

Neuropsychiatric Symptoms as “Cost-Drivers” in AD

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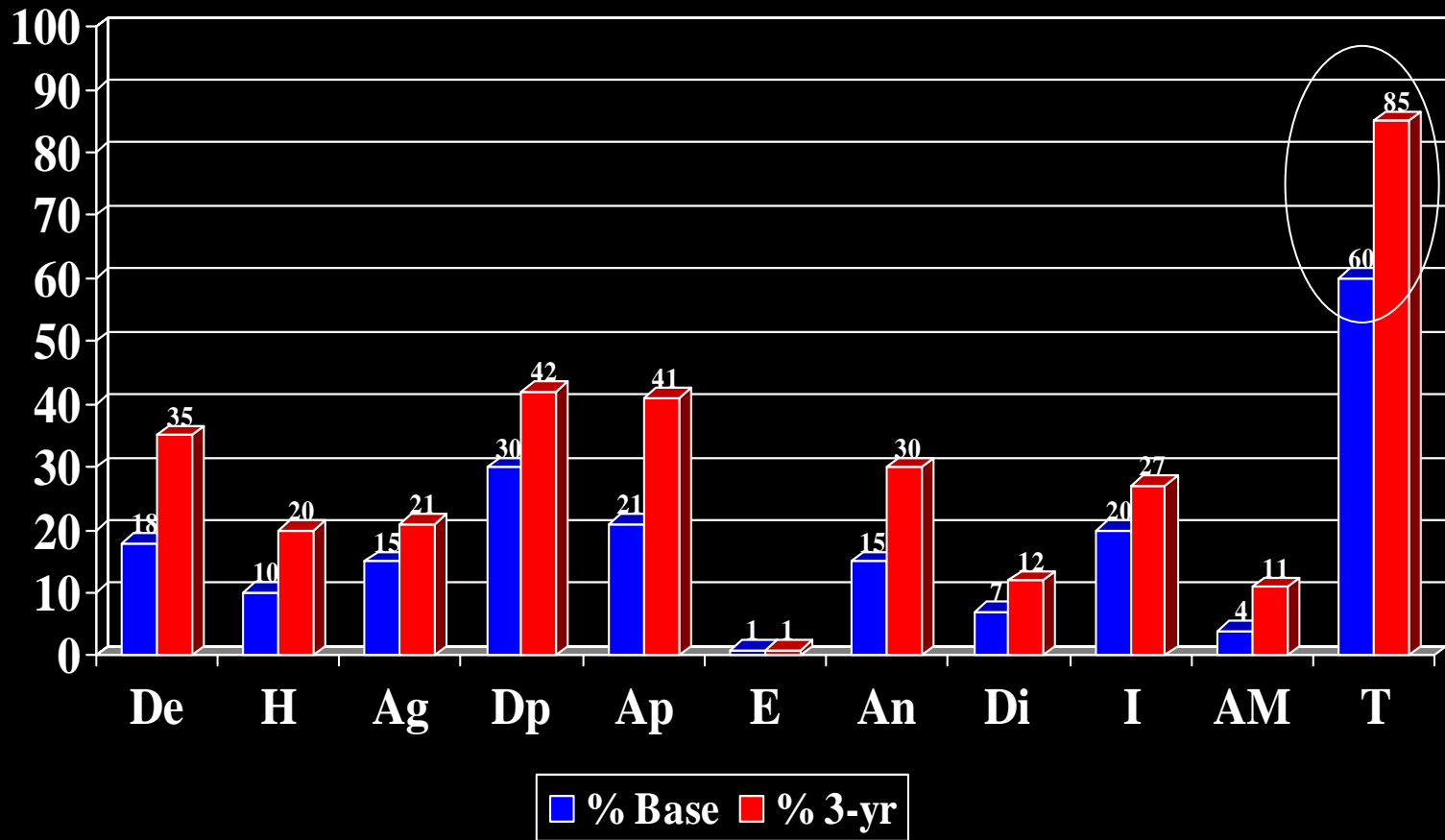


Nomenclature

- Behavioural and Psychological Symptoms of Dementia (BPSD)
- Neuropsychiatric Symptoms
 - Associated with Neuropsychiatric Inventory (NPI)
 - Implies neuropsychiatric mechanism
(i.e. symptoms result from underlying brain disease)
 - Concise

NP Symptoms in Dementia: Point Prevalence

From Cache County Study on Memory and Health in Aging



Derived from Steinberg M, et al. Int J Geriatr Psychiatry 2008; 23:170-177.

