



# Ride or Relocate

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# Outline

- ▶ Introduction
- ▶ North Dakota Assisted Living
- ▶ Literature Review
- ▶ Research Methodology
- ▶ Simulation Results
- ▶ Summary and Conclusions



# Introduction

- ▶ Objective
  - Quantify the cost of living at home and riding transit versus relocating to an assisted living facility in North Dakota
- ▶ Living at Home Defined
  - Homeowners with no mortgage
  - Homeowners with a mortgage
  - Apartment dwellers

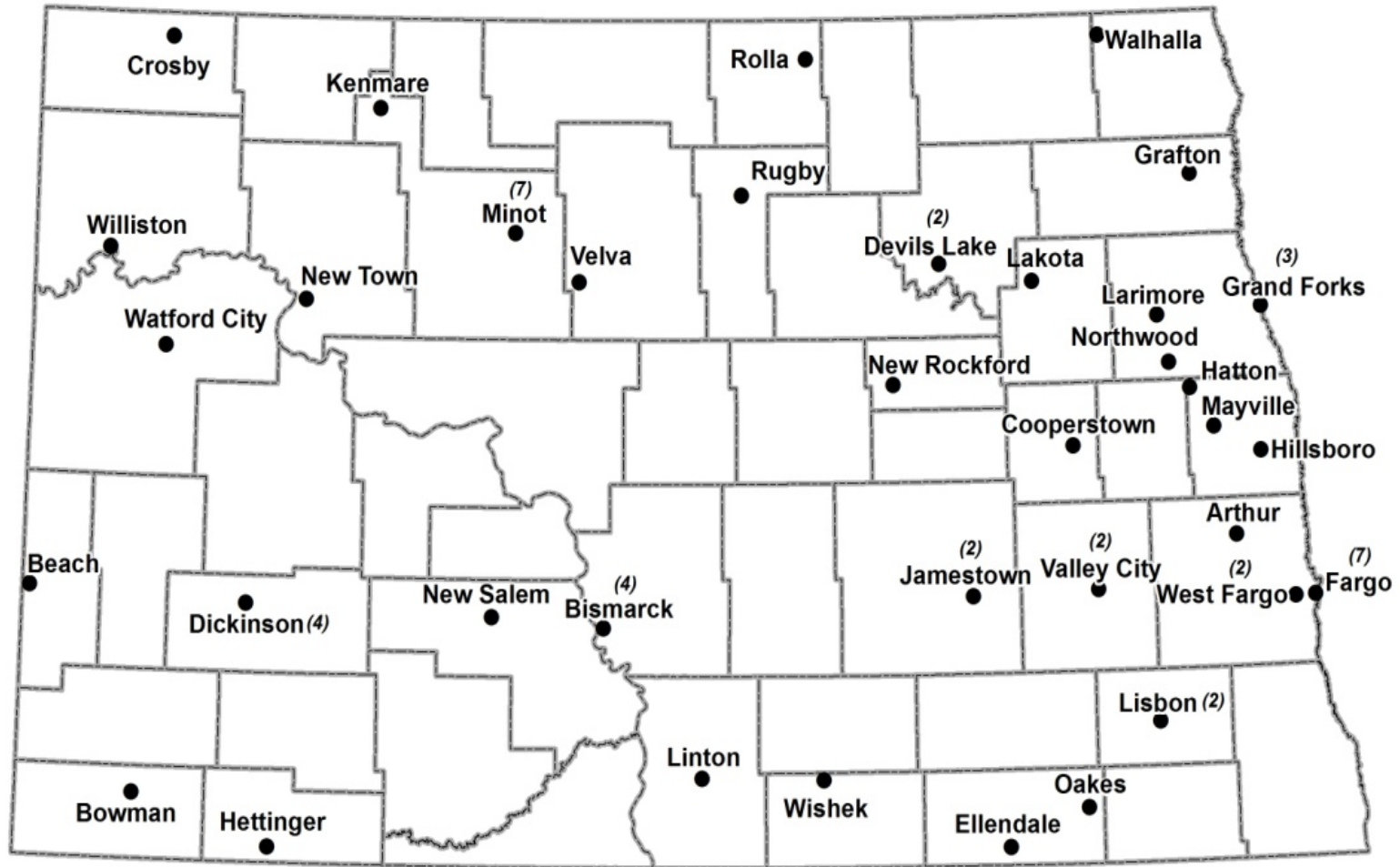


# Introduction

- ▶ Assisted Living Facility Defined
  - “A building that has at least five separate living units where individualized support services are made available to individuals to accommodate needs and inabilities to enable individuals to remain independent.”
  - North Dakota Department of Human Services (2009)

# ▶ North Dakota Assisted Living Facilities

- 64 Total
- 21 in Fargo, Bismarck, Grand Forks and Minot



ND Department of Human Services (2009)

# North Dakota Assisted Living Facilities Survey

- ▶ 36 Facility Survey
  - 1,386 living units
  - 90% of living units occupied
  - 125 living units had more than one occupant
  - Rental range \$720 – \$2,650 / month
  - Service package \$200 – \$2,000 / month
  - Common features
    - Transportation
    - Housekeeping
    - Meals
    - Activities
    - Bathing
    - Medication Management (nearly 50% of tenants)
    - Exercise
    - Cable TV

The North Dakota Long Term Care Association (2009)



# North Dakota Assisted Living Facilities Survey

- ▶ Average Age: 85
- ▶ 74% of Tenants Female
- ▶ 84% Lived at Home Prior to Admission
- ▶ Top 3 Reasons for Admission
  - Physical decline
  - Cognitive decline
  - Social isolation

The North Dakota Long Term Care Association (2009)

# Literature Review

## ▶ Aging in Place

- 2025 62 million Americans 65+
- 80% increase from 2009
- (Bailey 2004): 21% Americans 65+ do not drive
- (Hansen 2009): 90% of Americans 50+ want to stay in their homes, but many feel their homes and communities will not meet their needs, specifically mobility and access
- (Khil 2005): Difficult for elderly to access shops, services, and recreational opportunities without automobile





# Literature Review

## ▶ Relocation and Travel Behaviors

- (Plane 2009): Elderly often move from large metropolitan areas to micropolitan and rural areas
- (Bradley 2009): Cost-of-living plays central role
- (Krizek 2003): Transit trips increase for residents living within ½ mile of bus or rail stop

## ▶ Public Transits Role

- 600,000 drivers 70+ lose drivers licenses annually
- (HLB Decision Economics 2003): Absence of public transit would increase costs for home health care in Wisconsin almost \$60 million annually
- Benefit of medical purpose transit trips \$134 million in Wisconsin



