

# THE ECONOMIC BURDEN OF ALZHEIMER'S DISEASE AND OTHER DEMENTIAS IN SAN DIEGO COUNTY

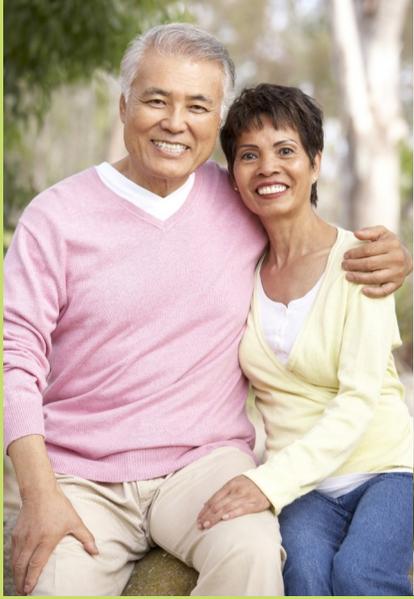
MARCH 2015



COUNTY OF SAN DIEGO  
**HHSA**  
HEALTH AND HUMAN SERVICES AGENCY



**LIVE WELL**  
SAN DIEGO



 **ALZHEIMER'S**Project  
San Diego unites for a cure and care

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# **THE ECONOMIC BURDEN OF ALZHEIMER'S DISEASE AND OTHER DEMENTIAS IN SAN DIEGO COUNTY**

County of San Diego  
Health and Human Services Agency

Aging & Independence Services  
Public Health Services

March 2015

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# THE ECONOMIC BURDEN OF ALZHEIMER'S DISEASE AND OTHER DEMENTIAS IN SAN DIEGO COUNTY

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March 13, 2015

**B**attling Alzheimer's disease is now one of San Diego County's leading public health priorities.

The statistics are startling: Alzheimer's is the region's third leading cause of death; some 60,000 residents have the deadly disease or other form of dementia; thousands of families struggle to provide quality care under tough circumstances; and the toll on taxpayers, caregivers and the healthcare system runs into billions of dollars a year.

In 2014, the County created The Alzheimer's Project, an ambitious regional initiative to find a cure and to help those with the disease and their caregivers.

As part of The Project, San Diego's world-class researchers are teaming up to accelerate efforts to find a treatment or cure, while physicians have set out to craft standards for the diagnosis and management of the disease. The County, working with the City of San Diego, Alzheimer's Association and other groups, is ramping up efforts to educate the public, assist families and improve the health and safety of those with dementia.

This report, *The Economic Burden of Alzheimer's Disease and Other Dementias in San Diego County*, provides a statistical snapshot of the challenge facing us.

It will help guide our way as we tackle this public health menace together.

A handwritten signature in black ink that reads "Dianne Jacob".

Dianne Jacob

Supervisor, Second District

A handwritten signature in black ink that reads "Dave Roberts".

Dave Roberts

Supervisor, Third District



# County of San Diego

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CHIEF OPERATIONS OFFICER

March 13, 2015

Dear San Diegans,

The County of San Diego Health and Human Services Agency, which includes Aging & Independence Services and Public Health Services, is proud to release *The Economic Burden of Alzheimer's Disease and Other Dementias in San Diego County*. As the third leading cause of death in San Diego County, Alzheimer's disease has a significant local economic burden.

In January 2014, then Chairwoman Dianne Jacob issued a groundbreaking call to action and, joined by Supervisor Dave Roberts, convened The Alzheimer's Project, bringing together members of the care community, researchers, and physicians, to improve care and accelerate the search for a cure. This report contributes an important component to our understanding of the impacts of this devastating disease on our community.

This report quantifies the economic costs to our community of lifetime care, hospital charges, and the cost of caregiving for the 60,000 San Diegans currently living with Alzheimer's disease and other dementias, as well as the anticipated 94,000 estimated for 2030. Understanding the impacts of Alzheimer's disease and other dementias is an essential part of the County's *Live Well San Diego* vision that promotes healthy, safe, and thriving communities for all residents.

*Live Well San Diego,*

A handwritten signature in blue ink that reads "Ellen Schmeding".

Ellen Schmeding,  
Director, Aging & Independence Services

A handwritten signature in blue ink that reads "Wilma J. Wooten, M.D., M.P.H.".

Wilma J. Wooten, M.D., M.P.H.  
Public Health Officer  
Director, Public Health Services

