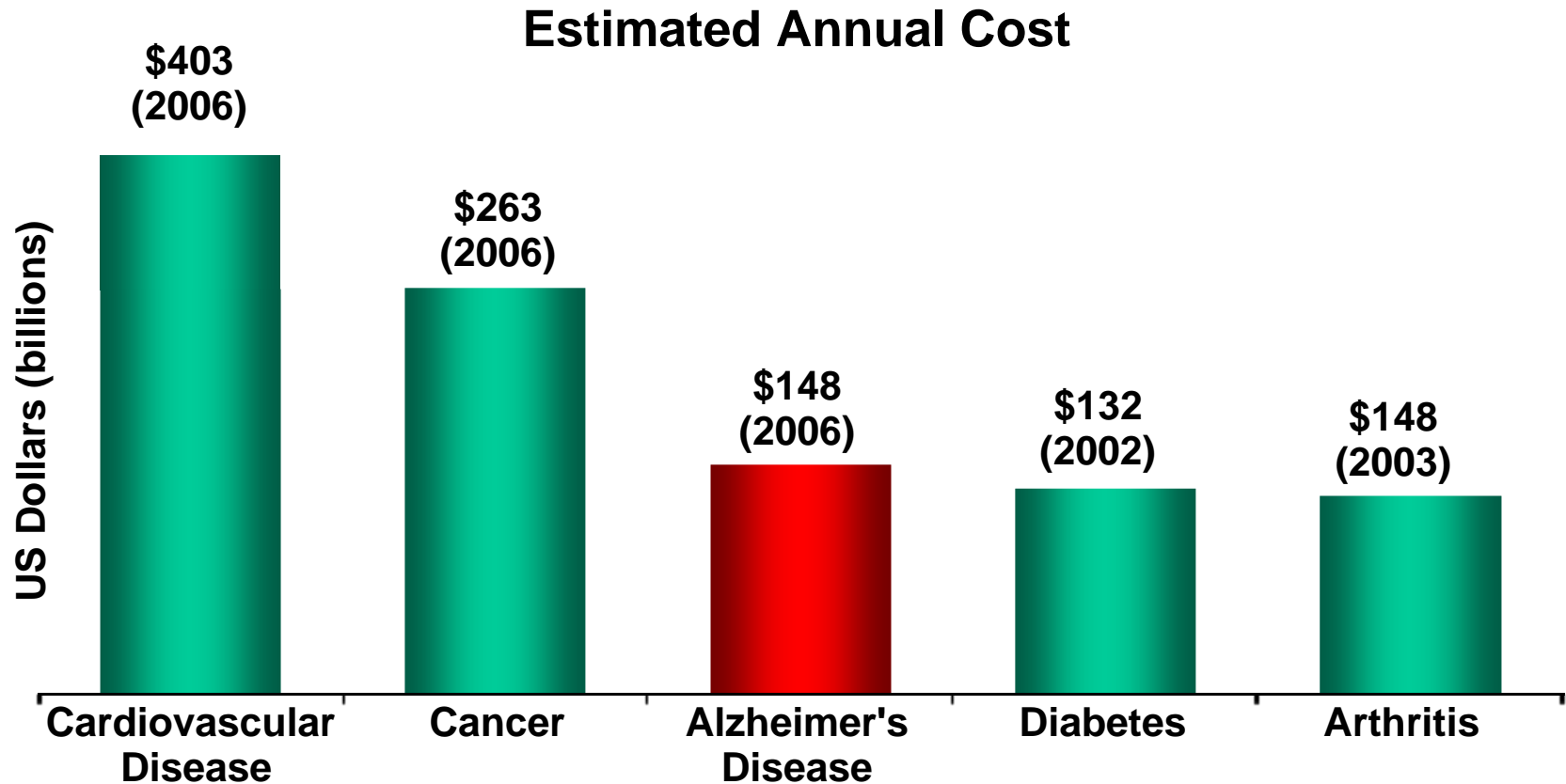

Excess Costs in Dementia Care and Impact of Comorbidities: A North American Perspective

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Alzheimer's Disease (AD): Third Most Costly Disease in the US



Costs for Alzheimer's Disease by Payer in the United States

- Medicare
 - Medicare total direct costs for AD (2005): **\$91billion**
 - Medicare Part A and B (fee-for-service), Part C (Medicare Advantage managed care plans) and D (Medicare prescription drug plans)
 - Total expenditures for Medicare Part D was \$32B (2006)
 - costs of anti-dementia therapies to FFS Medicare Part D was **~\$1B**
- Medicaid
 - Health care for the poor, provides benefits for long term care including nursing home care
 - **\$21B** spent on AD in 2005

