

Patterns and Predictors of Health Services Utilization and Costs at the End of Life in Alberta, Canada

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- When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science."

British physicist, Lord Kelvin, 1890's

- You can't manage what you can't measure.

American Economist, Peter F. Drucker (?)

Outline

- Background
- Objectives
- Methods
- Results
- Discussion
- Conclusion

'Sisyphus Syndrome': Sustainability of Health Care System

- ✓ Medical spending enhances longevity
- ✓ Longevity results in accelerated ageing of the population
- ✓ Increased population beyond retirement results in decreased government revenues
- ✓ Increased demand for health and public resources by seniors

Health Care Spending in Alberta

- Alberta population: ~3 million
- \$9+ billion Cdn total health spending.
- Health funding growth: 9.5%/year
- Provincial revenue growth: 6.6%/yr
- Elderly and dying consume disproportionately large percentage of health resources

'Trajectories of Dying'

- Glaser and Strauss (1968) Time for Dying use qualitative research methods to describe various 'trajectories of dying'
- Joan Teno et al (2001) conducted a mortality follow-back survey of next-of-kin measuring functional decline at end of life for 3,614 patients
- June Lunney, Joanne Lynn et al (2003) conducted a sub-analysis of 4,091 patients enrolled in EPESE Study, measuring functional decline at end of life

Joan Teno et al 2001

FUNCTIONAL TRAJECTORY IN THE LAST YEAR OF LIFE

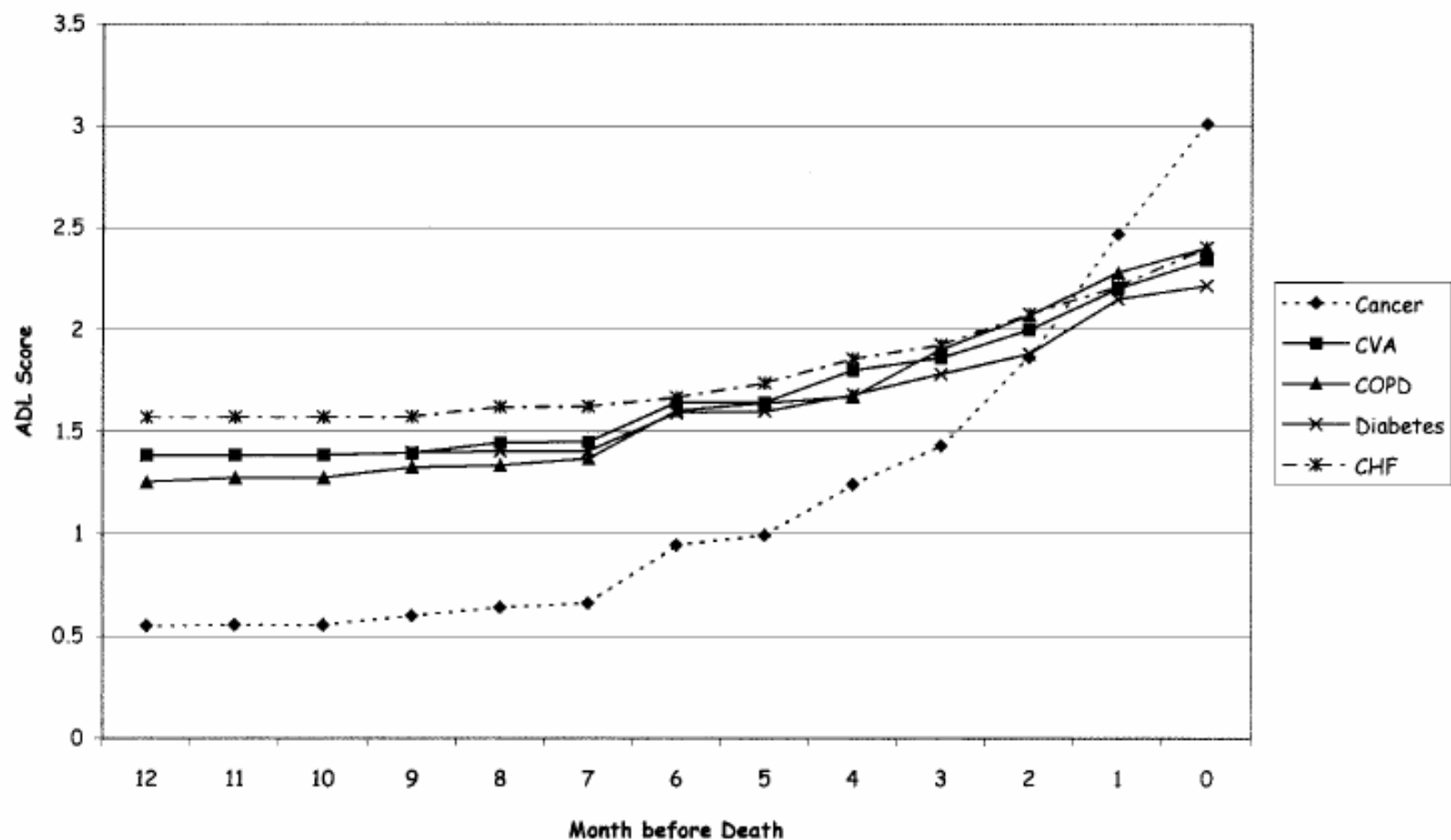
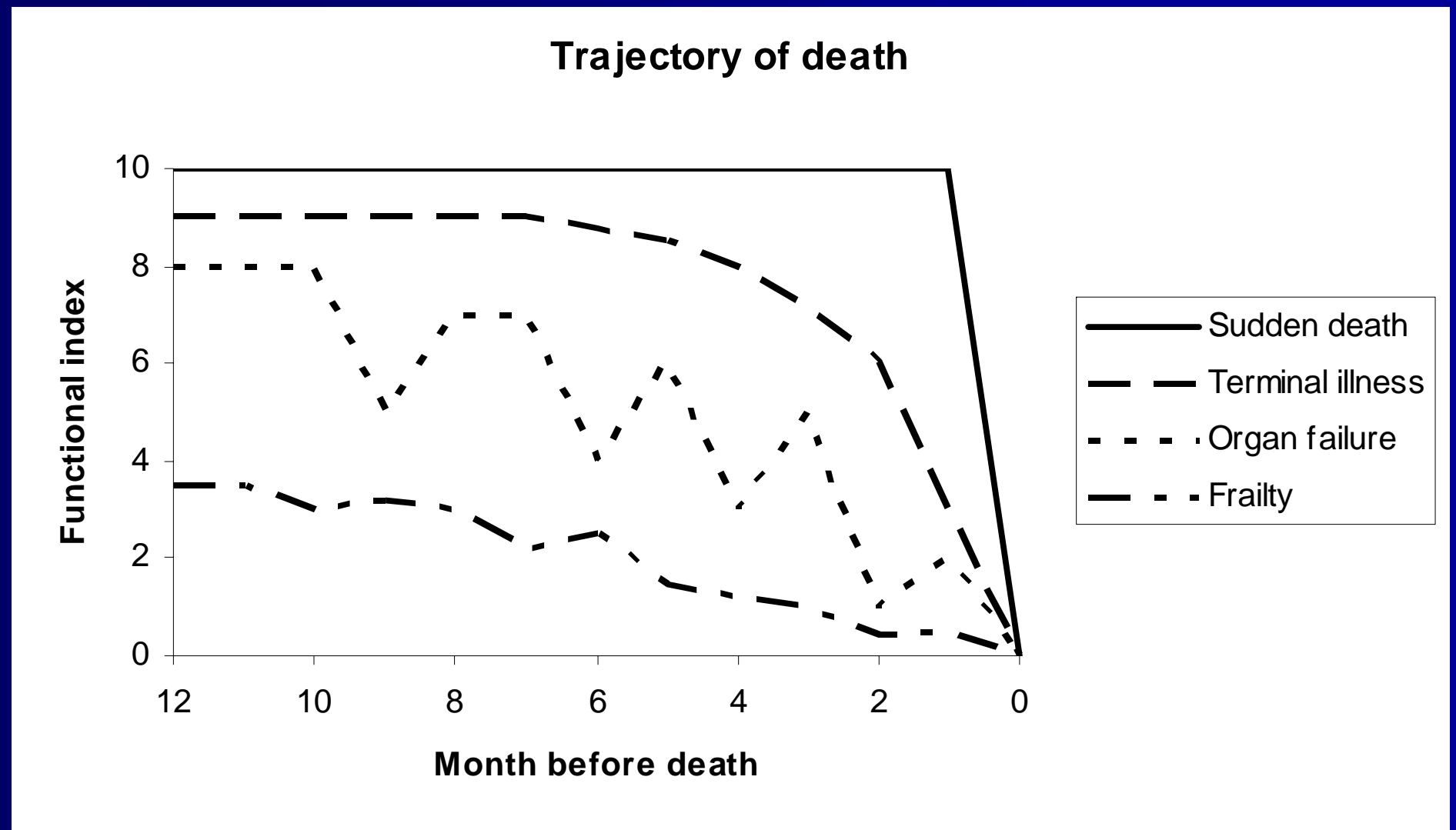


FIG. 1. Age-adjusted activities of daily living (ADL) scores by month before death.