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# EXECUTIVE SUMMARY

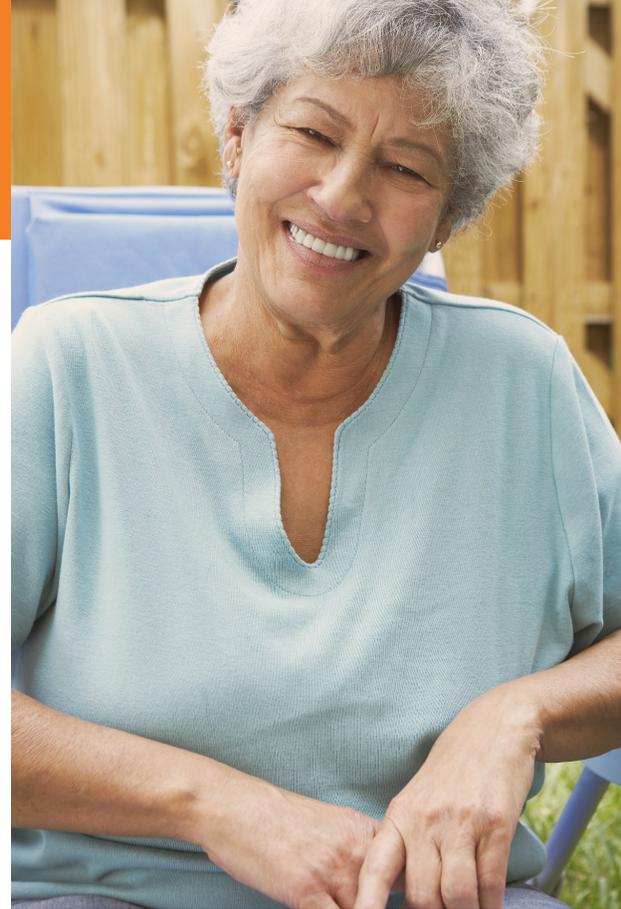
## ALZHEIMER'S DISEASE AND OTHER DEMENTIAS COSTS IN SAN DIEGO COUNTY

Approximately 60,000 San Diego County residents, age 55 years and older, were living with Alzheimer's disease and other dementias (ADOD) in 2012.<sup>1</sup> In San Diego County alone, ADOD prevalence is expected to increase by 30%, from 60,000 in 2012 to 77,956 in 2020. An additional 20% increase in the San Diego County ADOD population is projected to occur from 2020 to 2030, from 77,956 to nearly 94,000.

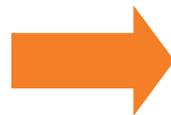
In 2012, the Health and Human Services Agency East Region had the largest number of individuals living with ADOD, followed by North Inland Region. However, by 2030 Central and North Central Regions are projected to surpass North Inland Region with 15,637 and 15,432 individuals, respectively.

### COMMUNITY COSTS

National estimates of an individual's lifetime cost due to dementia ranged from \$41,689 to \$56,290 per year (2010 dollars).<sup>2</sup> This estimate included direct and indirect medical costs as well as loss of income and productive services to the market economy. The higher estimation of per person cost accounts for the added expense of informal care. Research has shown the estimated average life expectancy, after a diagnosis of ADOD, ranges from four to eight years.<sup>3-8</sup> The total lifetime cost of care for San Diegans currently diagnosed with ADOD is estimated to be between \$13.5 billion and \$27 billion dollars, depending on life expectancy. This cost is projected to nearly double by 2030.



**In 2012:**  
Lifetime cost of care for San Diegans diagnosed with ADOD is estimated to be between \$13.5 and \$27 billion, depending on length of survival.



**By 2030:**  
Lifetime cost of care for San Diegans diagnosed with ADOD is estimated to be between \$21 and \$42 billion, depending on length of survival.

# EXECUTIVE SUMMARY



## HOSPITALIZATION CHARGES

In 2012, there were 16,897 hospitalizations with any mention of ADOD among San Diego County residents age 55 years and older, accounting for approximately \$886 million in direct hospitalization charges.

- The average charge for a single hospital stay with any mention of ADOD was \$52,412.
- The average length of stay for hospitalization with any mention of ADOD was 9.4 days.
- Two in five hospitalizations with any mention of ADOD resulted in the patient transferred to a skilled nursing or intermediate care facility.

Hospitalizations with ADOD as a secondary diagnosis (any mention of ADOD, aside from principal diagnosis) accounted for 94.3% of all ADOD hospitalizations among residents age 55 and older in San Diego County.

- Individuals admitted with a principal diagnosis of ADOD were hospitalized 27 days on average and approximately 38% were discharged to a skilled nursing or intermediate care facility.
- Individuals admitted with a secondary diagnosis of ADOD were hospitalized an average of 8 days and were discharged to a skilled nursing or intermediate care facility approximately 44% of the time.

By 2030, ADOD hospitalizations among residents 55 and older are expected to increase by 66%, from 16,897 to 28,128. This will result in an increase in direct hospitalization charges from almost \$886 million to nearly \$1.5 billion.

In 2012, the three most frequently occurring principal diagnoses among hospitalizations with any mention of ADOD for residents age 55 years and older were septicemia, urinary tract infections and pneumonia. These hospitalizations had slightly shorter lengths of stay and lower total charges compared to hospitalizations for these conditions without a mention of ADOD. However, these hospitalizations were more likely to be discharged to a skilled nursing or intermediate care facility. Studies have shown that the average annual payment for an individual with ADOD treated at a skilled nursing facility was ten times higher than the cost of individuals without ADOD (\$4,072 vs \$472 in 2013 dollars).<sup>1</sup>

**By 2030, ADOD hospitalization charges will increase to nearly \$1.5 billion dollars.**

# EXECUTIVE SUMMARY



**In 2012, the health care cost to caregivers due to the physical and emotional impact of caregiving was nearly \$75.4 million (in 2013 dollars).**

## CAREGIVING COSTS

In 2012:

- There were more than 136,800 San Diegans providing unpaid care to 60,000 people age 55 years and older living with ADOD in San Diego County.
- Caregivers to San Diegans living with ADOD provided an estimated 156 million hours of unpaid care, worth \$1.94 billion (in 2013 dollars).
- In San Diego County, the health care cost to caregivers due to the physical and emotional impact of caregiving was approximately \$75.4 million (in 2013 dollars).
- East Region had the highest proportion of caregivers with 24.8% of the 136,800 unpaid caregivers in the county caring for residents in East Region, followed by North Inland Region at 17.6%.

By 2030:

- There will be approximately 94,000 San Diego County residents age 55 years and older living with ADOD.
- The increased number of San Diegans with ADOD will require more than 213,300 unpaid caregivers to provide nearly 242.8 million hours of care a year. The economic value of this care is estimated to be worth \$3.02 billion dollars (in 2013 dollars).
- The health care costs of unpaid caregivers will increase to \$117.6 million dollars a year (in 2013 dollars).