Excess Costs for Alzheimer's Disease in the United States by Payer

- Private long term care insurance
 - total payout of claims was \$3.3B in 2006
 - 60% of claims are for Alzheimer's disease
 - 30% for assisted living, 36% for nursing home, and 46% for home care
(Amer. Association for Long Term Care Insurance)
- Out of pocket costs
 - Medicare beneficiaries spent average of 22 % of income on health care
 - Medicare Part B, C and D premiums, and private supplemental insurance amount to half of these out of pocket costs
 - Out of pocket costs account for approximately half of all long term care costs

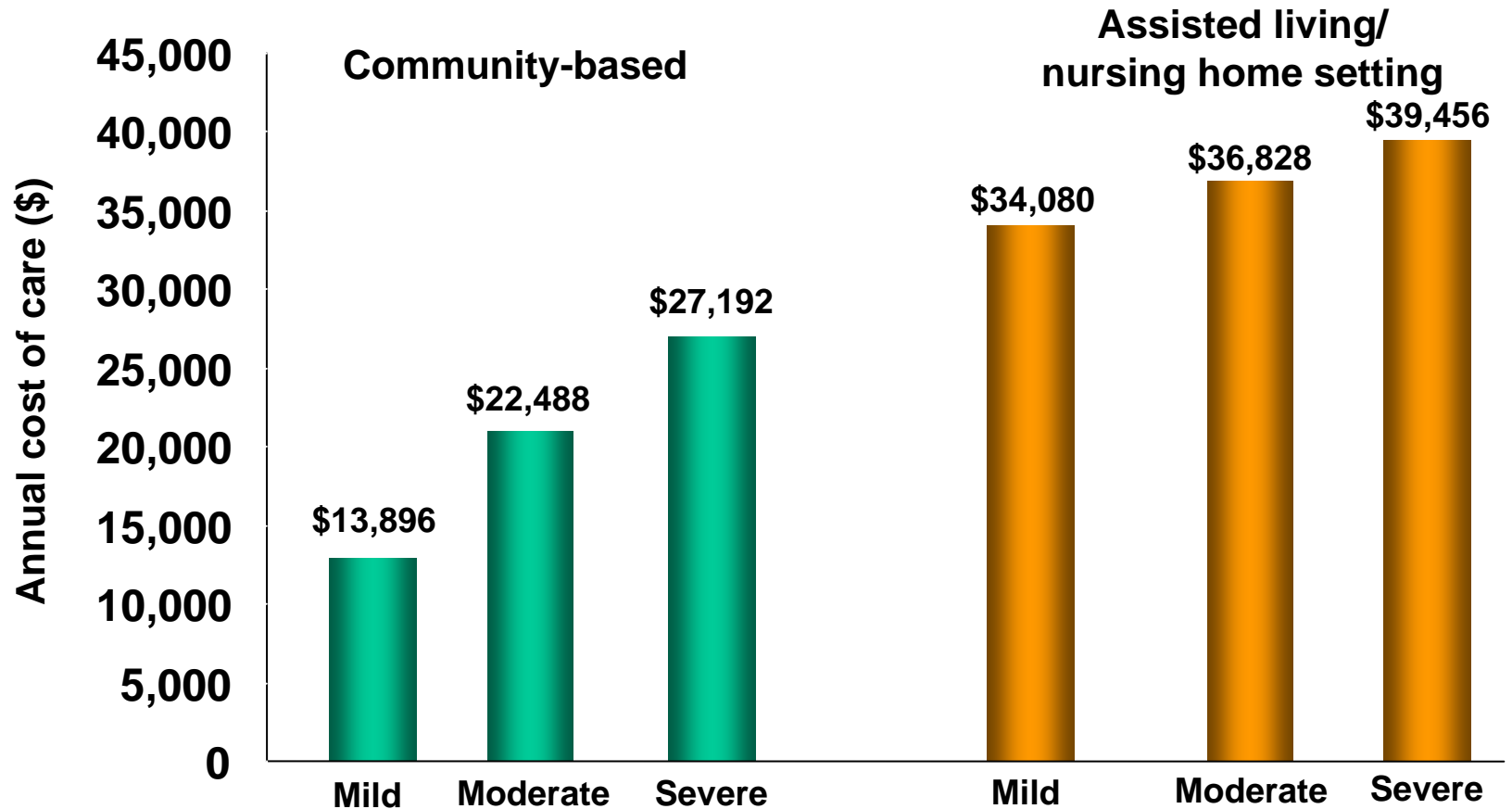
Costs in Canada

- 290,000 Canadians over 65 have Alzheimer's disease
- Universal public insurance at no charge to the individual
 - Continuing and community care services provided by a combination of public, private and not-for-profit providers
- \$5.5 billion a year is spent on persons with Alzheimer's disease and related dementias in Canada

Ostbye T., et al. Can Med Assoc J 1994

Hux M, et al. Can Med Assoc J 1998: 159

Impact of AD Severity and Site of Care on Costs



Costs include medical costs, caregiver hours, and other costs incurred in the assisted living/nursing home care