NP Symptoms in Dementia: Persistence

- Population based sample n=329
- Of 204 with baseline NP symptoms, 117 were available for retesting at 18 months
- 81% of patients with symptoms at baseline continued to have some symptoms at 18m
- Mean severity scores were not significantly different in all ten domains (0 vs. 18m) in those with persistent symptoms

Clinical Predictors of Direct Costs in AD

- 150 patients/caregiver dyads
 - 133 AD (NINDS/ADRDA), 17 DLB (Consensus Criteria)
- Recruited from 9 practices in Michigan
 - 6 Neurology, 3 Geriatric Medicine
- Interviews
 - Baseline interview of patient and caregiver
 - Yearly telephone interview of caregivers for 3 years

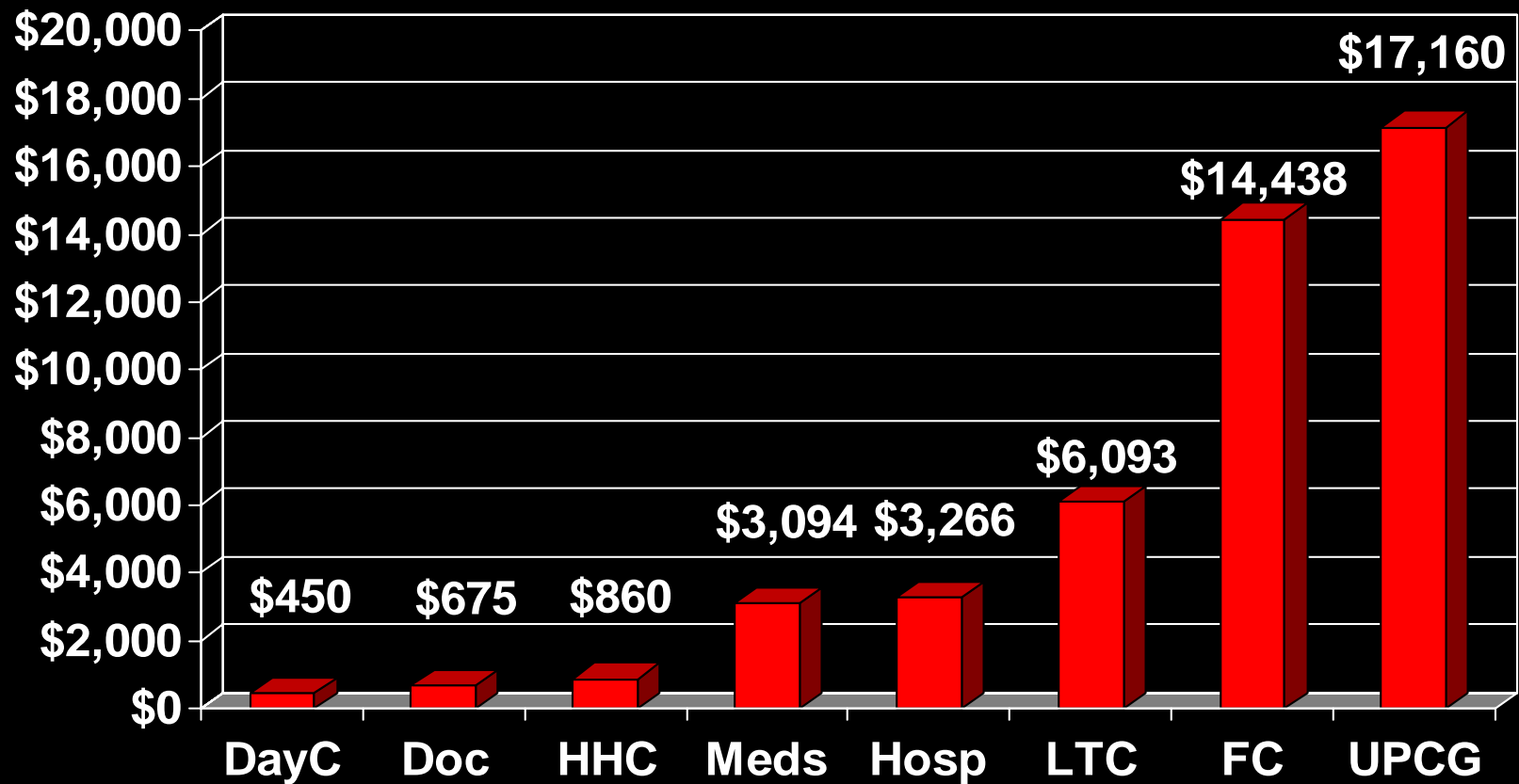
Clinical Predictors of Direct Costs in AD