# Research Methodology

- ▶ Home-Based Health Services
  - Homemaker Services: Provides “hands-off” care such as cooking and running errands
  - Home Health Aide Services: Provides “hands-on” personal care such as bathing, dressing, and transferring
  - Adult Day Health Care: Provides social support services in a protective setting

Source: Genworth Financial (2009)

# Research Methodology

- ▶ Compare cost of senior citizens living at home while utilizing home-based health services and transit versus moving to an assisted living facility
  - Each individual unique (uncertainty involve)
  - Used @Risk simulations (Microsoft excel add-in program)
  - Generate observation from random variables
  - Example: RISKNORMAL (5,1) generates observation from a normally distributed variable with mean 5 and standard deviation 1
  - Simulations run to imitate real-life situation
  - Probability distributions: Logistic, triangular, normal, etc.
  - Monte carlo simulations: similar to roulette wheel, iterations are independent of each other

# Research Methodology

- ▶ @Risk Variables
  - Assisted living facility costs
  - Homemaker services
  - Home health aide services
  - Adult day health care
  - Home value appreciation
- ▶ Communities Studied
  - Fargo
  - Bismarck
  - Minot
  - Rest of state



# Simulation Settings

## ND Transit Provider Operating Costs per Trip

<b>City</b>	<b>Service Provider</b>	<b>Cost Per Trip</b>
Fargo	MAT	\$17.21
Bismarck	Bis-Man	\$8.11
Grand Forks	Cities Area Transit	\$7.17
Minot	Minot Commission on Aging	\$7.14
Mandan	Bis--Man	\$8.11
Dickinson	Elder Care James River Senior Citizens Center, Inc.	\$8.99
Jamestown		\$7.19
West Fargo	MAT	\$17.21
Williston	Williston Council for the Aging	\$7.71
Wahpeton	Fargo Senior Commission	\$10.81
Devils Lake	North Central Planning Council	\$9.12

Source: Rural NTD, NTD



# Simulation Settings

## Base Case Settings, Fargo Homeowner

Cost Variables	Cost/Hr/Ride	Monthly Rides/Hours	Cost/Month
Transit (Fare)	\$2.50	40	\$100
Transit (Agency Cost-Fare)	14.71	40	588
Homemaker Services	RiskLogistic(17.64,0.31)	15	265
Home Health Aide Services	RiskNormal(20.80,1.3)	15	312
Adult Day Health Care	Risk Normal(8.00,1)	30	240
Utilities (Heat,Power, City Services)			\$150
Lawn Care/Snow Removal			60
Miscellaneous Maintenance			100
Property Taxes	\$144,000 home	\$2500/yr	208
Homeowners Insurance	\$144,000 home	\$840/yr	70
Groceries		\$40/week	160
Home Appreciation	\$144,000 home	5% annually	RiskNormal(600,100)
Cost Increase/Month	RiskNormal(0.45%,0.08%)		

Sources: Rural NTD, Genworth Financial, U.S. Census



# Simulation Settings

## Base Case Settings, Fargo Assisted Living

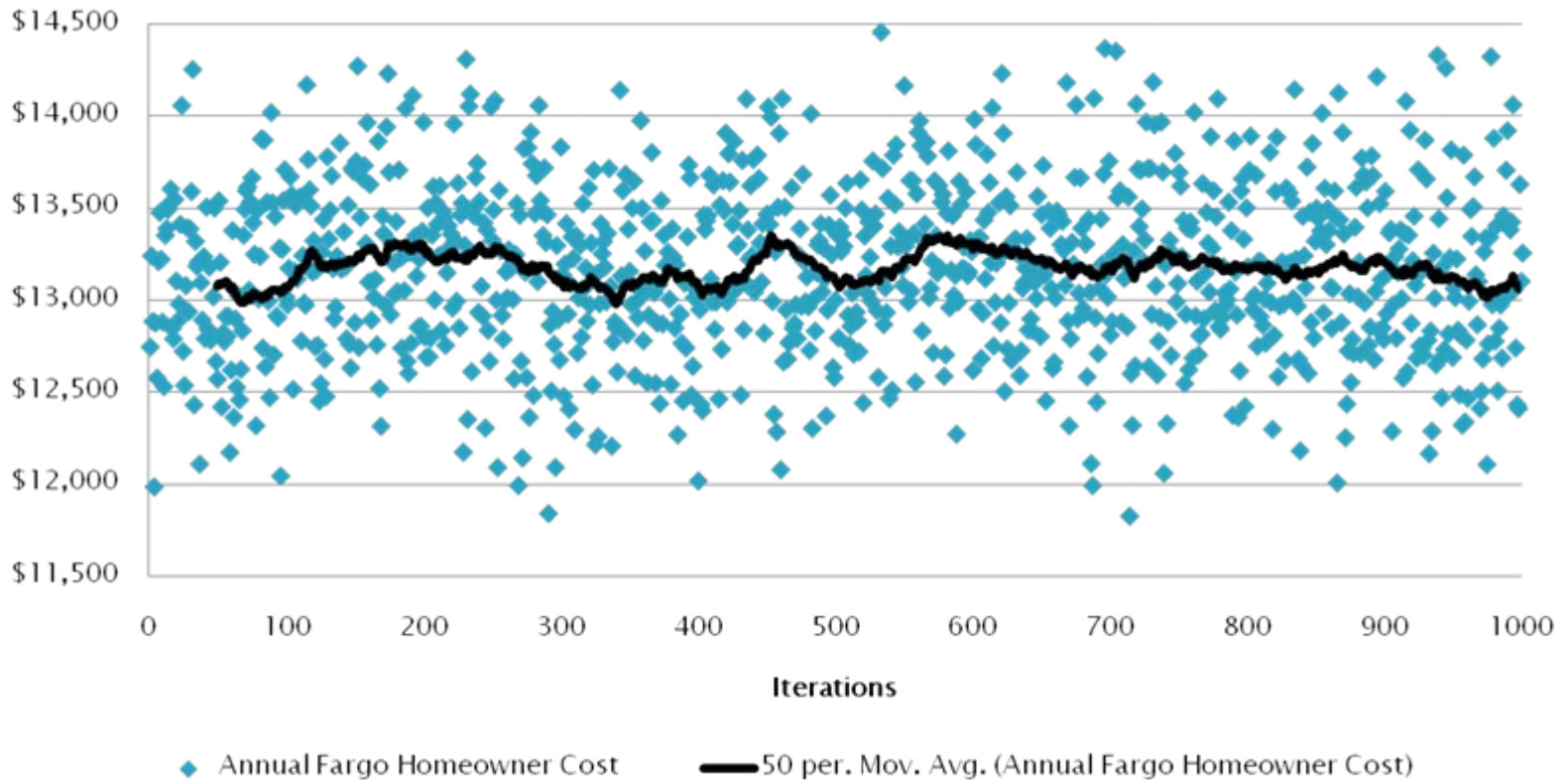
<u>Cost Variables</u>	<u>Cost/Ride</u>	<u>Monthly Rides</u>	<u>Cost/Month</u>
Transit (Fare)	\$2.50	20	\$50
Transit (Agency cost-Fare)	14.71	20	294
Rent			Risk Normal(2050,275)
Miscellaneous Expenses			100
Cost Increase/Month			RiskNormal(0.42%,0.08%)