June Lunney et al 2003



Research Question

- What are the patterns and predictors of health services utilization and costs for survivors as compared to decedents by selected trajectories of dying?

Objectives

1. To describe patterns of health services utilization and costs at end of life by 'trajectories of dying'
2. To determine if age, gender, place of residence and socioeconomic status explain health services utilization and costs at end of life
3. To evaluate whether health care services are equitably distributed at the end of life

Methods

1. Refine 'trajectories of dying' using Modified Delphi Technique (MDT)
 - Literature review and synthesis
 - Consultation with physician specialists
 - Cluster analysis
2. Descriptive Analysis
3. Expenditure Decomposition
4. Ratio Analysis

Expenditure Decomposition

Component	Policies	Mutability
Persons (Period Prevalence)	Target Population, Eligibility Criteria, Copayments	Medium
× Visits / Person	Clinical Practice & Technological Innovation	High
× Services / Visit		High
× Current \$ / Service		High
× Constant \$ / Current \$	Price Inflation	Low
= Total Expenditure (adjusted or unadjusted)		

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Ratio Analysis

- Assess relative distribution of resources using decedent to survivor ratios
- Controls for secular trends in clinical practice and technological innovation, among other things

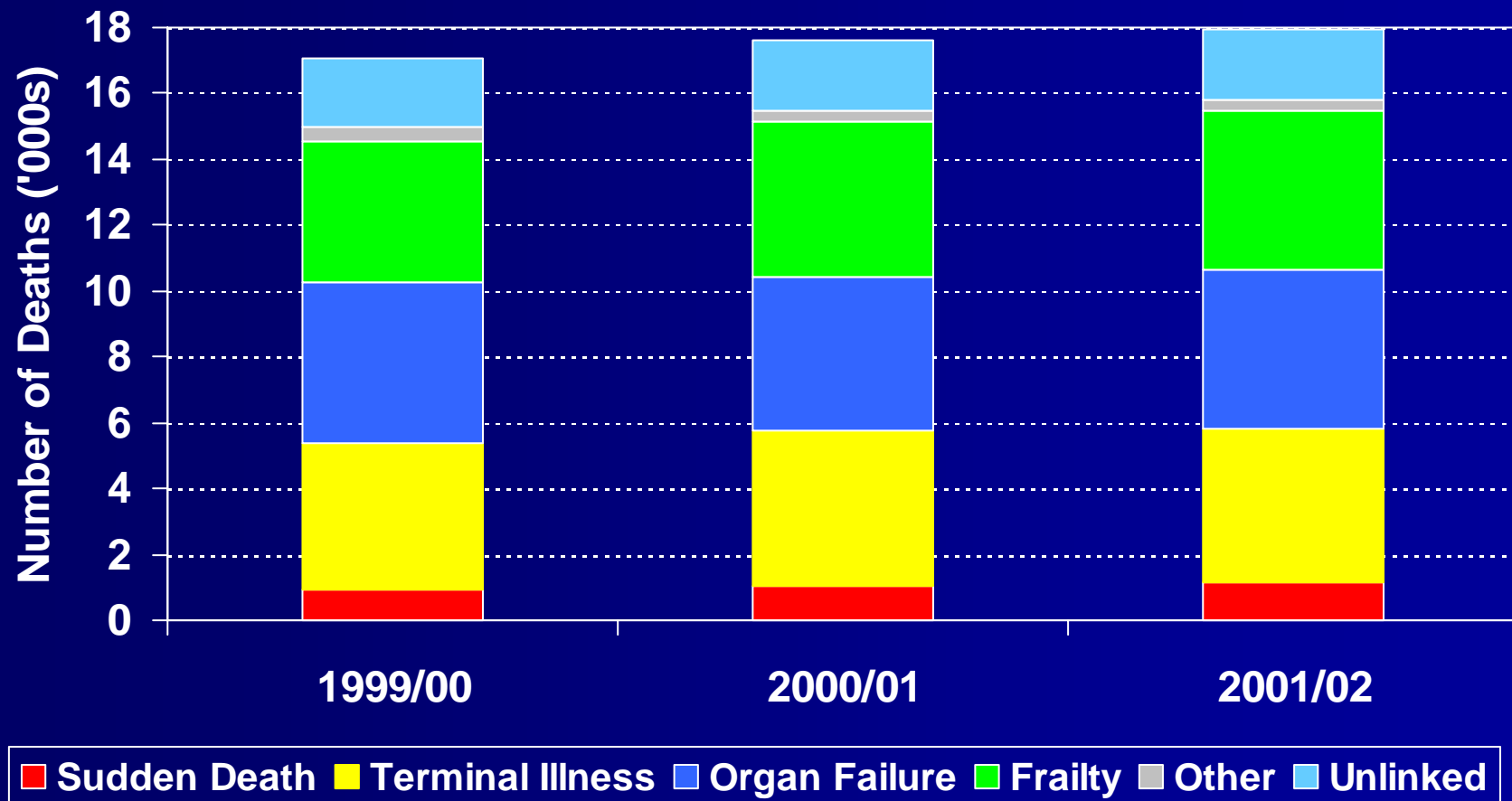
Results

Objective 1: Defining and describing the dying population

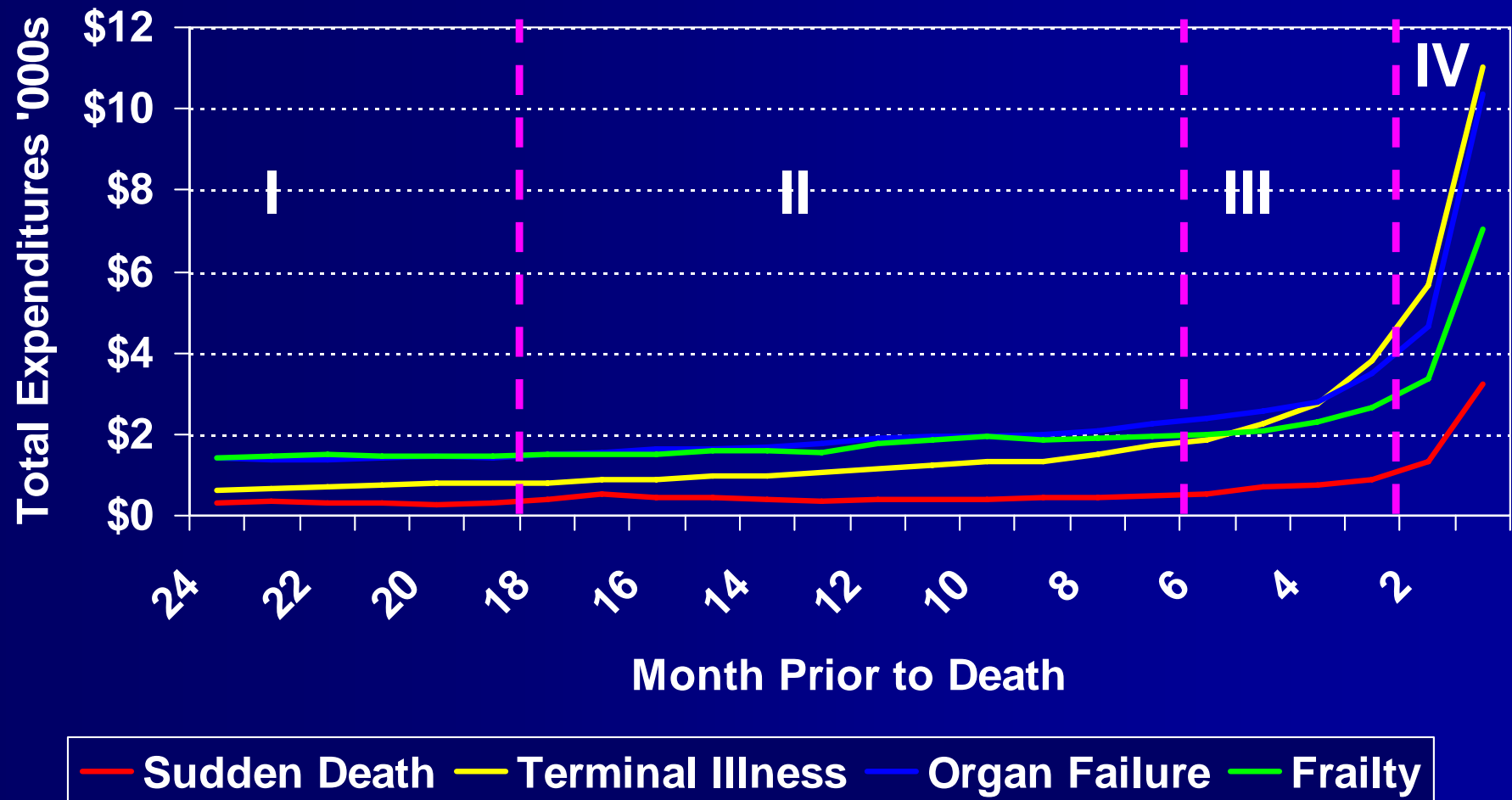
'Trajectories of Dying' Refined

Trajectory	Underlying Causes of Death
Sudden Death	Accidental death
Terminal Illness	Cancer, ESRD, ALS, HIV
Organ Failure	CHF, COPD, other organ failure
Frailty	Infections, weight loss, dementia, Parkinson's, osteoporosis, chronic heart disease
Other	Mental health, neonatal frailty, non-classifiable

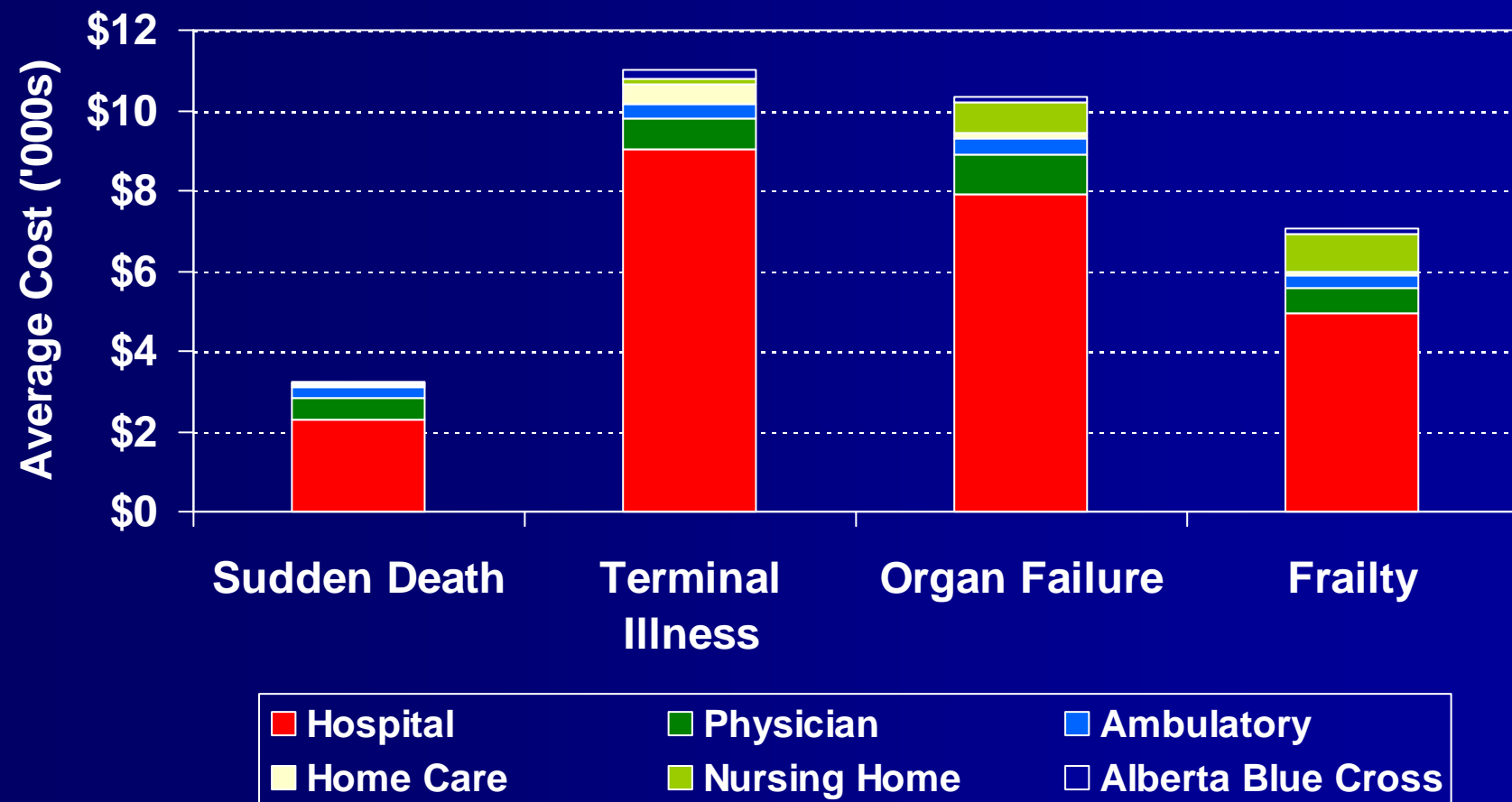
Number and Type of Deaths in Alberta



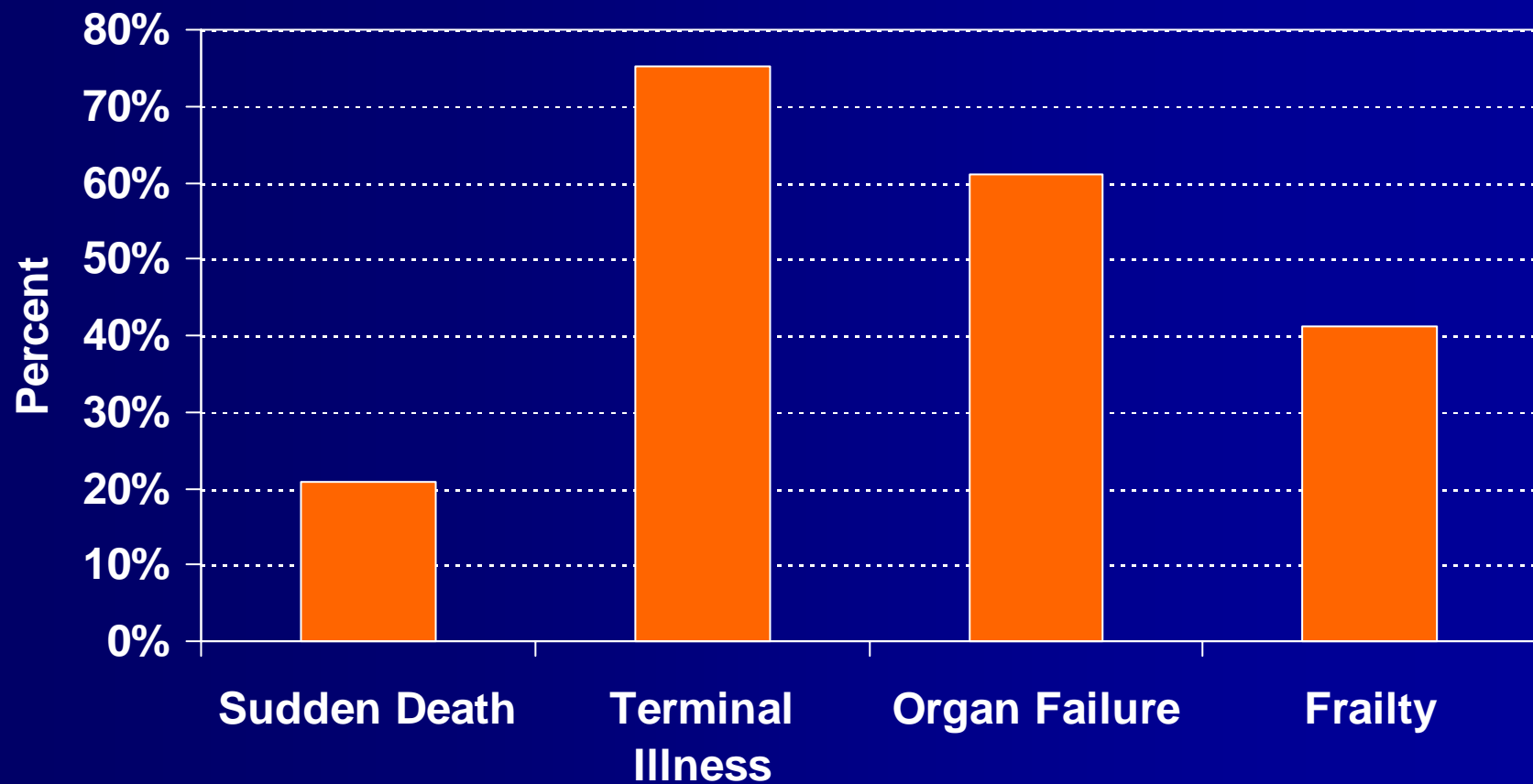
Cost Trajectories at End of Life (2001/02 Cohort)