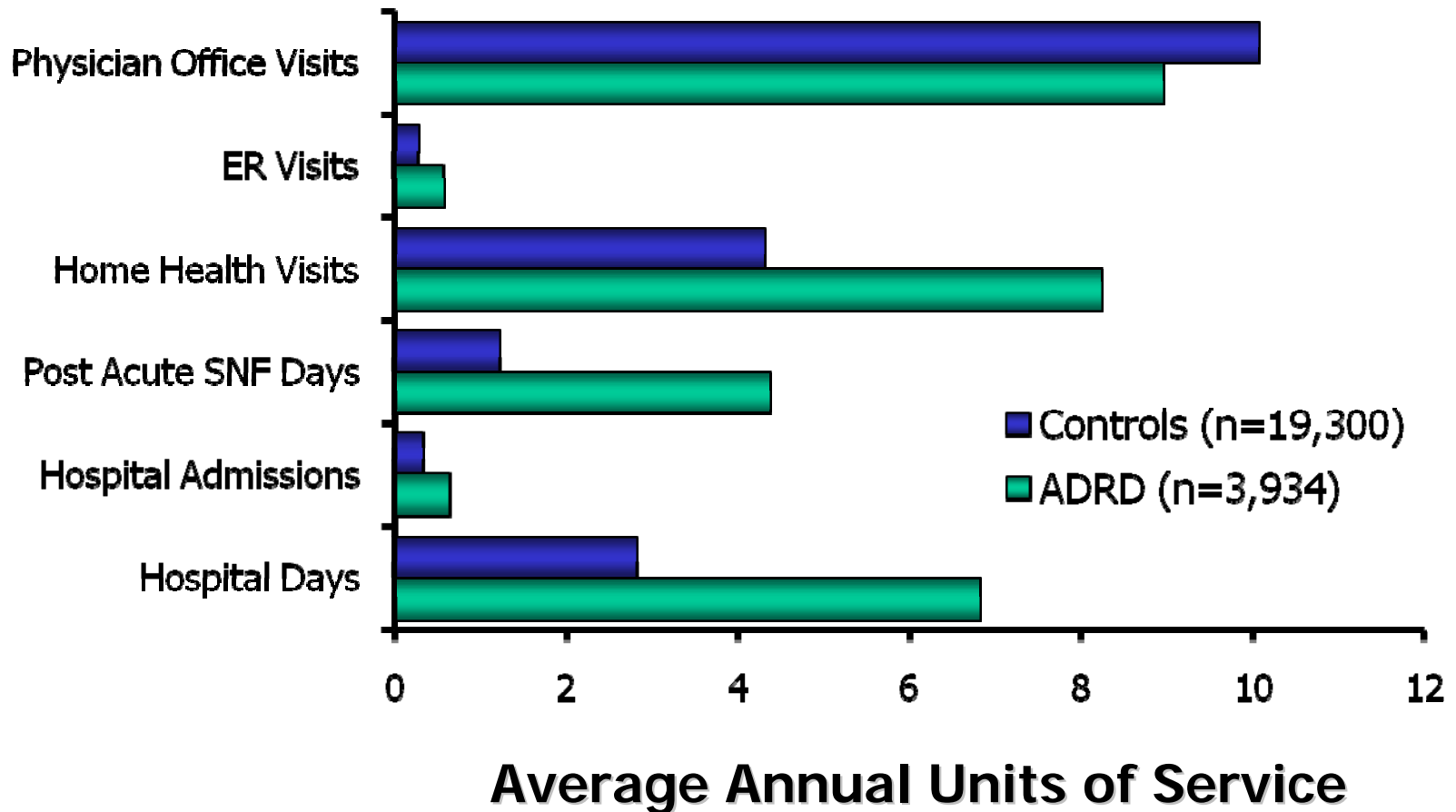
Sources of Excess Costs of Dementia

- Mild to moderate stages
 - failure to diagnose cognitive impairment early, costs of diagnosis, functional impairment and accidents, poor control of comorbidities, preventable hospitalizations, behavior disorders, caregiver burden
- Late stages
 - Multiple complications leading to hospitalization and institutionalization
- Increasing pharmacy costs
 - Cognitive enhancers, psychotropics, and antidepressants
 - Disease modifying agents