Sources: Rural NTD, Genworth Financial, Interviews



# Simulation Results

## ▶ Fargo Homeowner Results (1 000 Iterations)

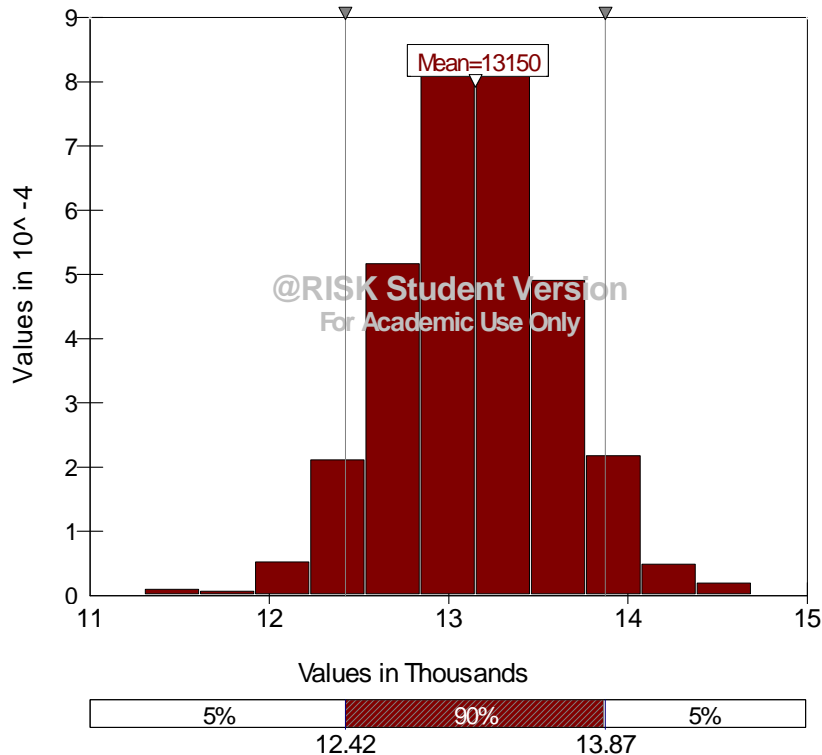




# Simulation Results

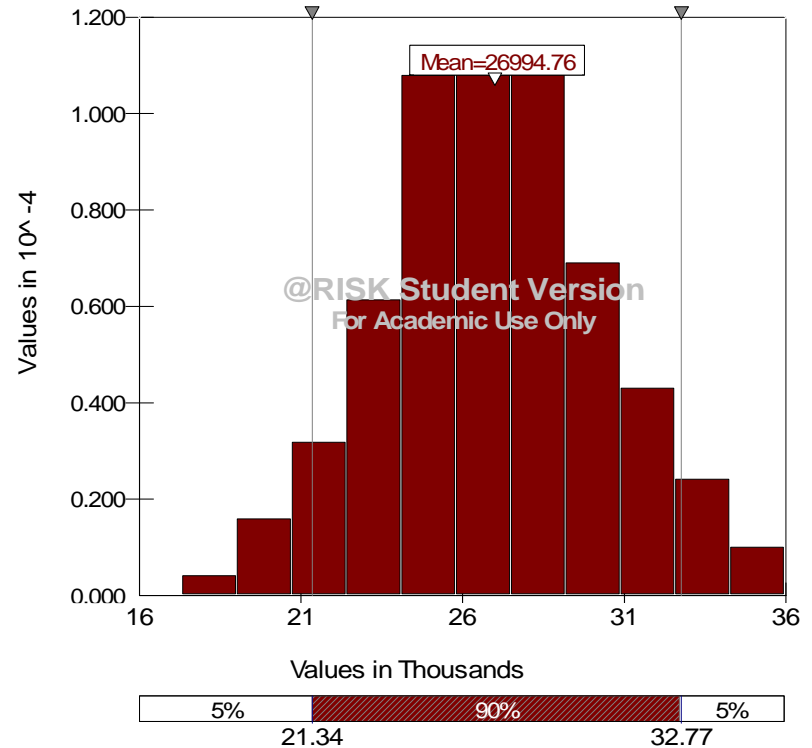
## Fargo Homeowner

Distribution for Total Cost for year



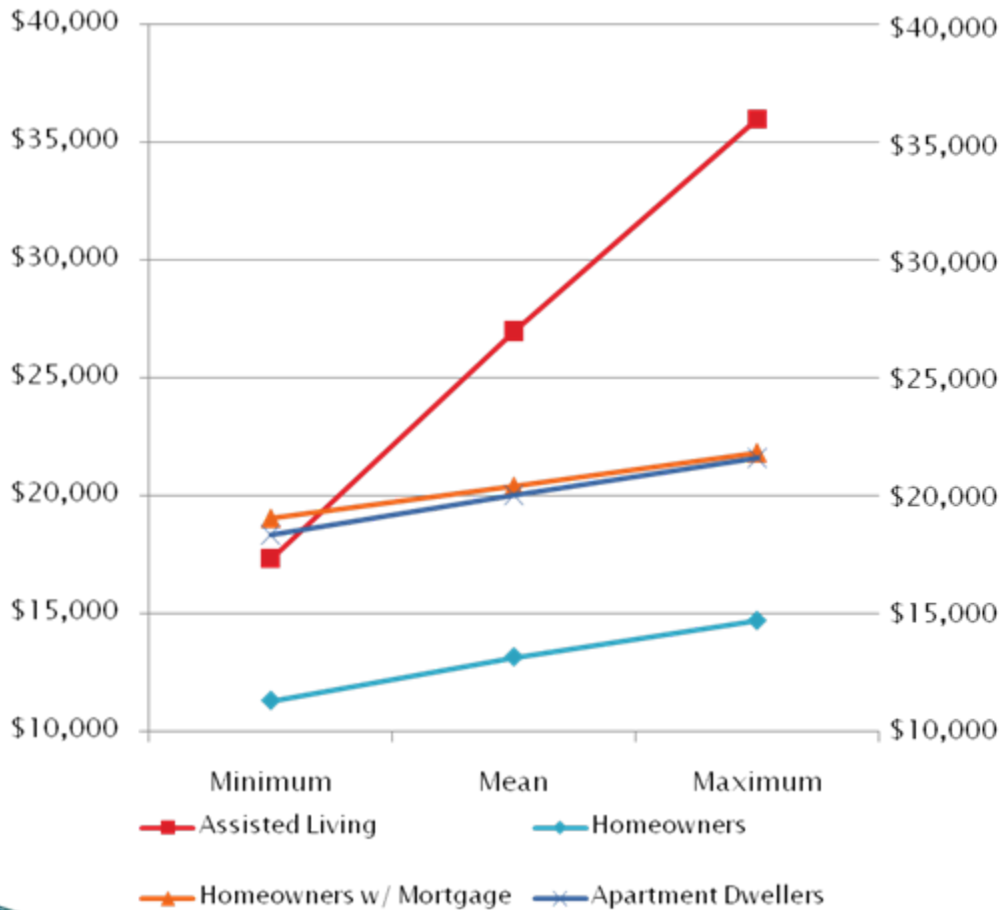
## Fargo Assisted Living

Distribution for Total Cost for year/