- Measured Clinical Symptoms
 - Cognition, Neuropsychiatric Symptoms, Extrapyrarnidal Signs, Medical Co-morbidity, Functional Dependence
- Quantified Annual Healthcare Utilization
 - Structured interview from HRS/AHEAD
 - Caregiver Activities Time Survey (CATS)
- Utilization Data Converted to Direct Cost
 - Unit costs derived from regional/national sources

AD Cohort Baseline Characteristics

Characteristic	Average (n=133)
Age	76 years
Education	12.9 years
Sex	55% women
MMSE	15.1
NPI	18.7
CIRS	20.8
EPS	3.5

Types of Direct Costs in AD Patients

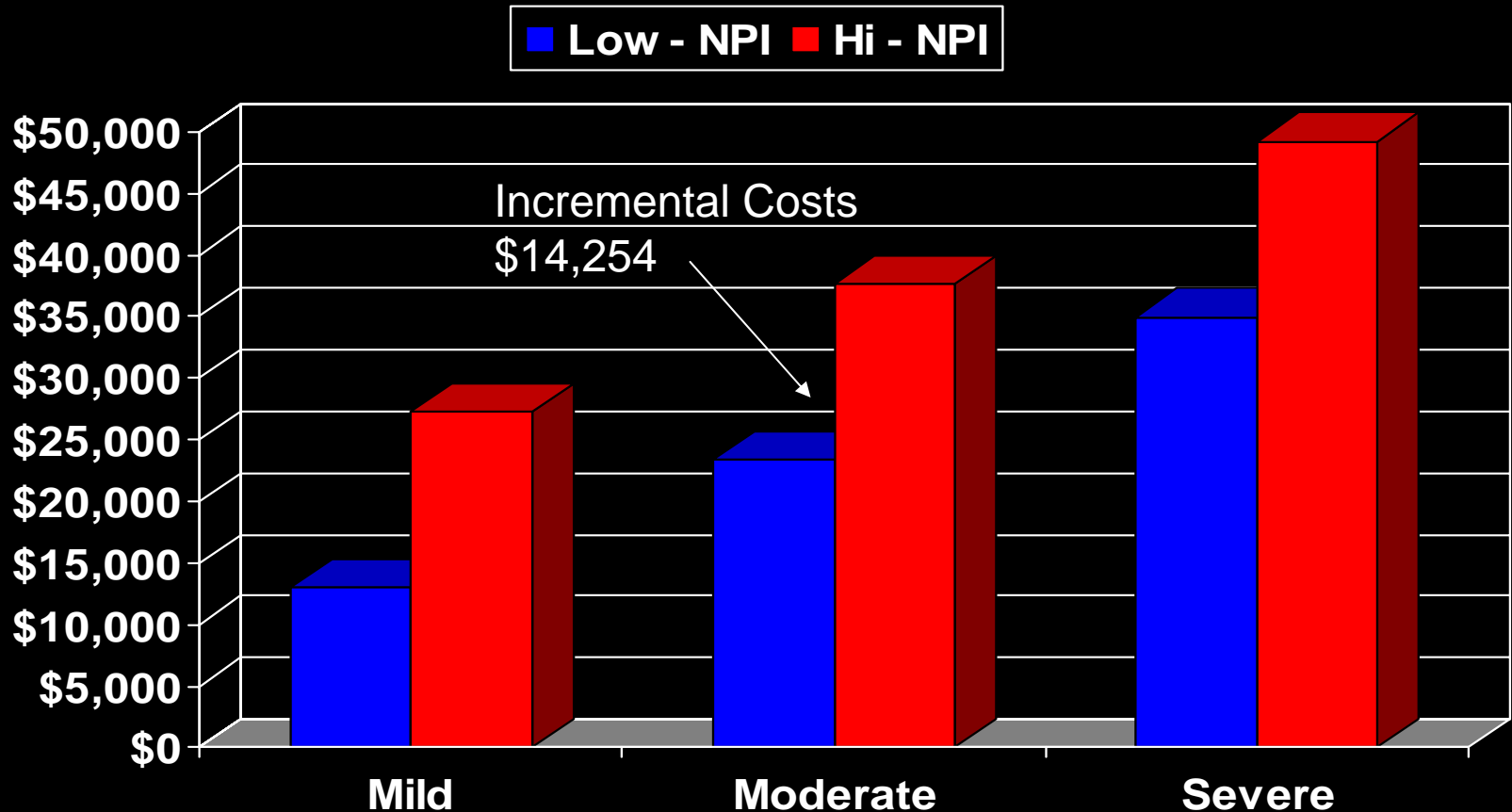


Average, annual costs for AD cohort (n=133) in 2001

Low/High NP Symptom Groups

	Low NPI Group	High NPI Group
Number	57	71
Age	76.1	76.4
NPI	4.7	29.9*
MMSE	16.9	13.6*
CIRS	19.4	21.9*
EPS	3.0	3.9

Incremental Costs Associated With “High” NP Symptom Group in AD



Average, annual, total direct costs (2001 US dollars).

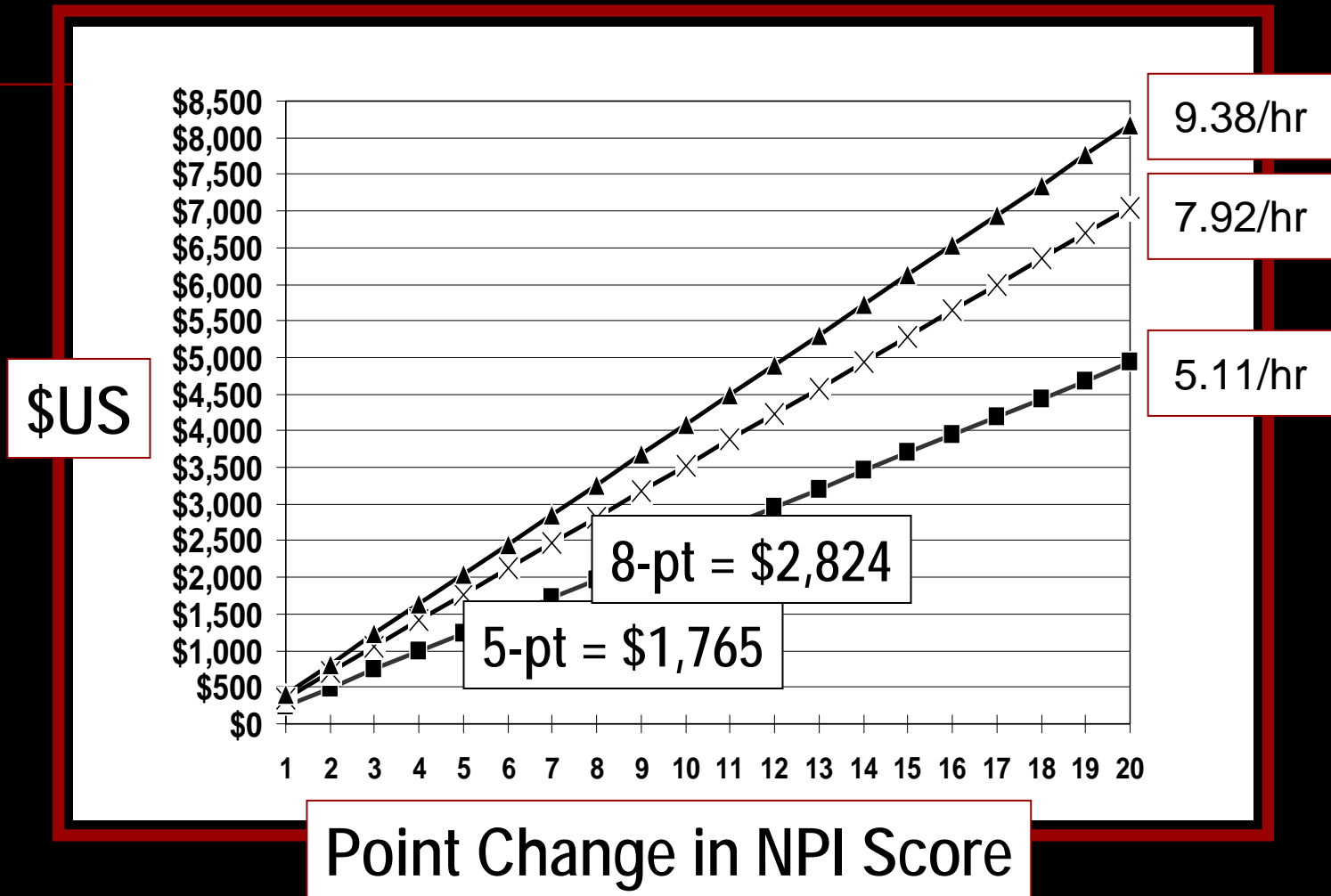
Adjusted for severity of dementia and co-morbid medical conditions.