Under-Recognition of the Role Hospital Costs on the Economics of Dementia

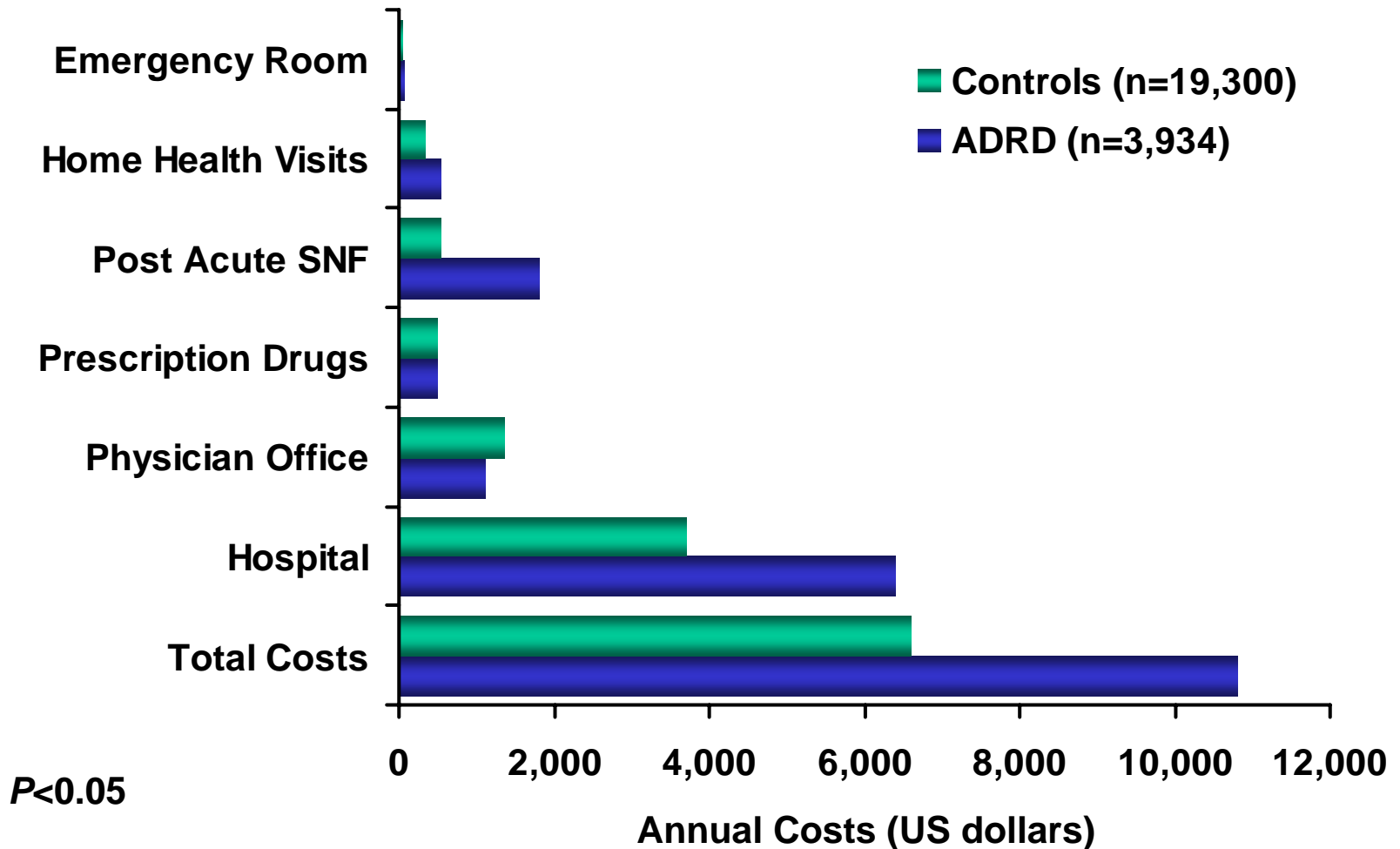
- Hospital costs for demented patients were 75% higher
- Hospital length of stay for demented patients was 100% longer
- *Undercoding*: Although 63% of admitted patients had dementia,
 - dementia was listed as admitting diagnosis for **only 3%** of demented patients
 - dementia was coded for claims in only **31%** of demented patients

Dementia Significantly Increases Utilization of Most Services in Community-Dwelling Elderly



$P < 0.05$; Hill et al. *Neurology*. 2002;58:62-70.