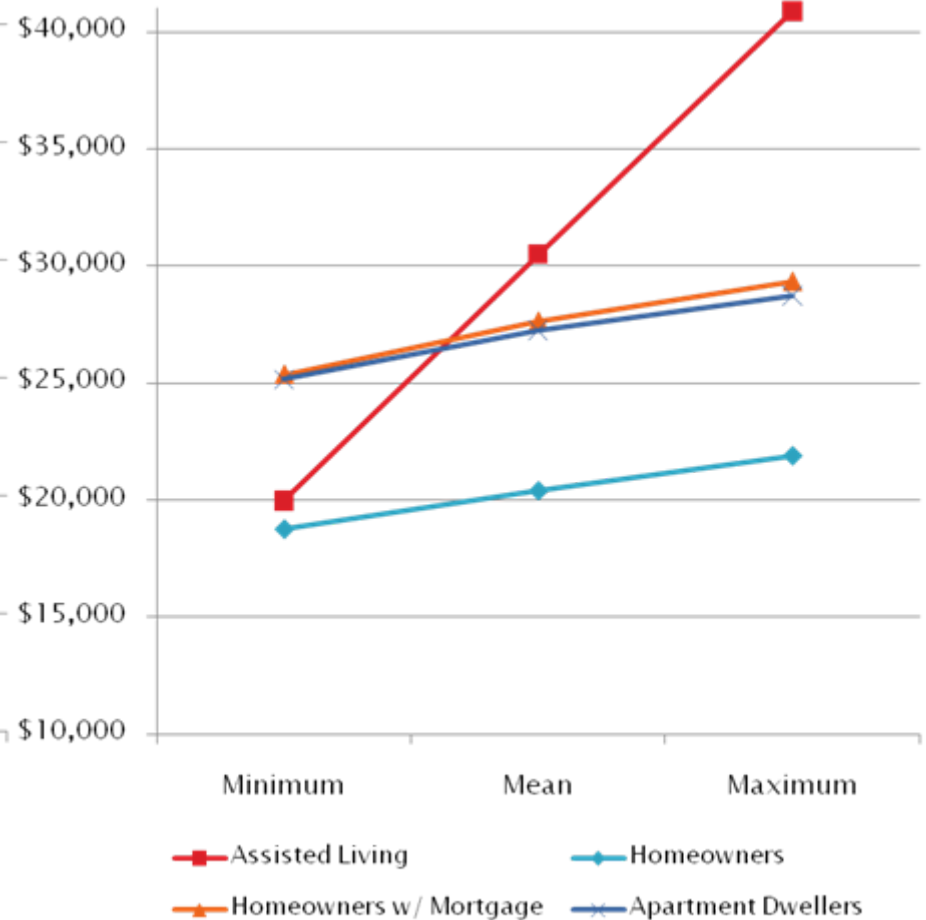


# Simulation Results

## Annual Fargo Out-of-Pocket Cost

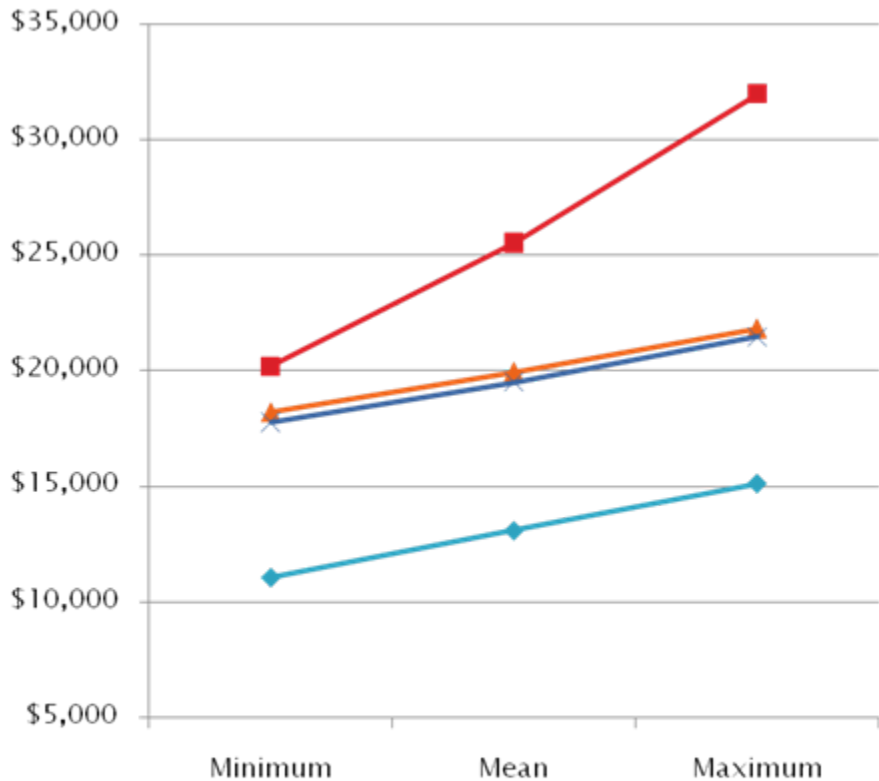


## Annual Fargo Total Cost



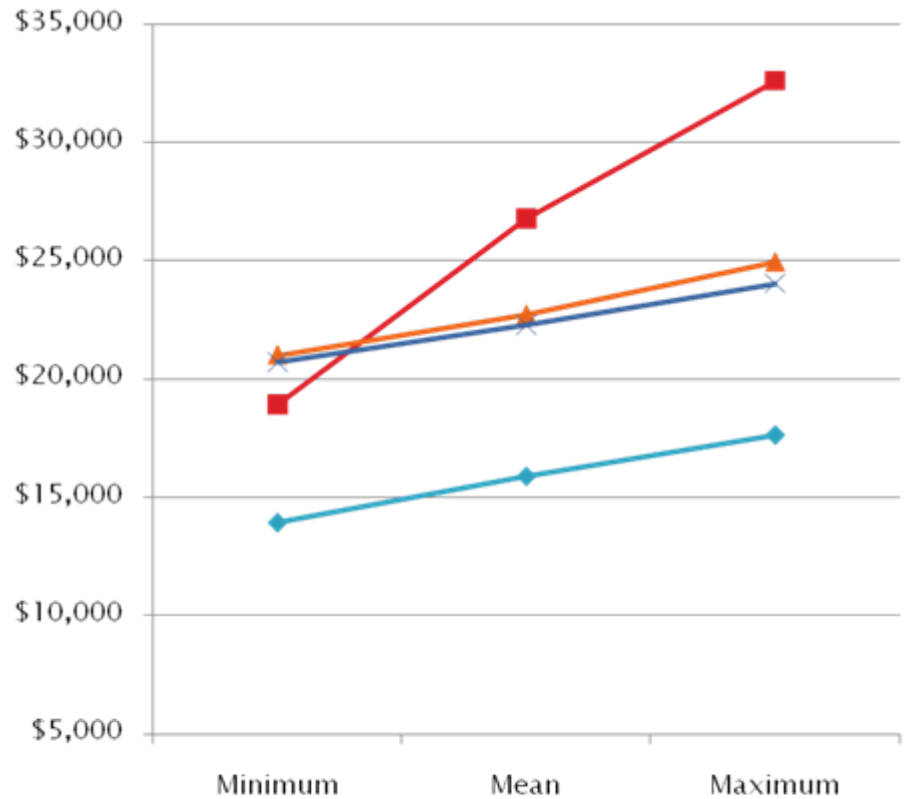
# Simulation Results

## Annual Bismarck Out-of-Pocket Cost



- Assisted Living
- ▲ Homeowners w/ Mortgage
- ◆ Homeowners