Utilization/Cost Differences

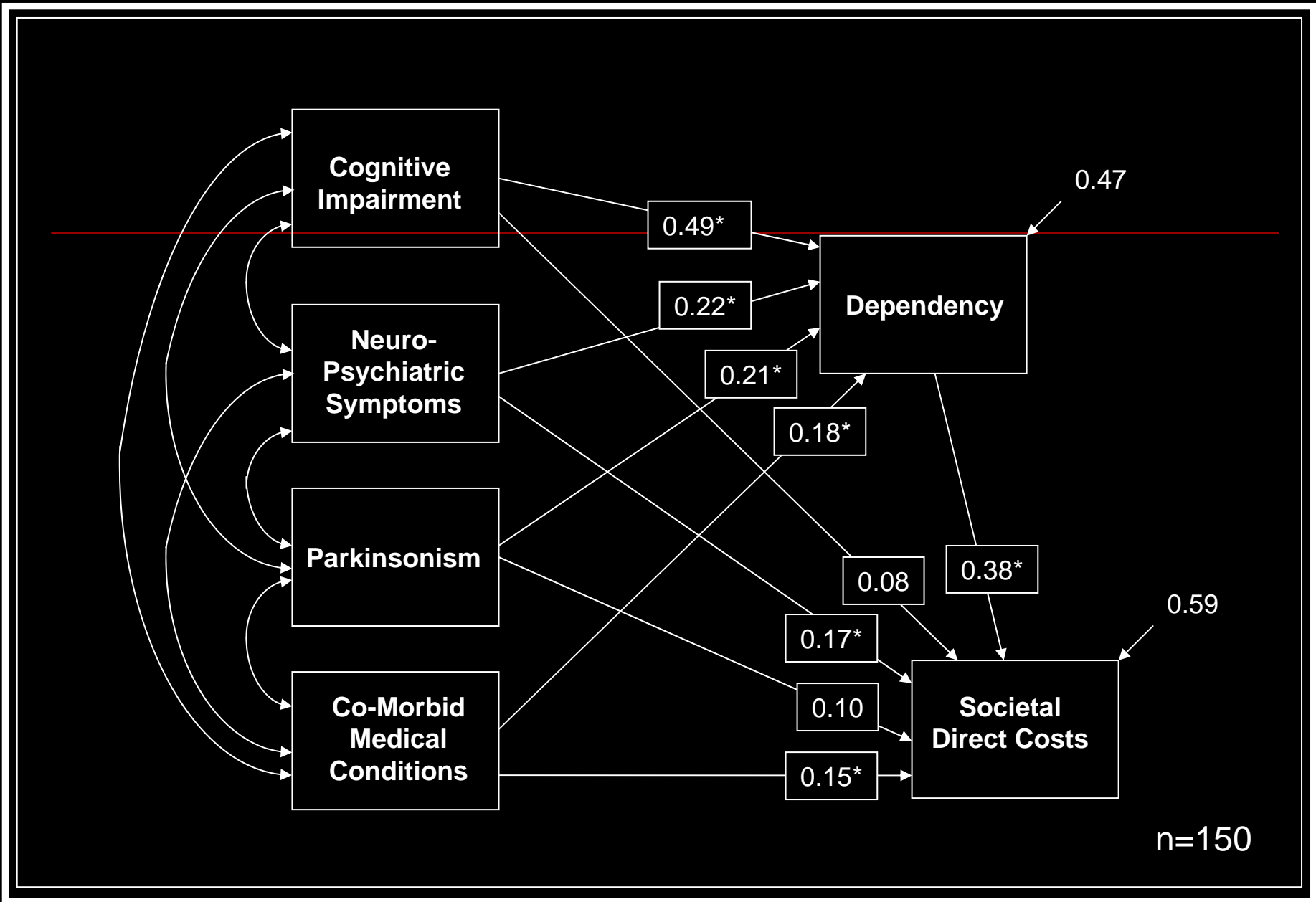
	Low NPI	High NPI
Unpaid Care	4.4 hours/d	7.9 hours/d*
	\$11,451	\$21,524*
Longterm Care	12 %	27 %*
	\$3,123	\$7,550
Prescriptions	3.5 drugs	4.7 drugs*
	\$2,470	\$3,453*
Physician Visit	6.6/yr	10.6/yr*
	\$508	\$826*