Dementia Increases Healthcare Costs in Community-Dwelling Elderly

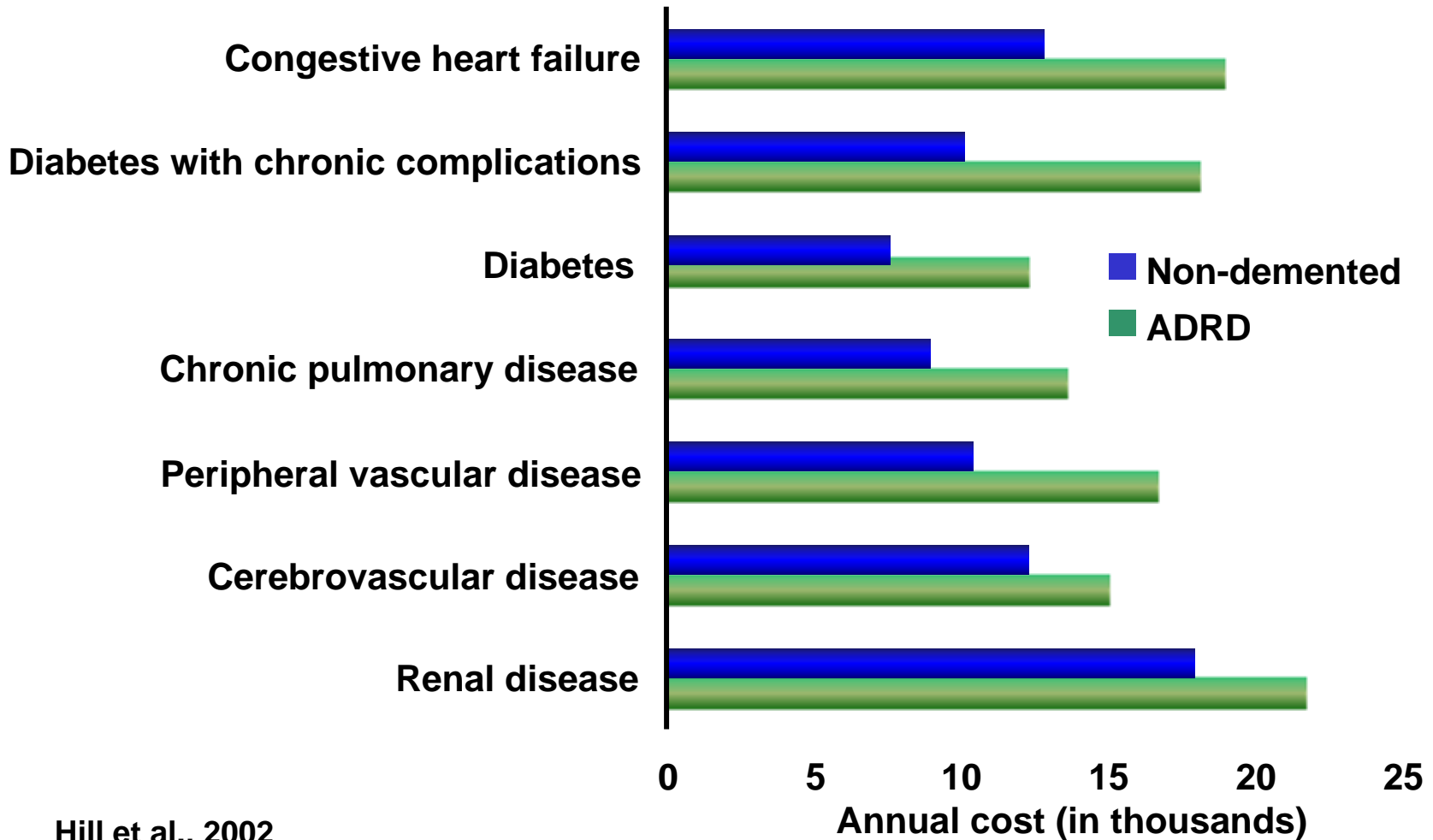


Hill JW et al. *Neurology*. 2002;58:62-70.