# EXECUTIVE SUMMARY

## COST COMPARISON

Below is a comparison of costs of ADOD on the local, state, and national level.

COSTS	SAN DIEGO COUNTY	CALIFORNIA	UNITED STATES
LIFETIME	\$13.5 BILLION	\$ 130.6 BILLION	\$1,170.8 BILLION
<b>HOSPITALIZATION</b>			
<b>PRIMARY DIAGNOSIS</b>			
PER PERSON	\$46,818	-	-
TOTAL	\$886 MILLION	-	-
<b>ANY MENTION OF ADOD</b>			
PER PERSON	\$52,412	-	-
TOTAL	\$840 MILLION	-	-
CAREGIVING	\$1.94 BILLION	\$21.9 BILLION	\$220.2 BILLION

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# INTRODUCTION



In May 2014, the County of San Diego Board of Supervisors voted to launch the Alzheimer's Project to address the devastating effects of the disease on affected individuals, their families and the region's health care system. The Alzheimer's Project brings together the region's caregivers, researchers, clinicians, advocacy groups and leadership to inventory and improve caregivers resources and provide support for local efforts to find a cure. The Alzheimer's Project includes six major components:

to inventory and improve caregivers resources and provide support for local efforts to find a cure. The Alzheimer's Project includes six major components:

- Cure - enhancing the awareness, partnerships and funding for Alzheimer's disease research
- Care - development of a countywide plan to improve the network of services for those afflicted with the disease and their caregivers
- Clinical - addresses improving medical care for patients with Alzheimer's disease and other dementias (ADOD)
- Education/Awareness - development of a multi-faceted education and public awareness campaign
- Legislation – support legislation that increases funding for Alzheimer's disease research and provides resources for caregivers, family members and those directly affected by the disease
- Funding – identify and pursue opportunities for additional resources to support the Alzheimer's Project

The Alzheimer's Project supports the *Live Well San Diego* vision, which encourages residents to live healthy, safe, and thriving lives. *Live Well San Diego* is a comprehensive, long term plan to advance the health and well-being of all San Diegans through the collective efforts of residents, community, faith-based organizations, businesses, schools, law enforcement, as well as local, city and tribal jurisdictions and the County of San Diego.

The Alzheimer's Project inventories and improves resources for San Diegans living with ADOD and their caregivers in order to enhance their ability to live healthy, safe, and thriving lives. Specifically, improving coordination and communication related to care for someone living with ADOD and raising awareness for early diagnosis improves the health of San Diegans with ADOD and their caregivers. An inventory of resources and facilities with designated ADOD programs and education on environmental modifications for those living with ADOD will ensure the safety of those living with the disease. Lastly, improving the entire network of services enhances the quality of life for San Diegans living with ADOD and their caregivers, allowing them to thrive through all stages of the disease.

For more information on *Live Well San Diego*, please visit [www.LiveWellSD.org](http://www.LiveWellSD.org).

# INTRODUCTION

## WHY ALZHEIMER'S DISEASE AND OTHER DEMENTIAS?

ADOD includes conditions caused by the degeneration of brain cells. Alzheimer's disease is the most common form of dementia, but all dementias can be characterized by a decline in thinking skills, memory loss, and reduced ability to perform everyday activities. These diseases often require increasing levels of care as the disease progresses.<sup>1</sup> While dementia is more common among the older population, ADOD is increasingly diagnosed at an earlier age. Therefore information on ADOD is discussed for the 55 years and older age group unless otherwise noted.

The specific definition of ADOD was developed after consultation with local advocacy groups, subject matter experts, and review of research publications and national standards for reporting ADOD. All people suffering from dementia need

access to similar types of resources, such as caregivers and health care professionals trained in the treatment of dementia. Considering this, the definition of Alzheimer's disease was expanded to include other dementias. The definition includes major causes of dementia such as Alzheimer's disease, frontotemporal dementia, and vascular dementia. Other forms of dementia include senility and mild cognitive impairment. For a complete list of conditions included in the definition of ADOD, and the corresponding International Classification of Disease (ICD)-9 codes, refer to the Data Guide and Definitions section.

Where possible, data on ADOD is provided. However, national and state publications frequently only provide information on Alzheimer's disease or on dementias individually. Prevalence estimates, hospitalization and caregiving data for San Diego County all refer to the expanded definition of ADOD.



# INTRODUCTION



## WHAT IS ECONOMIC BURDEN?

Economic burden is best described by two measures: direct costs and indirect costs.

### DIRECT COSTS

Direct costs are the actual costs of medical treatment incurred, and are represented by both service and product costs. Service costs include physician or other healthcare professional procedures, hospital or other inpatient care, outpatient care, and nursing home stays. Product costs include prescription and nonprescription drugs. Direct costs are also called treatment expenditures. This report estimates the direct hospitalization charges, or treatment expenditures, of ADOD.

### INDIRECT COSTS

Indirect costs can be incurred by both the sick person and their caregivers, and represent the impact on the workplace. These indirect costs result from the costs of absenteeism (work missed due to sick days) and efficiency losses from presenteeism (lost productivity while at work). An ill employee who continues to work in order to avoid sick days is unlikely to perform as well as a healthy worker. Productivity loss due to presenteeism is enormous. Indirect costs are also called lost productivity.