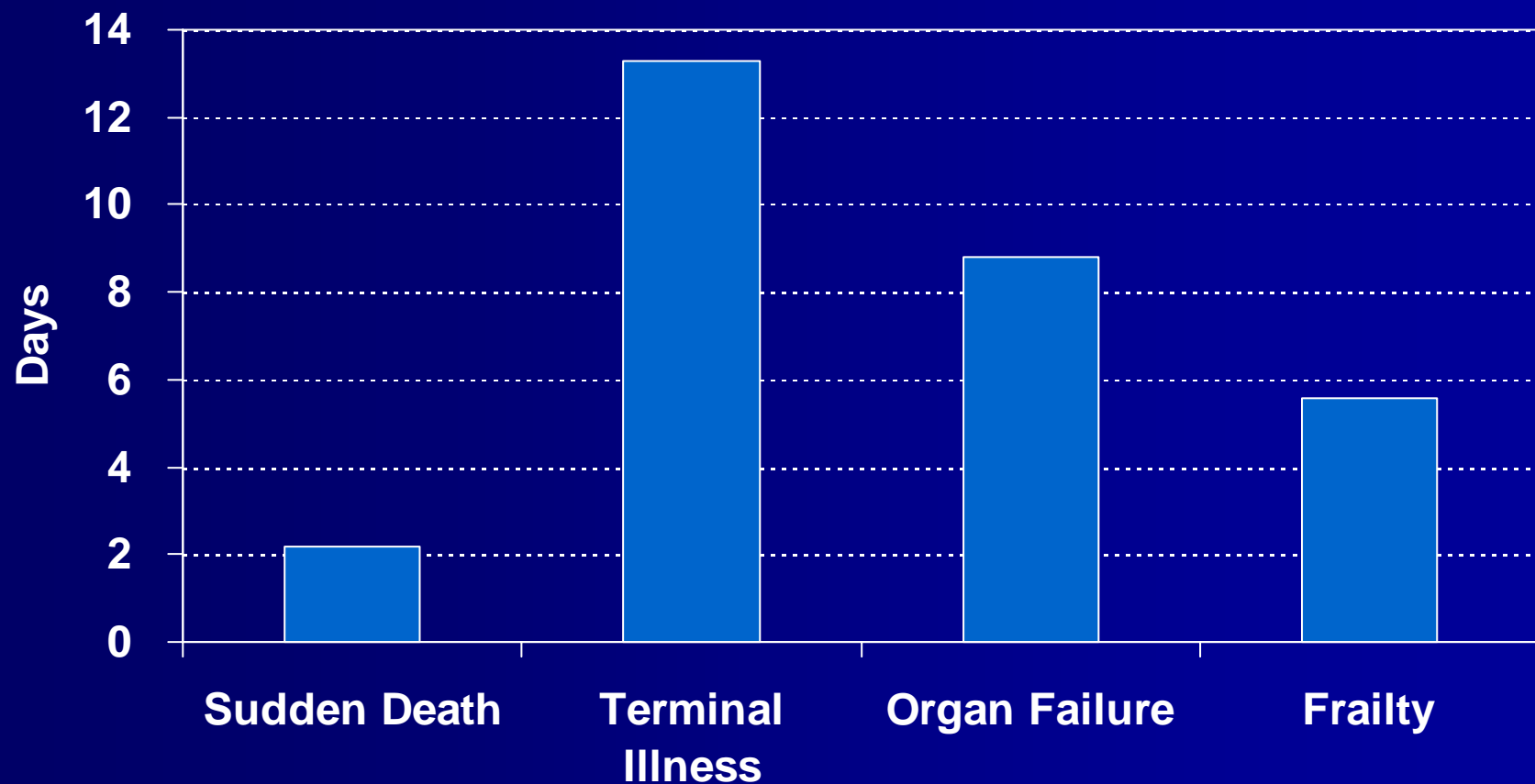
Average Cost in Last Month of Life (2001/02 Cohort)



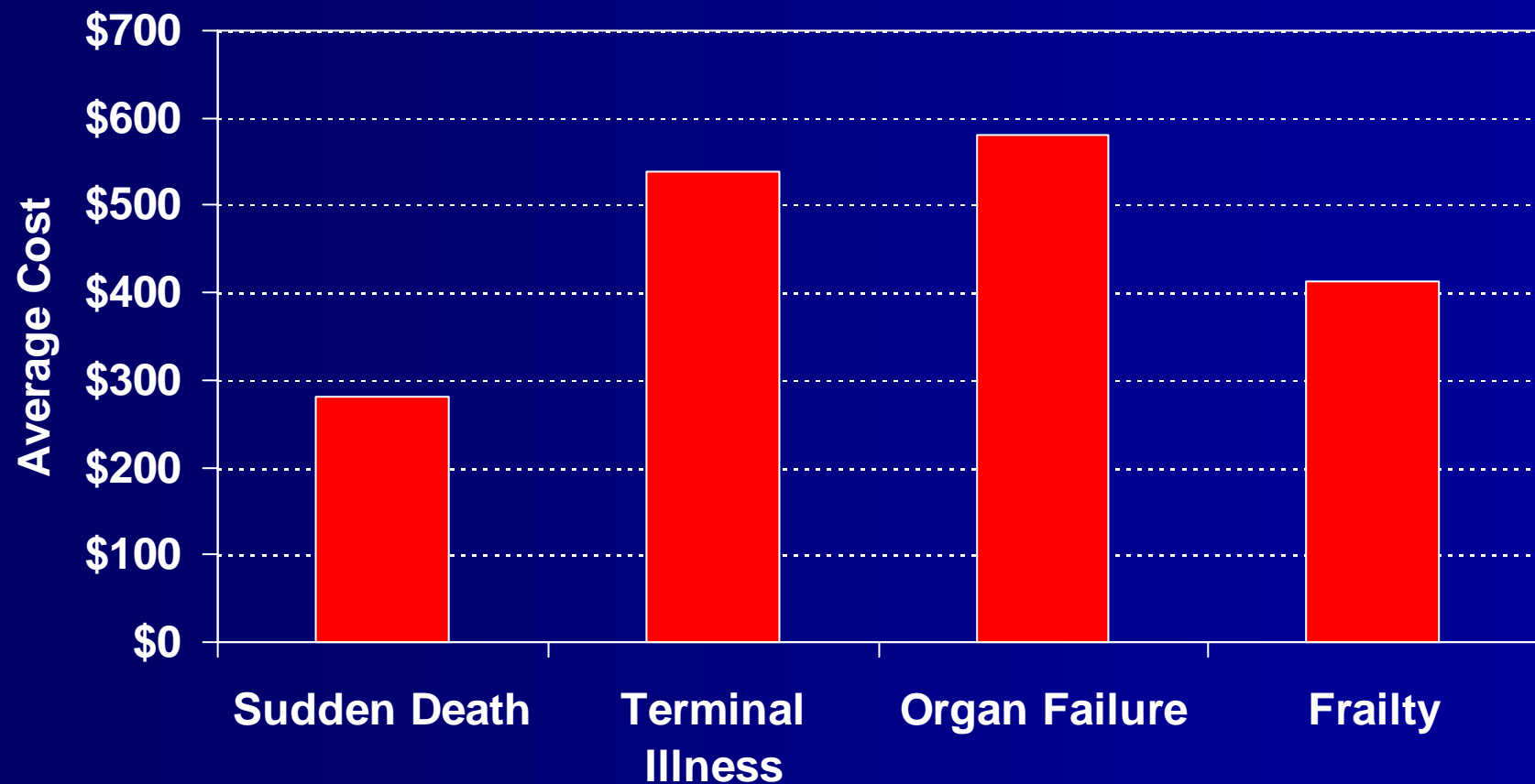
Probability of Hospitalization in Last Month of Life (2001/02 Cohort)