Medical Comorbidities and AD Pharmacoeconomics

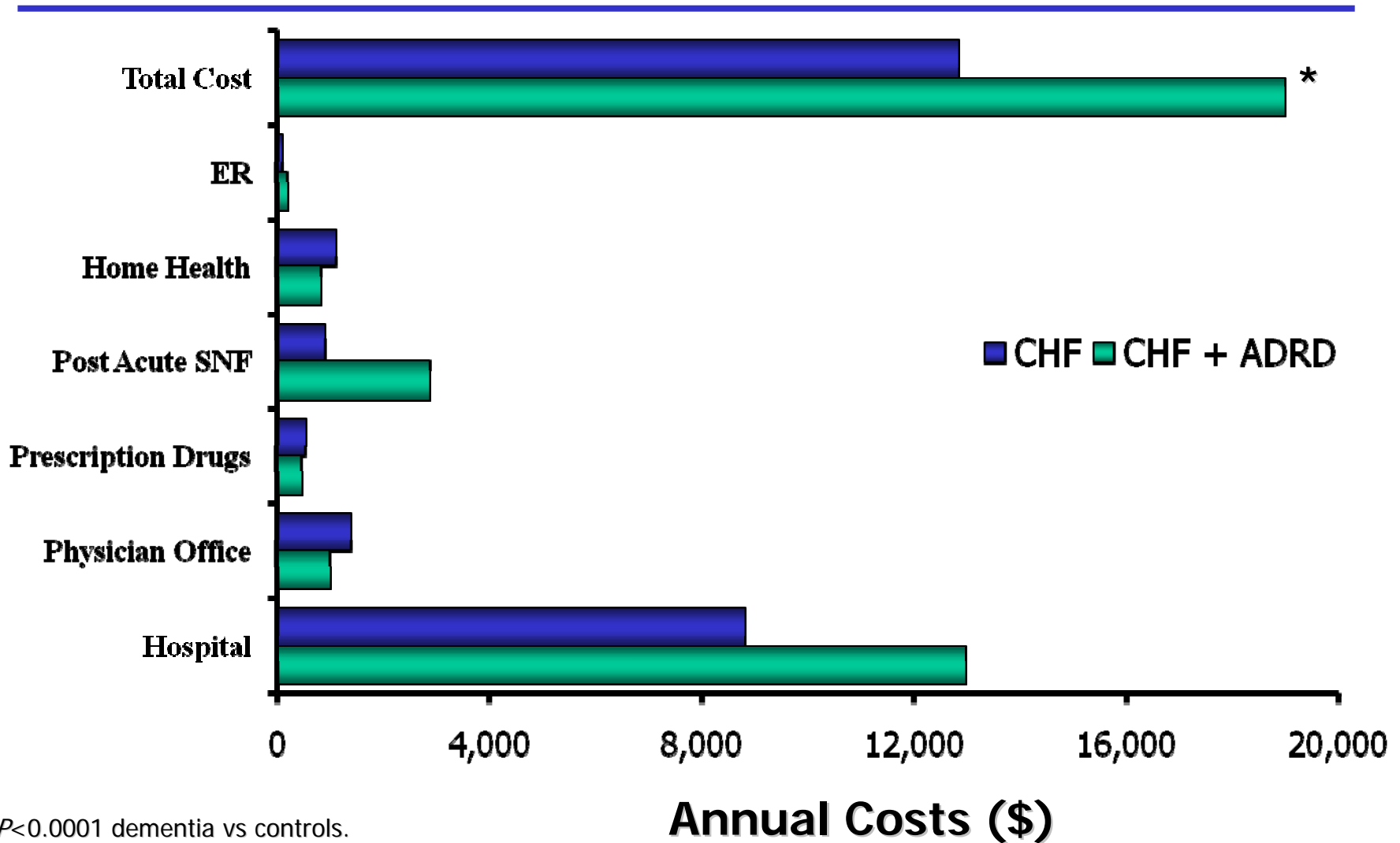
- Most elderly (>90%) with AD have at least 1 medical comorbidity that significantly impacts costs (eg, diabetes, CHF)
 - 60% have more than 3 comorbidities
- Interaction among medical co-morbidities and cognitive impairment may drive excess costs in AD

ADRD Increases the Annual Costs of Common Comorbidities



Hill et al., 2002

Dementia Increases the Costs of Managing Medical Comorbidities in the Frail Elderly: Congestive Heart Failure



* $P < 0.0001$ dementia vs controls.

Hill et al. *Neurology*. 2002;58:62-70.

Dementia, Comorbidities, Expenditures and Hospital Use in Fee For Service Medicare

- Cross sectional analysis of claims data from a 5% sample of fee-for-service Medicare beneficiaries in 1999
 - 1,238,895 persons
- Prevalence of dementia was 8.3%
 - 10% for patients 75-84, 24% for patients 85-94
- Overall, dementia patients had **3 times** Medicare fee-for-service costs compared to non-demented patients, after adjustment for covariates
- Analyzed impact of dementia on
 - most expensive causes of hospitalization
 - *potentially preventable ambulatory care sensitive* causes of hospitalizations
 - causes of hospitalization that *required significant patient self-management*

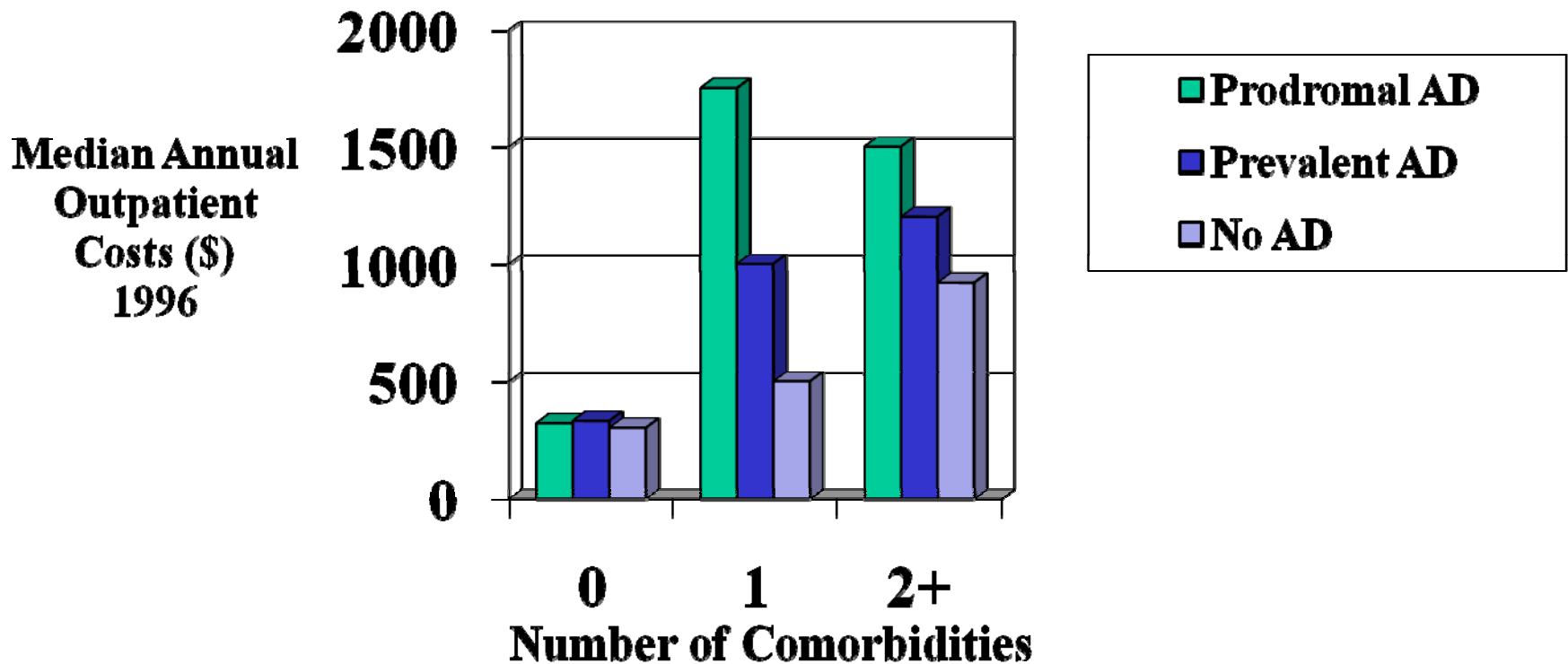
Dementia, Comorbidities, Medicare Expenditures and Hospital Use