The direct costs of ADOD among San Diego County residents were estimated using the 2012 Office of Statewide Planning and Development Patient Discharge Data. Statistics from the Alzheimer's Association, peer reviewed journals articles, and other published reports were also used to estimate direct costs in San Diego County. However, only the indirect costs incurred as a result of caregiving for residents living with ADOD in San Diego County were estimated. Indirect Costs are likely to be much higher than direct costs.

Along with direct and indirect costs, information on the prevalence of people living with ADOD and the rate of ADOD in the population is provided. Prevalence refers to the number of people living with ADOD at a specific point in time. These numbers represent the burden on the medical care and social systems established for caring for those with ADOD. The rate of ADOD represents the risk to an individual within the population.

# INTRODUCTION

**In 2012, Alzheimer's disease was the third leading cause of death in San Diego County.<sup>4</sup>**

## **BURDEN OF ALZHEIMER'S DISEASE AND OTHER DEMENTIAS**

Alzheimer's disease is the sixth leading cause of death in the U.S.,<sup>2</sup> fifth leading cause of death in California,<sup>3</sup> and the third leading cause of death in San Diego County.<sup>4</sup> Estimates show there are currently 5.2 million Americans suffering from Alzheimer's disease, a majority of whom are age 65 years and older.<sup>1</sup> Furthermore, the Centers for Disease Control and Prevention estimated that Alzheimer's disease caused more than 84,974 deaths in the U.S. in 2011.<sup>2</sup>

Additionally, in 2008, it was estimated that among fee for service Medicare beneficiaries with Alzheimer's disease and related disorders, nationwide there were five million people with a least one hospitalization.<sup>5</sup>

The economic costs of medical care due to Alzheimer's disease are staggering. In 2010, Alzheimer's disease cost the U.S. an estimated \$109 billion in direct medical costs, which was more than heart disease, with a cost of \$102 billion, and more than cancer, with a cost of \$107 billion.<sup>5</sup> This year, Alzheimer's disease costs Californians an estimated \$16 billion in traditional medical and social supports, such as doctor visits, hospital stays, skilled nursing facility stays, and home health services. By 2030, this number is expected to reach \$26.6 billion.<sup>6</sup>



**Nationally, direct medical costs for ADOD were estimated at \$109 billion, higher than heart disease or cancer in 2010.<sup>5</sup>**

# COMMUNITY COSTS

## PREVALENCE OF ALZHEIMER'S DISEASE AND OTHER DEMENTIAS

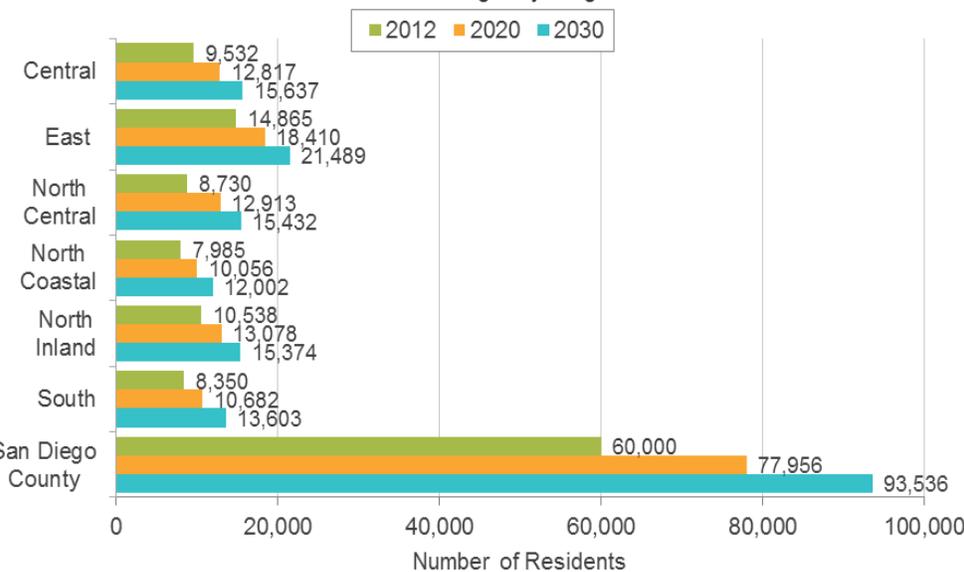
Based on national and state prevalence estimates approximately 60,000 San Diego County residents age 55 years and older were living with ADOD in 2012.<sup>1,6</sup> Many of these residents may suffer from more than one form of dementia. For example, a person living with Alzheimer's disease may also have vascular dementia and/or Parkinson's disease.

The prevalence may increase as the rate of disease increases, individuals live longer, and the 'baby boomer' population grows older. By 2020, the percent of the population age 55 years and older will increase by 33% in San Diego County, while ADOD prevalence will increase by 30% from 60,000 to 77,956 in 2020. Between 2020 and 2030, the percent of the population 55 years and older will increase by 20% in San Diego County. ADOD prevalence among San Diegans age 55 years and older is also expected to increase by 20%, from 77,956 to 93,536 in 2030.



**60,000 San Diego County residents aged 55 years and older were living with ADOD in 2012.**

Estimated Prevalence of Alzheimer's Disease and Other Dementias Among San Diego County Residents, 55 Years and Older, by Health and Human Services Agency Regions, 2012-2030



Among the Health and Human Services Agency (HHS) Regions, East Region had the most number of people age 55 years and older living with ADOD in 2012 (14,865), followed by North Inland Region (10,538). The HHS region with the lowest prevalence of ADOD in 2012 was North Coastal, with 7,985 individuals.

However, in 2030, Central and North Central Regions are projected to surpass North Inland Region in the number of individuals age 55 years and older living with ADOD, with 15,637 and 15,432 individuals, respectively.