Average Inpatient Days in Last Month of Life (2001/02 Cohort)



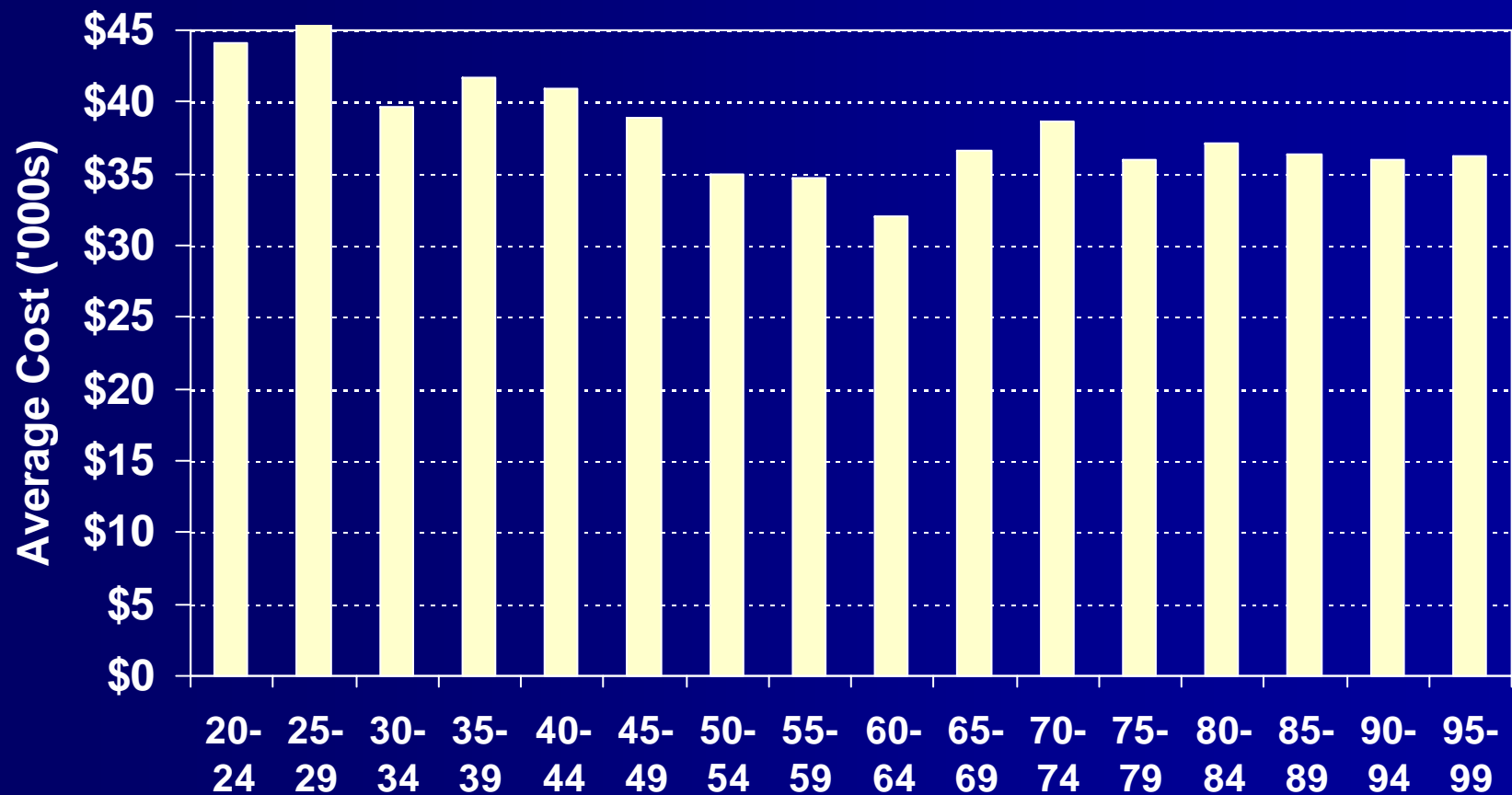
Average Inpatient Cost per Day in Last Month of Life (2001/02 Cohort)