Potentially Preventable *Ambulatory Care Sensitive* Hospitalizations (per 1000 beneficiaries)

Number of chronic conditions	Crude rate	Crude rate adding dementia	Adjusted OR associated with dementia
0	0.9	18.2	6.58
1	5.3	31.2	2.89
2	10.7	54.7	2.77
3	24.4	72.5	2.19
4	52.6	113.0	1.68
5	128.0	189.0	1.49

Bynum et al, J. Amer. Geriatrics Soc, 2004

Excess Costs Due to Comorbidity in Ambulatory Care: Primary Care Expenditures Prior to Onset of Alzheimer's disease



Prodromal period of undiagnosed AD associated with
\$128-195M excess Medicare costs

Comorbid Conditions Are the Most Important Driver of Potentially Avoidable Costs in AD Patients: *A Payer Perspective*

- Examined strength of associations between 5 measures of need that are potentially modifiable in dementia patients, and direct costs of care from 5 payer perspectives
- Cohort study of 150 patients in clinical practice
- Measured need variables at baseline and utilization of health in the year before and after baseline

Comorbid Conditions Are the Most Important Driver of Potentially Avoidable Costs in AD Patients: A Payer Perspective

	Medicare	Medicare Advantage	Medicaid	Patient/ Family	Societal
Cognitive Impairment				0.28*	0.27*
Neuropsychiatric Symptoms		0.15*	0.18*	0.26*	0.25*
Parkinsonism			0.19*	0.19*	0.18*
Comorbid Medical Conditions	0.43*	0.45*	0.32*	0.16*	0.22*
Dependency				0.42*	0.38*
Model R ²	0.22	0.25	0.28	0.41	0.41

Excess Costs of Dementia by Degree of Functional Impairment

- For community-dwelling dementia patients, not on AD therapy, annual healthcare costs increased by
 - \$714 for each additional IADL impairment
 - \$1,541 for each additional ADL impairment

Excess Costs of Alzheimer's Disease in Nursing Homes

- Massachusetts Medicaid nursing home database 1995
- Comparative management levels and annual cost of caring for nursing home residents with and without dementia
- Studied per-diem rates for 10 designated management levels
- 49,724 residents; 26.4% rate of dementia (probably undercoded)

***Residents with dementia required 229 more hours
of care annually resulting in \$3,865 excess costs***

Reduced Costs of AD

During Last Three Years of Life

	Aggregate costs	Hospital days	Inpatient costs	Physician visits	Long term care
Alzheimer's (n=263)	\$11,834	7.2	\$8,712	11.3	\$6,625
Controls (n=133)	\$22,132	12.4	\$17,346	22.9	\$5,760