Due to rounding, HHS Region estimates may not add up to the county as a whole. Source: County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics, Alzheimer's Disease and Other Dementias Database.

# COMMUNITY COSTS

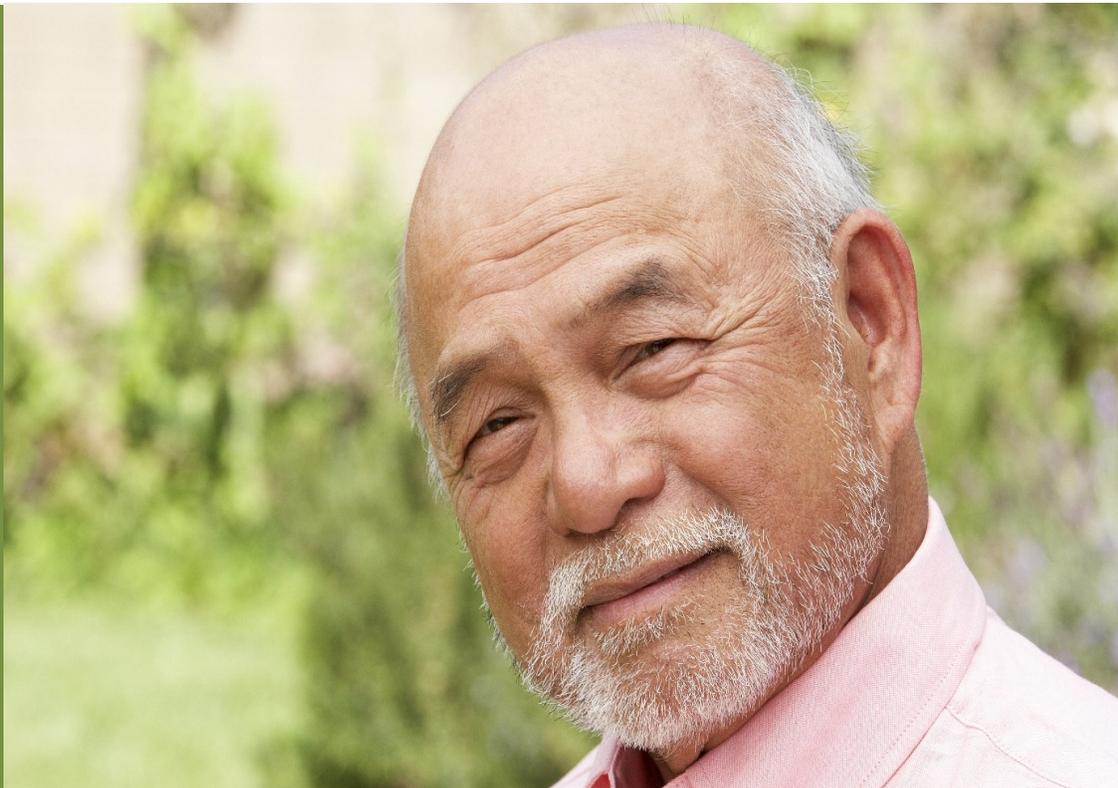
## LIFETIME COST PER PERSON

Lifetime cost refers to the monetary costs incurred during the years of survival after receiving a diagnosis. The annual cost for a person with ADOD was estimated to be between \$41,689 and \$56,290 per year, in 2010 dollars.<sup>7</sup> This estimate takes into account direct and indirect medical costs as well as loss of income and productive services to the market economy.

To calculate a lifetime cost among San Diego County residents age 55 years and older living with ADOD, the annual cost of \$56,290 was used to account for the costs of informal care, which are often difficult to estimate. Furthermore, studies show individuals 65 and older with Alzheimer's disease survive, on average, four or eight years after diagnosis.<sup>8-13</sup> The shorter survival time of four years was used to estimate lifetime costs due to ADOD after diagnosis. This cost was estimated for 2012 and projected for 2020 and 2030, both countywide and by HHSA Region.

In 2012, the estimated lifetime cost for San Diego County residents age 55 years and older with an ADOD diagnosis was estimated to be \$13.5 billion dollars. Compared to the other HHSA regions, East Region had the highest estimated lifetime cost for ADOD, at \$3.3 billion. This cost is indicative of its larger ADOD population. This was nearly \$1 billion more than the HHSA North Inland Region, which had the second largest estimated lifetime cost for ADOD.

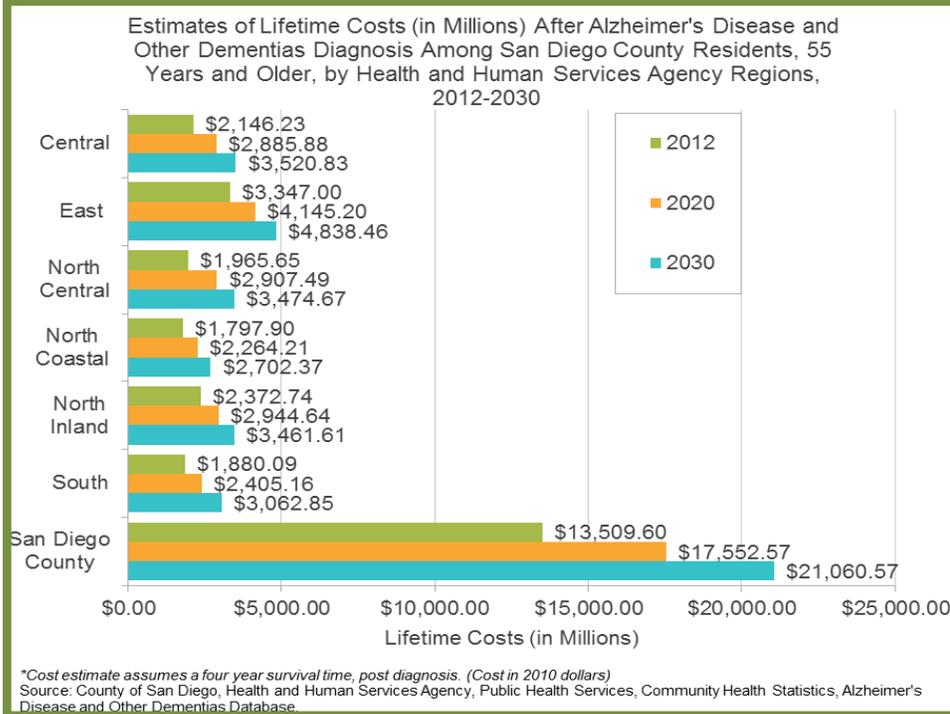
**In 2012, the lifetime cost for San Diego County residents age 55 years and older diagnosed with ADOD was approximately \$13.5 billion dollars.**