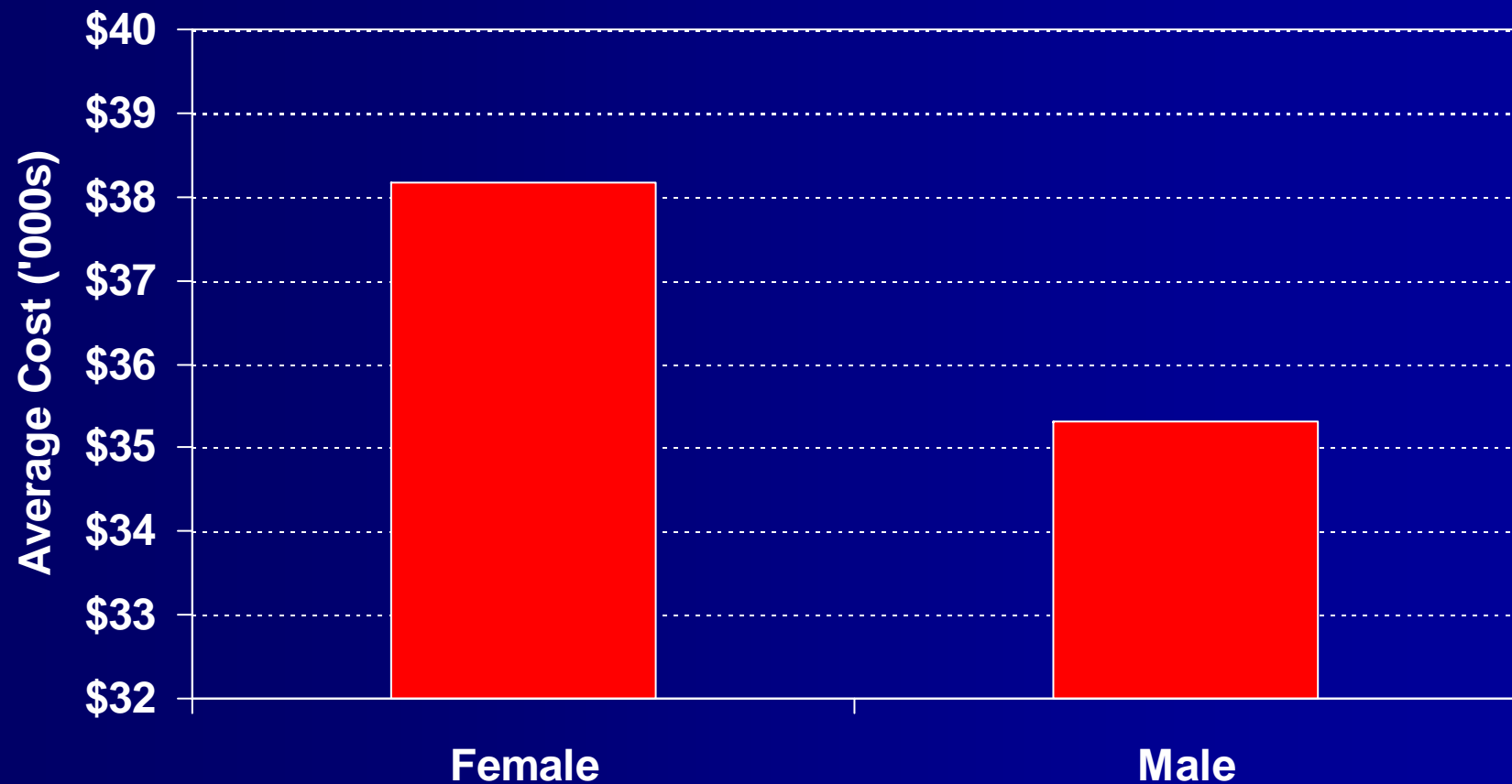
Results

Objective 2: Identifying predictors of utilization and costs

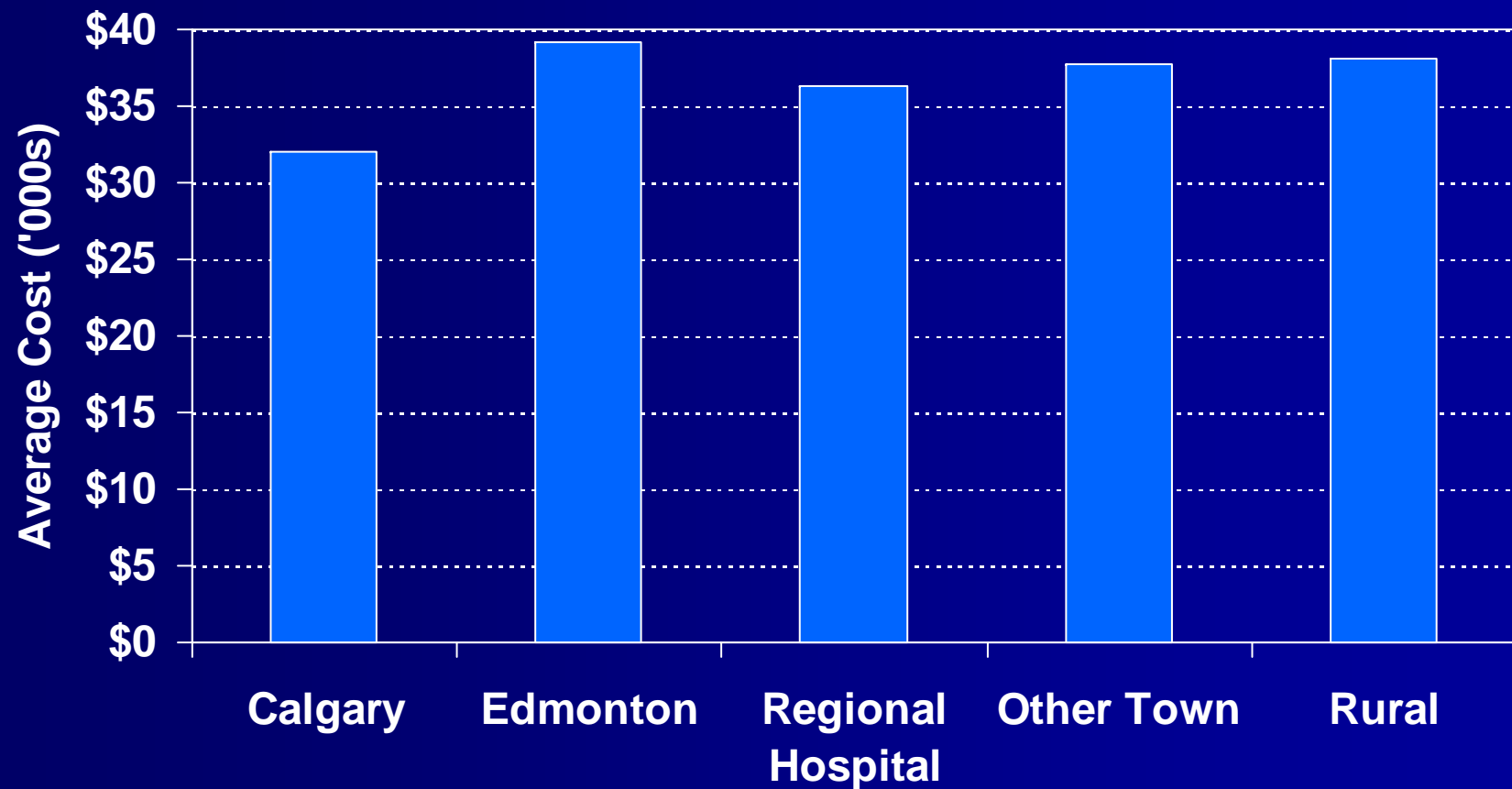
Average Cost in Last Year of Life of Cancer Patient × Age



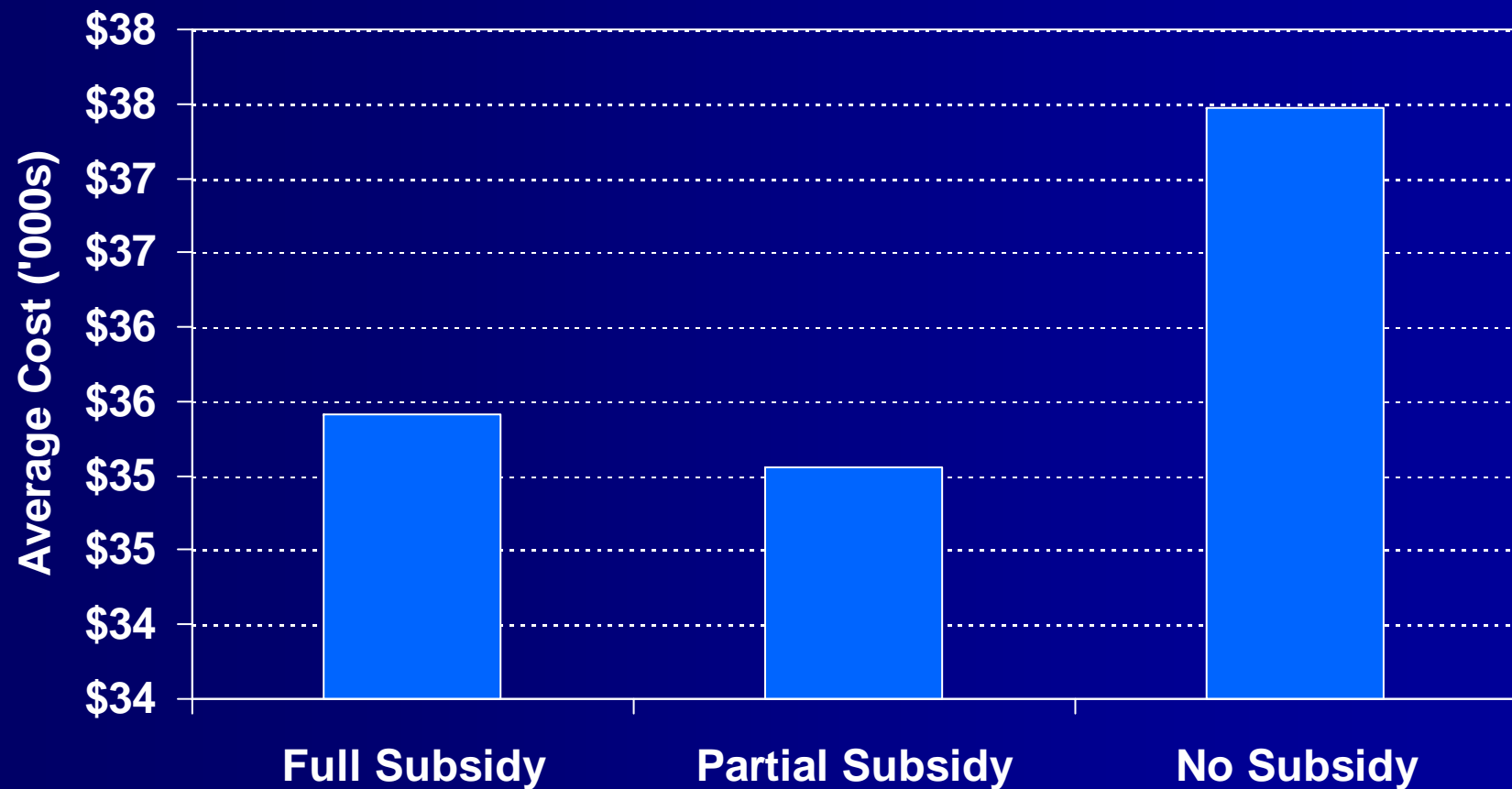
Average Cost in Last Year of Life of Cancer Patient × Gender