- ✕ Apartment Dwellers

## Annual Bismarck Total Cost

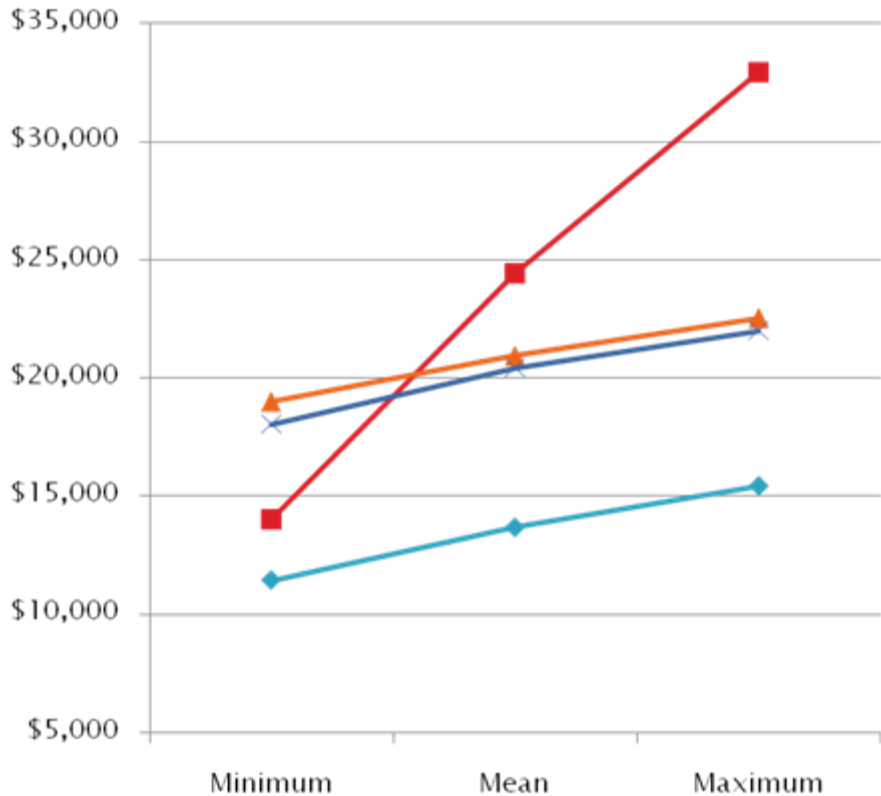


- Assisted Living
- ▲ Homeowners w/ Mortgage
- ◆ Homeowners
- ✕ Apartment Dwellers



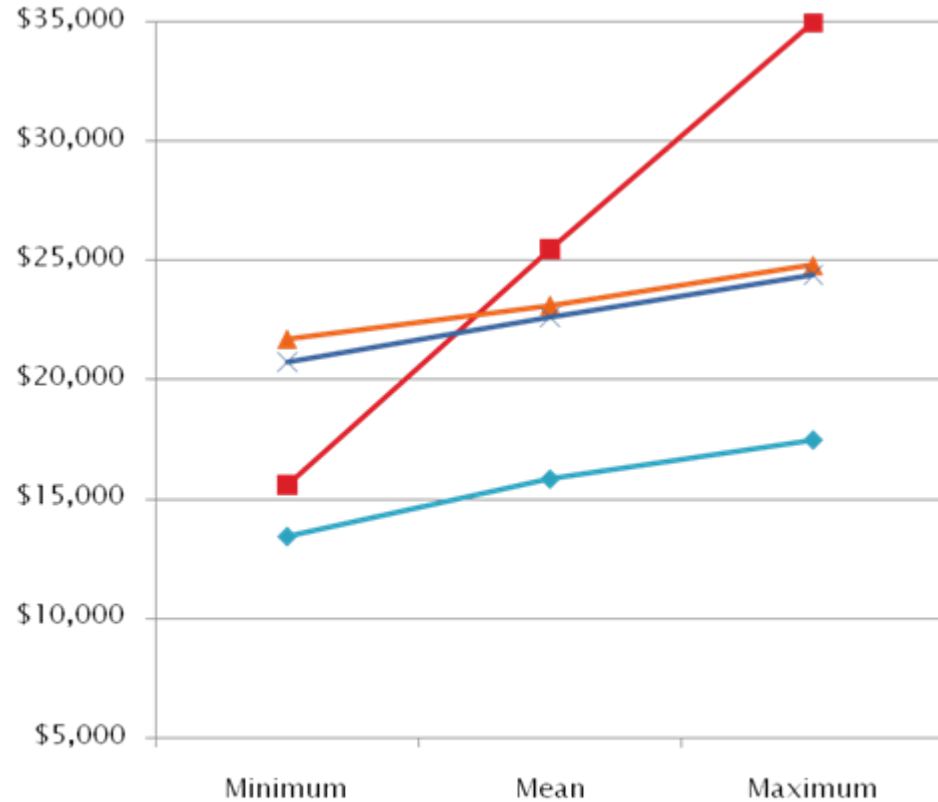
# Simulation Results

## Annual Grand Forks Out-of-Pocket Cost



- Assisted Living
- ▲ Homeowners w/ Mortgage
- ◆ Homeowners
- × Apartment Dwellers