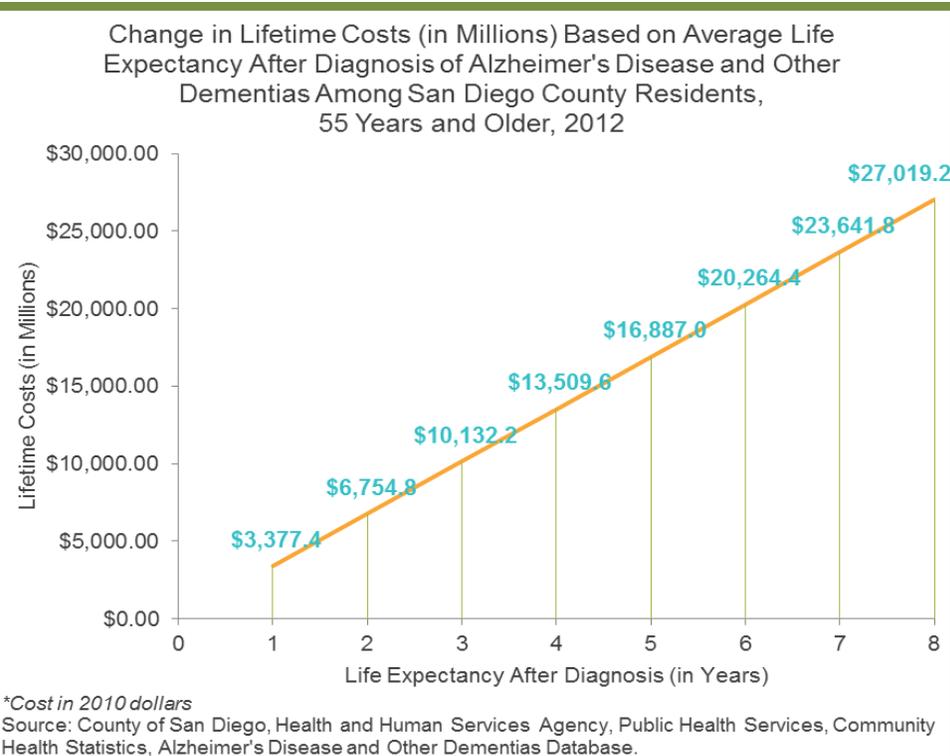
# COMMUNITY COSTS

When using the four year life expectancy after diagnosis, the lifetime cost of residents age 55 years and older with ADOD in San Diego County will increase by more than \$4 billion from 2012, reaching \$17.6 billion in 2020. This cost will continue to increase, reaching nearly \$21.1 billion by 2030.

As in 2012, East Region will continue to be the region with the highest lifetime costs due to ADOD in both 2020 and 2030. By 2030, East Region will reach a cost of over \$4.8 billion. However, Central Region will surpass North Inland Region as the region with the second largest lifetime costs due to ADOD after diagnosis.



These estimates mirror the prevalence estimates, as they are influenced by the estimated number of people age 55 years and older living with ADOD in each region of San Diego County. When using the longer survival time of eight years to estimate the lifetime costs of ADOD after diagnosis among those age 55 years and older in San Diego County, the cost increases to more than \$27 billion for 2012.