Average Cost in Last Year of Life of Cancer Patient × Location



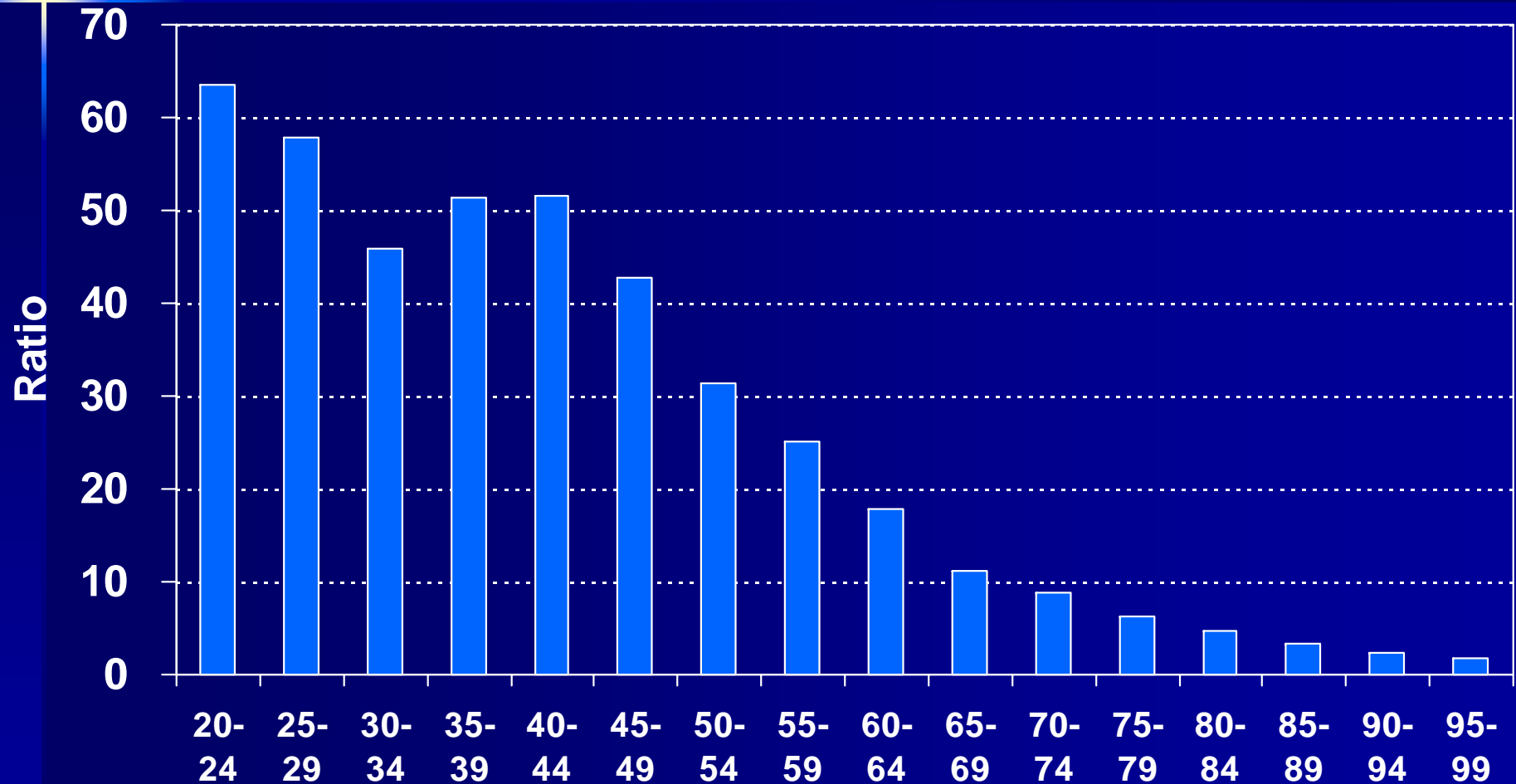
Average Cost in Last Year of Life of Cancer Patient × SES