* p < 0.05 adjusted models (dementia severity, CIRS)

Incremental TDC Per NPI Point Change



Regression model predictors: NPI score ($p < 0.01$), MMSE score, CIRS score, $R^2 = 0.31$



Relative Impact of Patient Factors on Direct Costs on AD

■ Societal Perspective

■ Dependency	0.38*
■ Cognitive Impairment	0.27*
■ Neuropsychiatric Symptoms	0.25*
■ Co-Morbid Medical Conditions	0.22*
■ Parkinsonism	0.18*

* Values are standardized, total path coefficients, all $p < 0.05$

Relative Impact of Patient Variables on AD Direct Costs for “U.S. Payers”

	Medicare	Medicare +D	Medicaid
Depend	0.07	0.06	0.18
Cog. Impair	0.08	0.03	0.10
NeuroPsych	0.12	0.15*	0.18*
Co-morbid	0.43*	0.45*	0.32*
Park	0.01	0.02	0.19*

*p<0.05. Values are standardized, total path coefficients.

NP Symptoms in Dementia: Grouping

■ Grouping

■ Factor Analysis: Mood, Psychotic, Frontal

- Frisoni GB, et al., Dement Geriatr Cogn Disord 1999;10:130-8

■ Cluster Analysis: Low, Affective, Psychotic

- Lyketsos CG, et al. Int J Geriatr Psych 2001; 16:1043-1053.

■ Clinical Diagnostic Criteria

■ Depression in AD

■ Psychosis in AD

■ ? Agitation in AD

NPI Clusters and Outcomes

- Three and Four Cluster Solutions
 - Minimally Symptomatic (n=38, NPI 6, MMSE 17)
 - Affective/Apathetic (n=31, NPI 14, MMSE 17)
 - Highly Symptomatic (n=53, NPI 29, MMSE 15)
- NP Clusters at Baseline Predict Time to NH placement, Survival and Caregiver Burden
 - Highly symptomatic group significantly more likely to receive institutional LTC, had shorter survival, and increased caregiver burden

Other Literature – Part I

- **AD Patient Cost-Drivers in Nordic Countries**
 - Recruited from memory disorder clinics in Sweden, Denmark, Norway, Finland. Probable AD (n=272)
 - Measured at baseline, 6 months, 12 months
- **Resource Utilization in Dementia (RUD)**
- **Informal Care Measured**
 - Included patient supervision by caregiver
 - Opportunity cost used to value informal care
 - Different approaches for valuing informal care were used in sensitivity analysis

Other Literature – Part I

■ Clinical Symptoms/Signs

- Five MMSE subgroups, co-morbidities, dependency
- NPI-Q used to measure neuropsychiatric symptoms

■ Results

- Direct costs increased 8% for each point NPI-Q increase, in multivariable models that included MMSE groups, co-morbidities, time since diagnosis
- Replacement wage method of valuing informal care resulted in substantially higher cost estimates

Other Literature – Part II

■ Predictors Study

- Predictors 2 cohort, AD subjects n=180

■ Measures

- Columbia University Scale for Psychopathology in AD (CUSPAD)
- Dichotomous groups: Psychotic, Behavioral, Depression
- Utilization, including informal care
- Informal care focused on help with IADL or ADL and did not include supervision. Unit cost of informal care \$14.32

Other Literature – Part II

■ Results

- Presence of depression significantly predicted costs in cross-sectional multivariable models, but did not in longitudinal analyses of direct costs.
- Neuropsychiatric symptom groups did not predict formal direct costs or informal care costs in longitudinal analyses.

■ Possible Explanations

- The measurement of neuropsychiatric symptoms as “too course” and did not account for the severity of symptoms
- Measurement of informal care time did not include time spent in supervision activities (i.e. “can the patient be left alone”)

Conclusions

- Neuropsychiatric symptoms are important, independent predictors of direct costs in AD
- Important “drivers” of these increased costs include: increased informal care, increased risk of formal longterm care and greater medication costs
- Empiric studies and economic models must include informal care costs and a long-term, time horizon to capture these incremental costs

Unresolved Questions

- What is the best way to measure and determine the value of informal care?
- Should NP symptoms be measured and modeled as a total score of a scale or patients grouped into subgroups?
- How can the dynamic nature of NP symptoms be measured and modeled?
- Is survival influenced by NP symptoms?