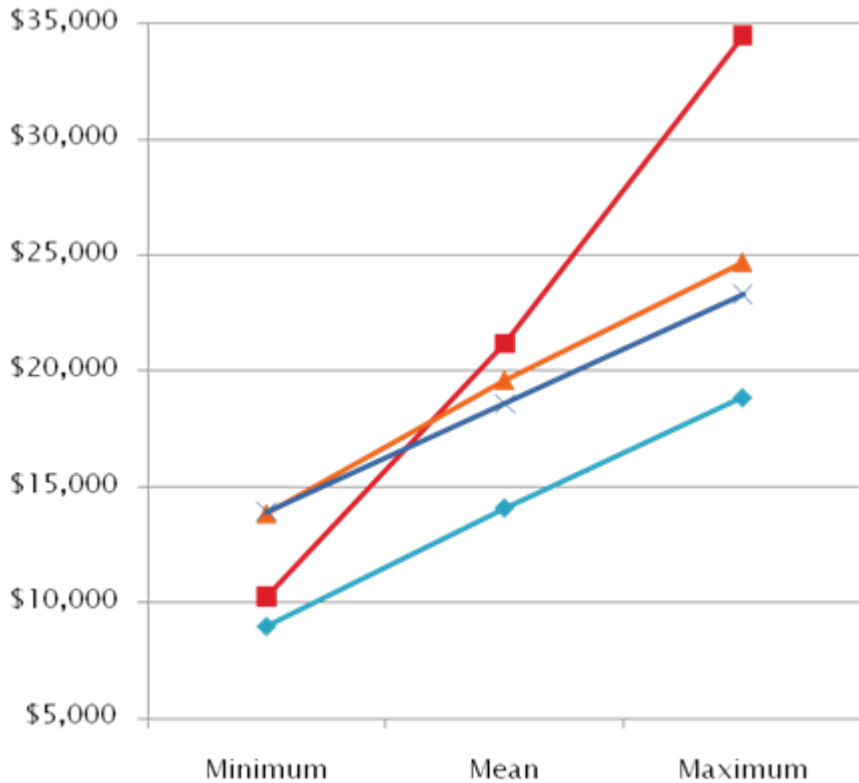
## Annual Grand Forks Total Cost



- Assisted Living
- ▲ Homeowners w/ Mortgage
- ◆ Homeowners
- × Apartment Dwellers

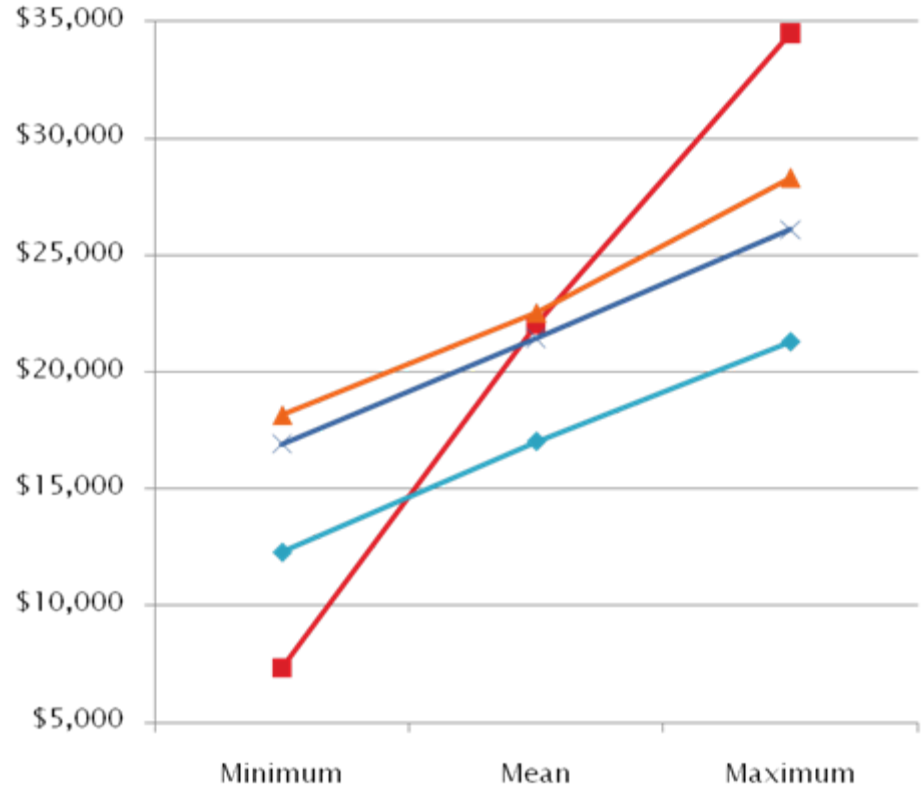
# Simulation Results

## Annual Out-of-Pocket Cost Rest of State



■ Assisted Living      ◆ Homeowners  
▲ Homeowners w/ Mortgage      × Apartment Dwellers