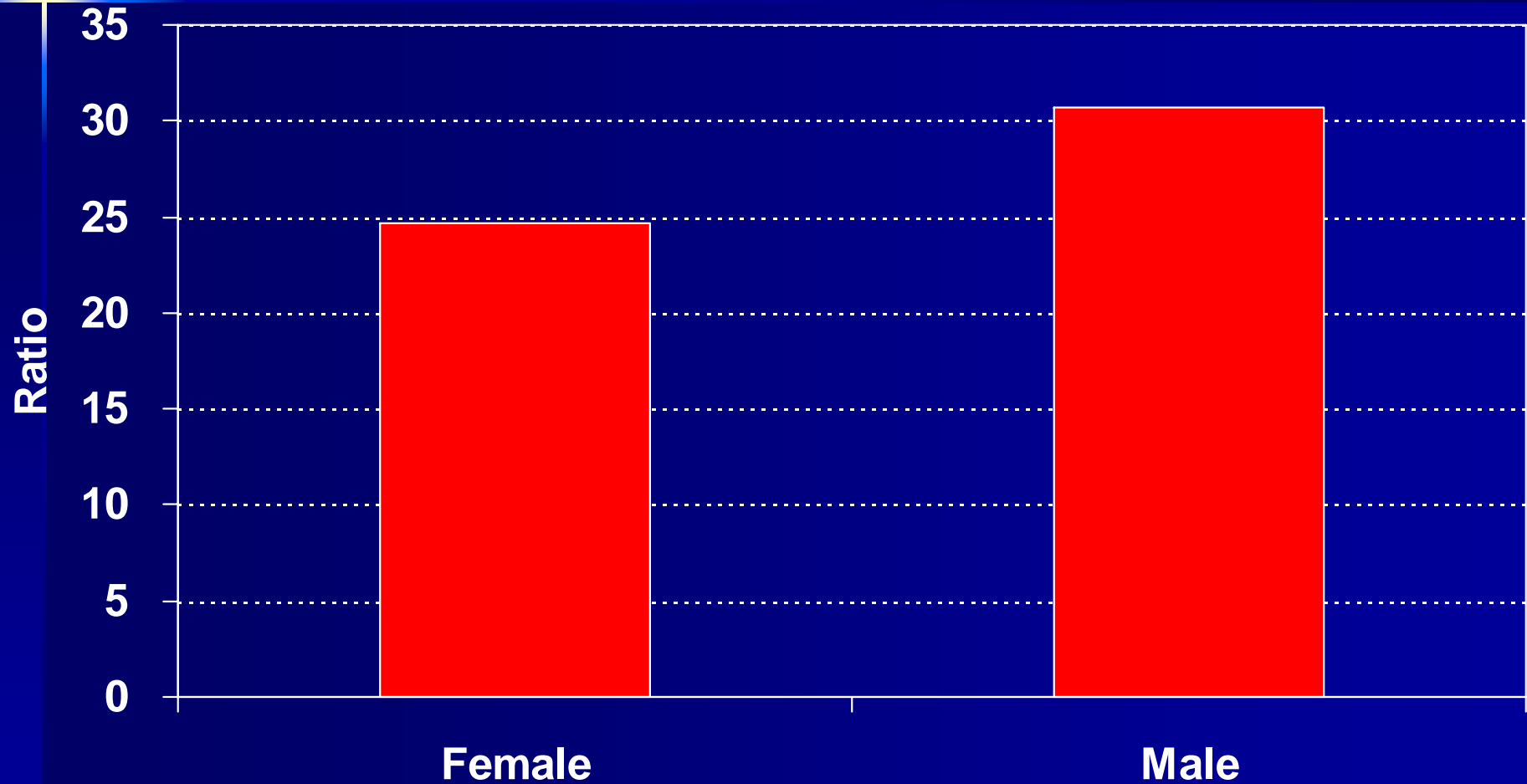
Results

Objective 3: Evaluate whether
resources are fairly distributed

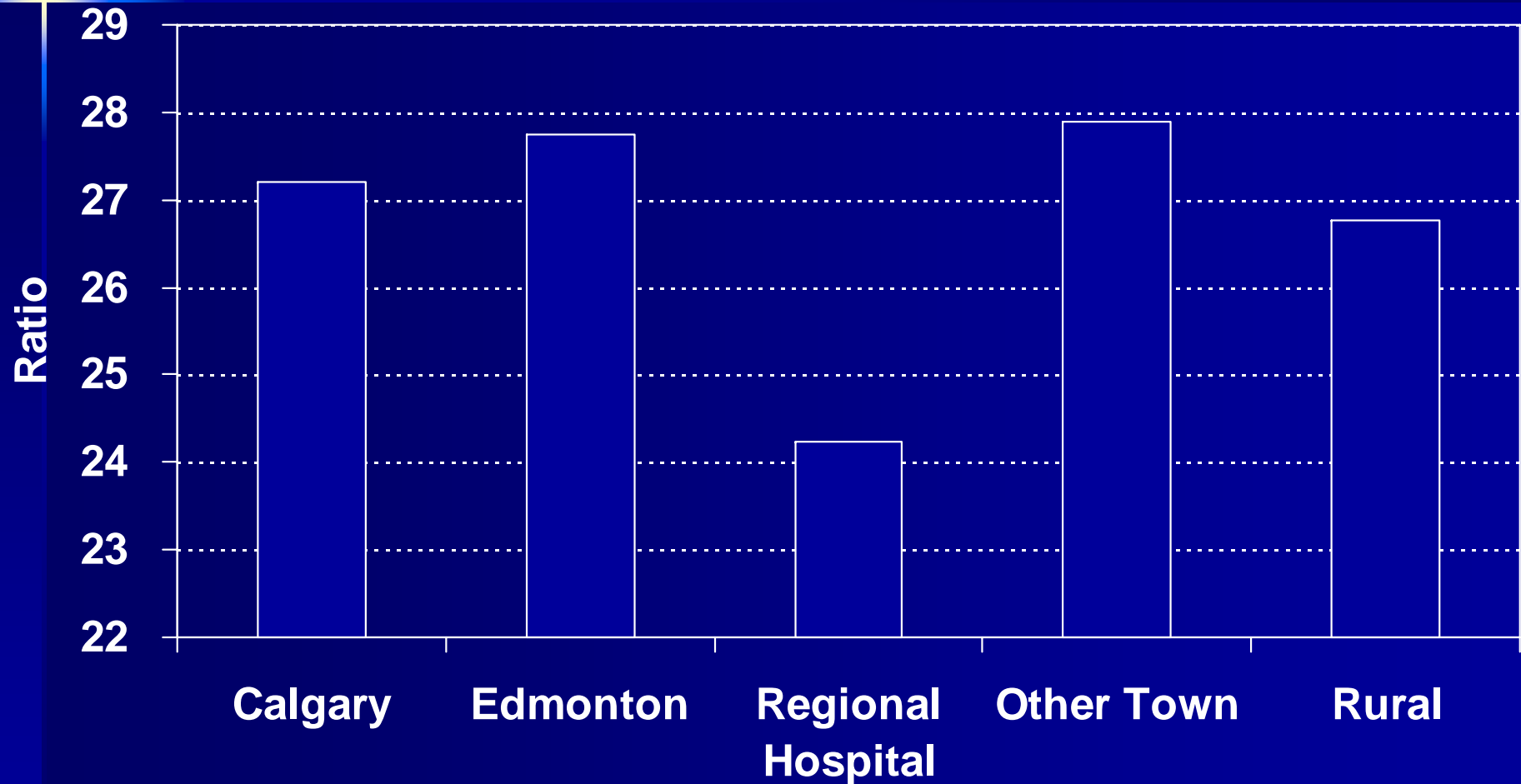
Ratio Analysis - Age



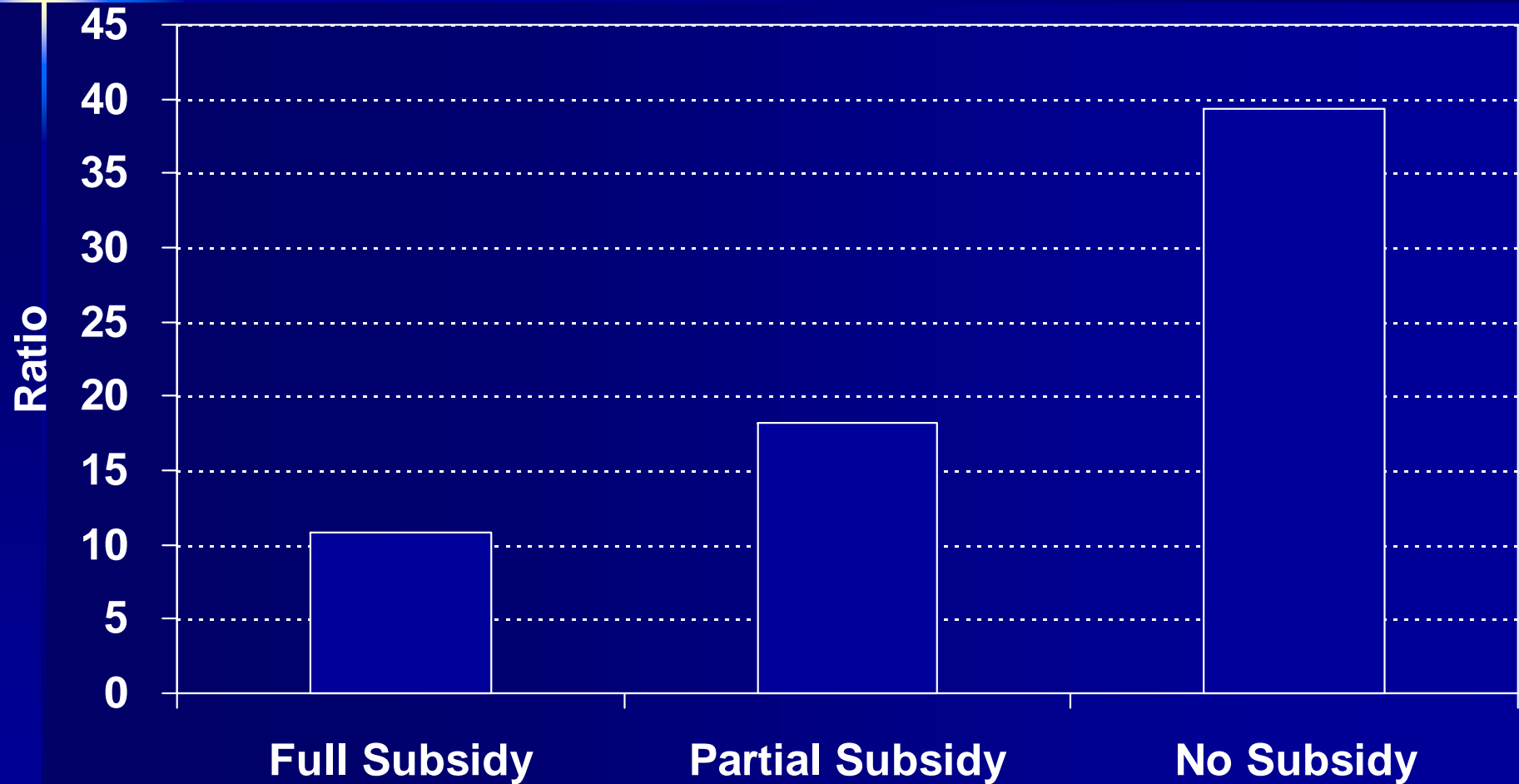
Ratio Analysis - Gender



Ratio Analysis - Location



Ratio Analysis - SES



Discussion

- Trajectories of dying are a useful classification of health care use and costs
- Significant patterns of use and cost include
 - Cancer costs two years prior to death
 - organ failure and frailty
- Increased use and cost may be correlated with need for palliative care services

Discussion cont'd

- Demand factors
 - Health behaviors
 - Prevention
 - Postpone decision to seek care
- Supply factors
 - Discrimination
 - Ability to pay

Discussion cont'd

- Equity framework required to distinguish the extent to which resources are fairly distributed for survivors and/or decedents. Eg.
 - Save the most lives
 - Women and children first
 - First come – first served
 - Maximize quality adjusted life years

Conclusion

- Unique trajectories of care may reflect unique needs and the opportunity for reorganizing health care services to better meet those needs
- Policies need to be developed to evaluate & address potential inequities of resources distributed at end of life

- Myth of Tithonius, Roman hero beloved by Eos, goddess of the dawn. She loved him so much that she begged her fellow Olympians to grant him eternal life. She forgot to ask for good health. He lived forever, in continual torment, unable to die.