**In 2012, East Region had the highest estimated lifetime cost of ADOD, at \$3.3 billion.**

# HOSPITALIZATION CHARGES

## HOSPITALIZATION CHARGES WITH ANY MENTION OF ALZHEIMER'S DISEASE AND OTHER DEMENTIAS

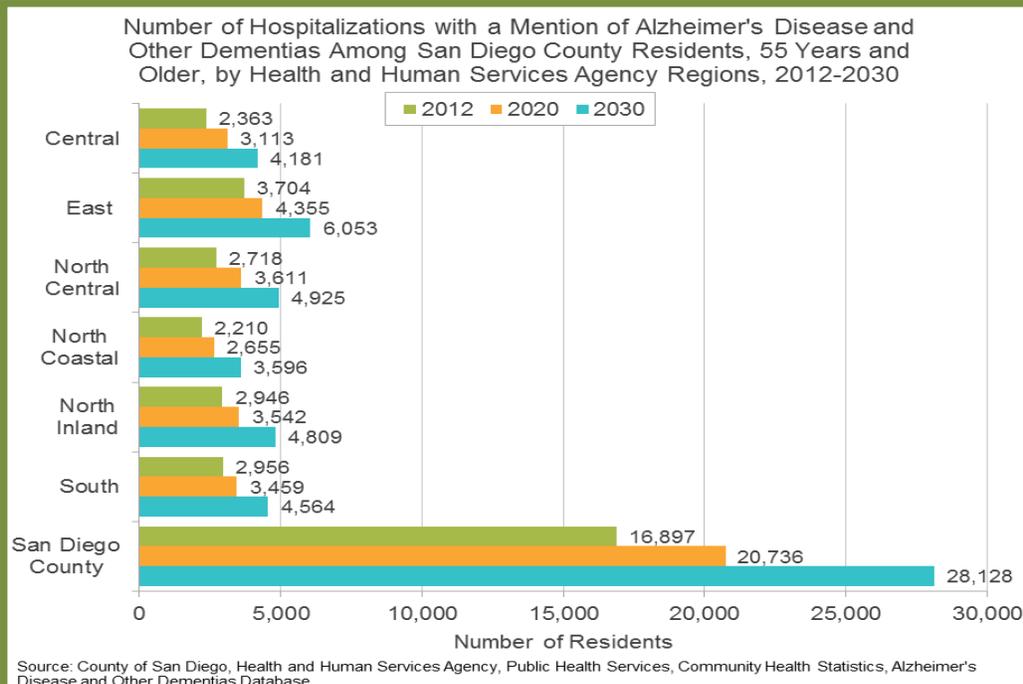
In 2012, there were 11,427 San Diegans hospitalized with any mention of ADOD. The reason for the hospitalization could be due to ADOD or for another reason with ADOD noted during the stay. Nearly one third of these residents were readmitted at least once, resulting in 16,897 hospitalizations with any mention of ADOD among residents age 55 years and older in San Diego County. In addition, nearly 32,000 San Diego County residents age 55 years and older are projected to be discharged from the ED or hospital with a mention of ADOD by 2030.

The total direct charges for these hospitalizations was nearly \$886 million, with an average charge of \$52,412 per hospitalization. The average length of stay of each hospitalization with a mention of ADOD was 9.4 days, with two in five hospitalizations resulting in the patient being transferred to a skilled nursing or intermediate care facility.

The number of hospital discharges with a principal diagnosis of ADOD accounted for only 5.7% of the total hospitalizations with any mention of ADOD. These hospitalizations accounted for \$45.2 million in total direct hospitalization charges, with an average charge of \$46,818 per hospitalization. On average, San Diegans with a principal diagnosis of ADOD, age 55 years and older, were admitted for 27 days. Two in five of these hospitalizations resulted in the patient transferred to a skilled nursing or intermediate care facility.

**In 2012, hospitalizations among San Diegans age 55 years and older with a mention of ADOD had an average charge of \$52,412 per hospitalization.**

**San Diegans age 55 years and older, with a principal diagnosis of ADOD, had an average hospital stay of 27 days in 2012.**



# HOSPITALIZATION CHARGES



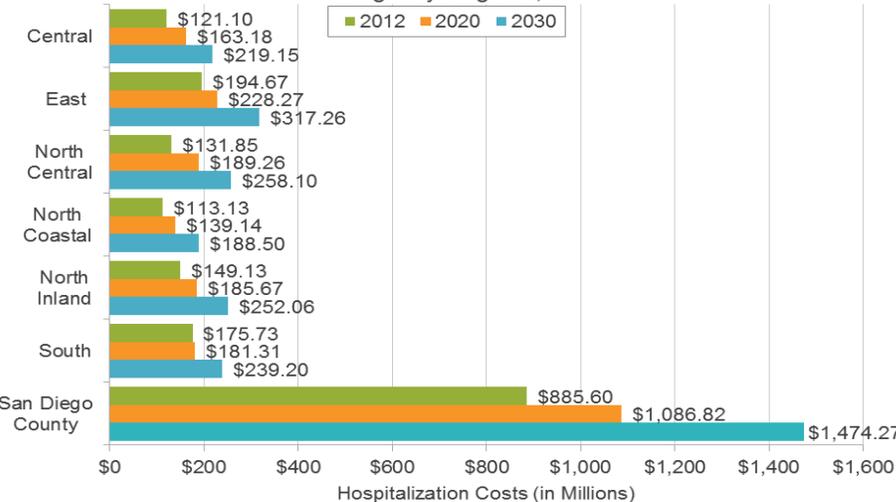
Of the more than 16,800 hospitalizations with any mention of ADOD among San Diego County residents age 55 years and older in 2012, 94.3% had ADOD as the secondary diagnosis (any mention of ADOD, aside from principal diagnosis). The total charges for these hospitalizations was \$840 million and the average charge for a hospitalization with ADOD as a secondary diagnosis was \$52,751. These hospitalizations had an average length of stay of 8 days and nearly 44% of the hospitalizations resulted in patient discharge to a skilled nursing or intermediate care facility.

Among the HHS Regions, East Region had the highest total charges due to hospitalizations with any mention of ADOD among residents age 55 years and older, with total charges of \$195 million in 2012. South Region followed closely with \$176 million in total charges due to hospitalizations with a mention of ADOD, despite the fact that South Region had one of the smallest estimated prevalence numbers of ADOD in 2012.

By 2030, hospitalizations among residents age 55 and older with any mention of ADOD are expected to increase by 66%, from 16,897 to 28,128 hospitalizations. The increase in hospitalizations will result in the doubling of direct hospitalization charges from \$886 million to nearly \$1.5 billion.

Among the HHS Regions, East Region will continue to have the highest charges due to hospitalizations with any mention of ADOD among residents age 55 years and older. By 2030, hospitalization charges will reach \$317 million for East Region residents. North Central Region will have the second highest hospitalization charges, with more than \$258 million for hospitalizations among residents age 55 years and older with a mention of ADOD.