## Annual Total Cost Rest of State

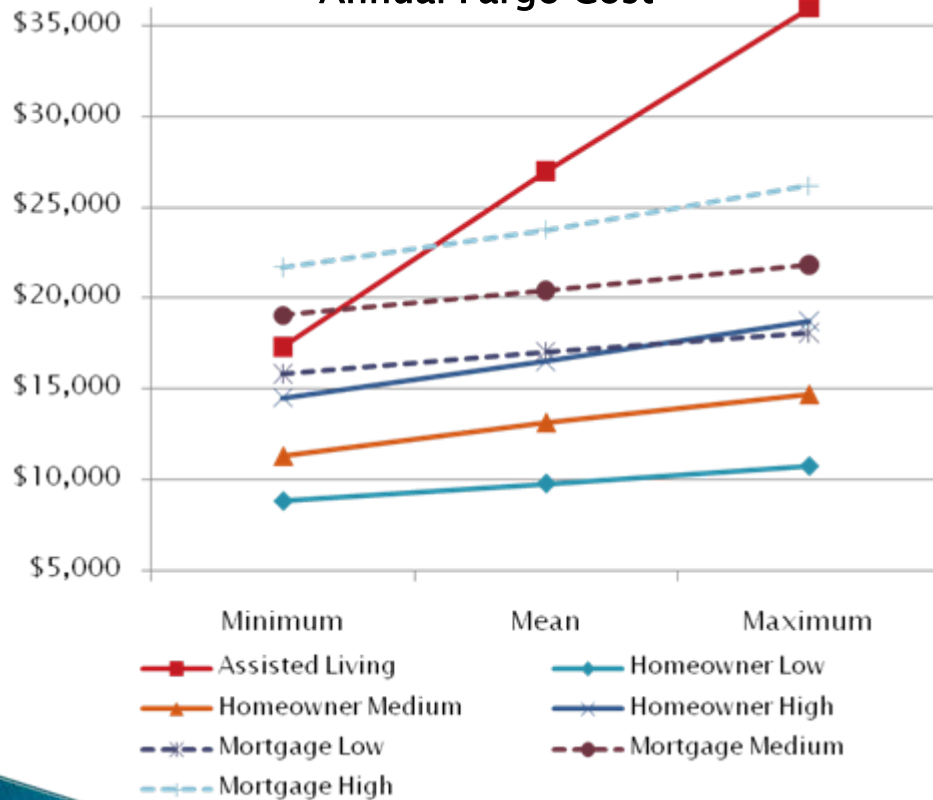


■ Assisted Living      ◆ Homeowners  
▲ Homeowners w/ Mortgage      × Apartment Dwellers

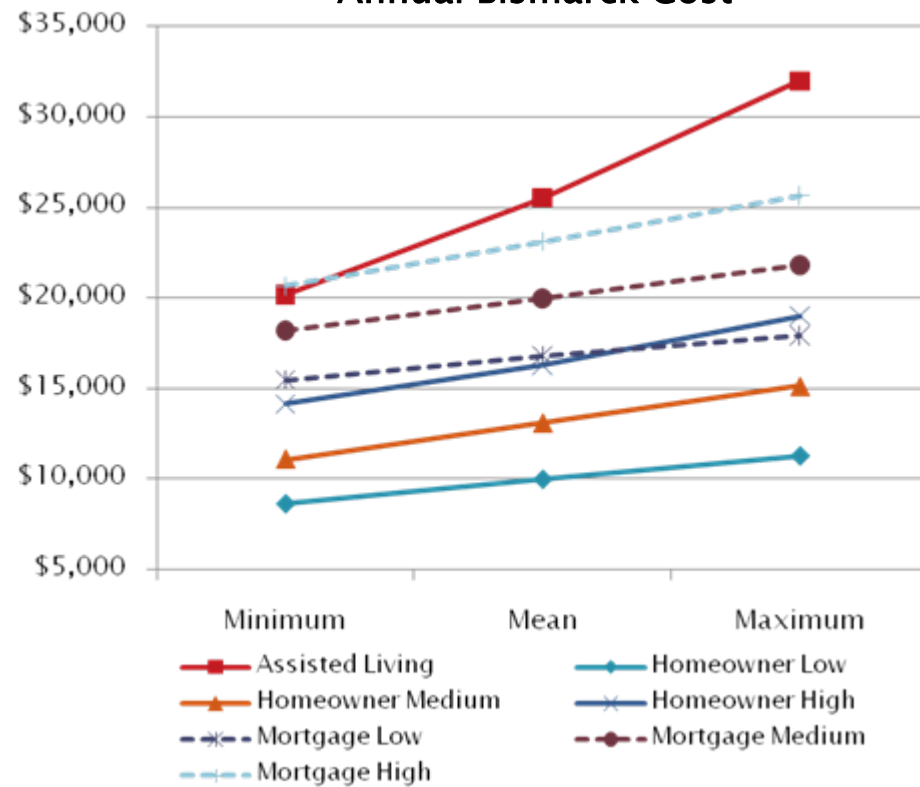
# Simulation Results

In-Home Care Services	Hours Per Month		
	Low	Medium	High
Homemaker Services	10	15	20
Home Health Aide Services	10	15	20
Adult Day Health Care	20	30	40