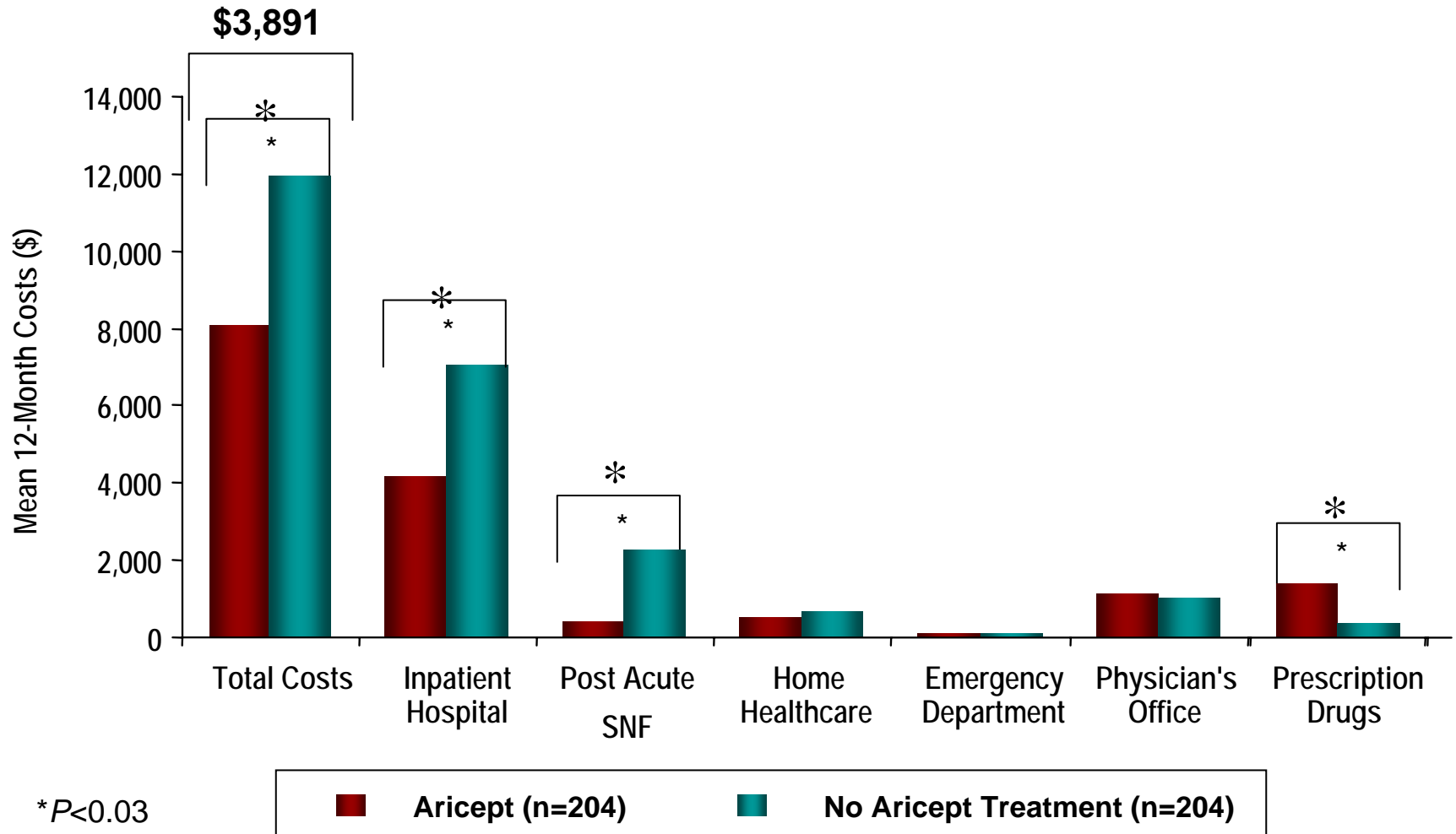
Subjects mean age 85 in a mature managed care organization
(Group Health Cooperative, Puget Sound, Washington state, founded 1947)

McCormick et al, J. Amer. Geriatrics Soc, 2001

The Excess Costs of Dementia Can Be Managed

- Caregivers receiving education and counseling had lower likelihood of hospitalization and emergency visits (Shelton, J. Amer. Geriatr. Soc. 49:1600, 2001)
- Patients and caregivers receiving care consultation had fewer emergency room visits and hospitalizations (Clark et al, Aging and Mental Health 8:40, 2004)
- Telephonic care management counseling for Alzheimer's Disease caregivers delayed time to nursing home placement by almost one year
(Mittelman MS, JAMA. 1996 Dec 4;276: 1725-31)

Pharmacotherapy is Associated with a Reduction in Excess Costs of Dementia



Fillit et al. *Family Medicine*, 2002

Lu, et al, *Am J Geriatr. Pharmacotherapy*, 2005

Excess Costs and Comorbidities of Alzheimer's Disease– North American Perspective

- Alzheimer's disease clearly causes excess costs
- Like other chronic diseases associated with aging, hospitalization is the most important driver of excess costs in community dwelling patients
- Excess hospital costs are driven by the impact of Alzheimer's disease on common medical comorbidities
- Excess hospitalizations are potentially preventable, and often involve conditions requiring self-management of a chronic disease
- Pharmacotherapy combined with care management have the potential to impact excess costs, providing a pharmacoeconomic benefit
- In the US, relevance of excess costs are determined by the payer