## Annual Fargo Cost



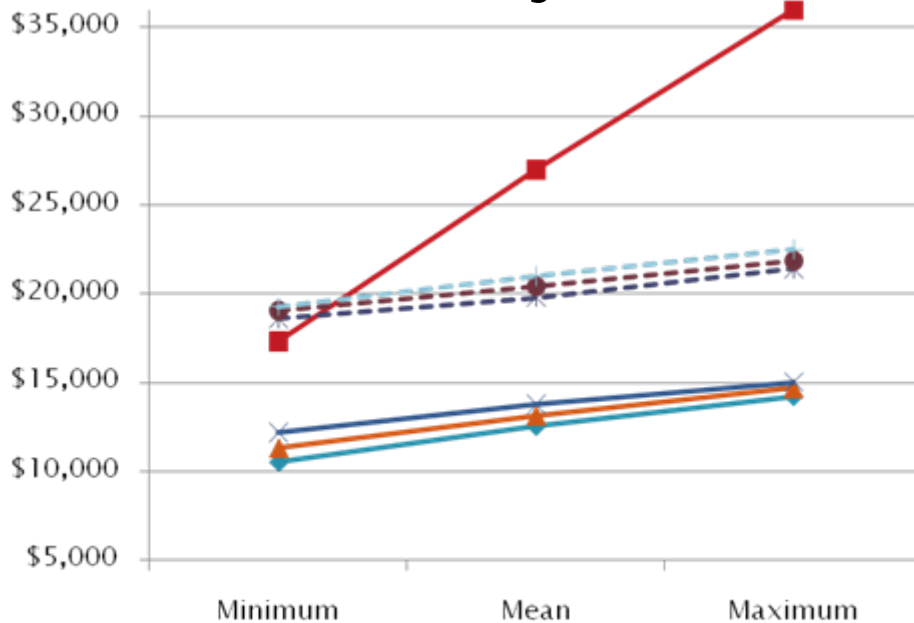
## Annual Bismarck Cost



# Simulation Results

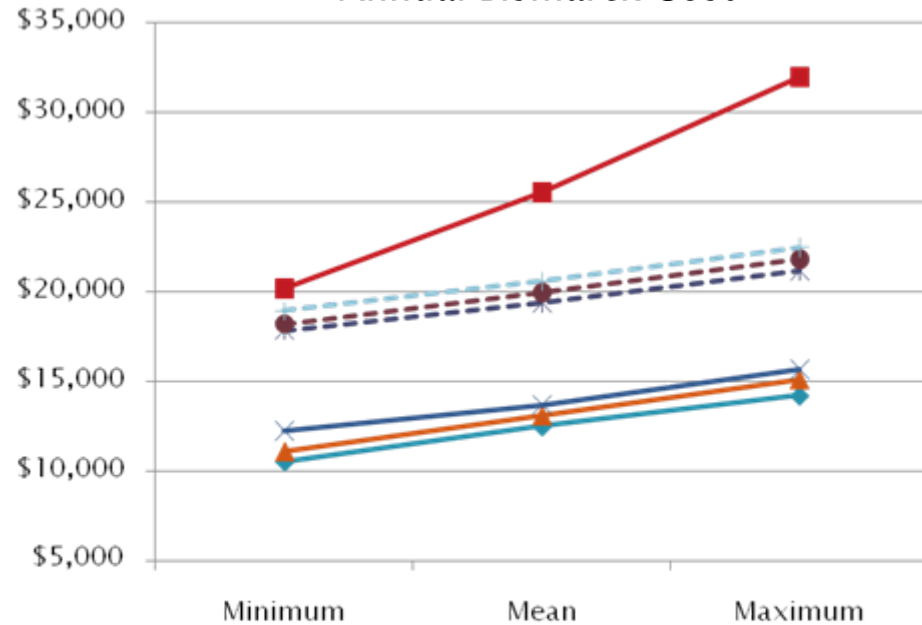
Transit Rides	One-Way Rides Per Month		
	Low	Medium	High
Demand for Rides	20	40	60

## Annual Fargo Cost



- Assisted Living
- ◆ Homeowner Low
- ▲ Homeowner Medium
- × Homeowner High
- ✱ Mortgage Low
- Mortgage Medium
- ⊕ Mortgage High

## Annual Bismarck Cost

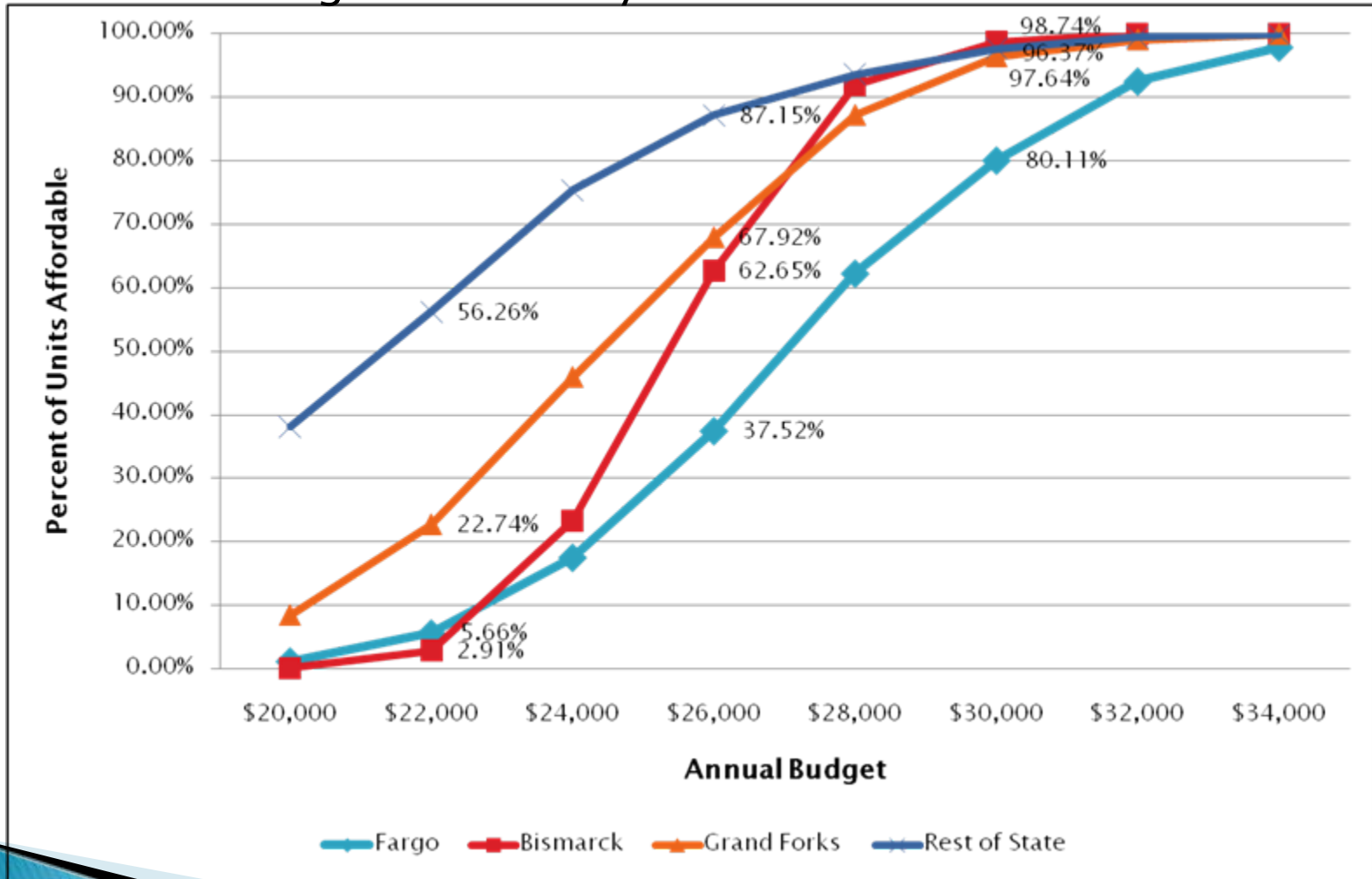


- Assisted Living
- ◆ Homeowner Low
- ▲ Homeowner Medium
- × Homeowner High
- ✱ Mortgage Low
- Mortgage Medium
- ⊕ Mortgage High



# Simulation Results

## Assisted Living Affordability





# Summary and Conclusions

- ▶ Assisted Living Costs Almost Always Higher Than Other Living Arrangements Assuming Similar Service Levels
- ▶ Homeowners Without Mortgages Have Distinct Advantage
- ▶ Considering Total Cost Made Assisted Living Comparably Less Costly, Especially in Fargo
- ▶ Other Factors Such as Amenities and Safety Should be Considered as Well