Costs of Hospitalizations (in Millions) with Any Mention of Alzheimer's Disease and Other Dementias Among San Diego County Residents, 55 Years and Older, by Health and Human Services Agency Regions, 2012-2030



**By 2030, charges for hospital stays among San Diegans age 55 years and older, with any mention of ADOD will reach \$1.47 billion a year.**

Source: County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics, Alzheimer's Disease and Other Dementias Database.

# HOSPITALIZATION CHARGES

## TOP THREE PRIMARY DIAGNOSES AMONG HOSPITALIZATIONS WITH ANY MENTION OF ALZHEIMER'S DISEASE AND OTHER DEMENTIAS

Individuals with ADOD are more likely to have co-occurring medical conditions than those without ADOD. These comorbidities result in higher health care utilization than those without such conditions. Older adults with ADOD also typically have higher health care costs than those without these conditions.<sup>14</sup>

In 2012, the top three reasons for a hospitalization among San Diegans age 55 years and older hospitalized with any mention of ADOD during their hospital stay were septicemia (infection resulting from the presence of bacteria in the blood), urinary tract infections, and pneumonia.

### HOSPITALIZATION DUE TO SEPTICEMIA

In 2012, there were 1,750 hospitalizations with a principal diagnosis of septicemia that included a secondary diagnosis of ADOD among San Diegans age 55 years and older. On average, the hospitalization charges for septicemia with a mention of ADOD were about \$31,600 less than hospitalization charges for septicemia without a mention of ADOD. The average charge for a hospitalization of septicemia with a secondary diagnosis of ADOD was \$65,953 compared to \$97,580 for hospitalizations of septicemia without a mention of ADOD.

Similar to hospitalization charges, the average length of stay per hospitalization was shorter for septicemia with a mention of ADOD (6.5 days) than septicemia admissions without a mention of ADOD (7.8 days). However, a larger percentage of septicemia hospitalizations resulted in discharges to skilled nursing or intermediate care facilities among patients with a secondary diagnosis of ADOD compared to those without a mention of ADOD. In fact, nearly half of the hospitalization discharges due to septicemia with a mention of ADOD were discharged to a skilled nursing or intermediate care facility compared to one third of the hospitalizations without a mention of ADOD.

### HOSPITALIZATION DUE TO URINARY TRACT INFECTION

The second most common principal diagnosis of hospitalizations with any mention of ADOD among San Diego County residents age 55 years and older was a urinary tract infection (UTI). In 2012, there were 948 hospital discharges with a primary diagnosis of UTI and secondary diagnosis of ADOD.

**In 2012, the average charge for a hospitalization due to septicemia with a secondary diagnosis of ADOD, among San Diego County residents age 55 years and older, was \$65,953, with an average of 6.5 days spent in the hospital.**

# HOSPITALIZATION CHARGES

The average hospitalization charges for UTI with a mention of ADOD was approximately \$1,000 less than the charges for UTI hospitalizations without a mention of ADOD, with charges of \$30,809 and \$31,928 respectively.

Similar to septicemia, hospitalizations for UTI with a mention of ADOD had a shorter length of stay than hospitalizations for a UTI without ADOD, at 5.1 days and 5.5 days respectively. However, UTI hospitalizations with a mention of ADOD were discharged to skilled nursing or intermediate care facilities twice as often as those UTI hospitalizations without a mention of ADOD.



## HOSPITALIZATION DUE TO PNEUMONIA

In 2012, there were 688 hospitalizations with a principal diagnosis of pneumonia and a secondary diagnosis of ADOD among San Diego County residents age 55 years and older. The average charge per hospitalization was less for patients with pneumonia and ADOD, at \$45,821 per hospitalization, than pneumonia admissions without a mention of ADOD, at \$48,887 per hospitalization. Yet pneumonia patients with co-occurring ADOD had longer average lengths of stay than pneumonia patients without a mention of ADOD, with 5.9 days and 5.5 days respectively.

Most notably, 42% of hospitalizations due to pneumonia with a mention of ADOD were discharged to a skilled nursing or intermediate care facility compared to only 18% of pneumonia hospitalizations without a mention of ADOD discharged to those types of facilities.

In general, ADOD complicates routine medical care. Patients with these three leading co-occurring diagnoses are much more likely to be discharged earlier and sent to a skilled nursing or intermediate care facility. These facilities provide a high level of care for patients while they recover from their illness. Furthermore, studies have shown that the average yearly Medicare payment for an individual with ADOD in a skilled nursing facility was nearly ten times higher than the payments to individuals without ADOD.<sup>1</sup> Thus, as the course of care moves out of the hospital and into care facilities such as a skilled nursing facility, the cost of care for patients with ADOD becomes much greater when the time spent in those facilities is taken into account.

**Patients with ADOD hospitalized for urinary tract infections (UTIs) were twice as likely to be discharged to a skilled nursing or intermediate care facility compared to patients hospitalized for UTIs without ADOD.**

# CAREGIVER COSTS

In 2012, there were more than 136,800 San Diegans providing unpaid care for an estimated 60,000 people living with ADOD in San Diego County. These caregivers provided an estimated 156 million hours of unpaid care in 2012. This number represents an average of 21.9 hours of care per caregiver per week, or 1,139 hours of care per caregiver per year.

The economic value of this care is estimated to be worth \$1.94 billion dollars (in 2013 dollars). If nothing else changes, by 2030 there will be approximately 94,000 people age 55 years and older with ADOD in San Diego County. The

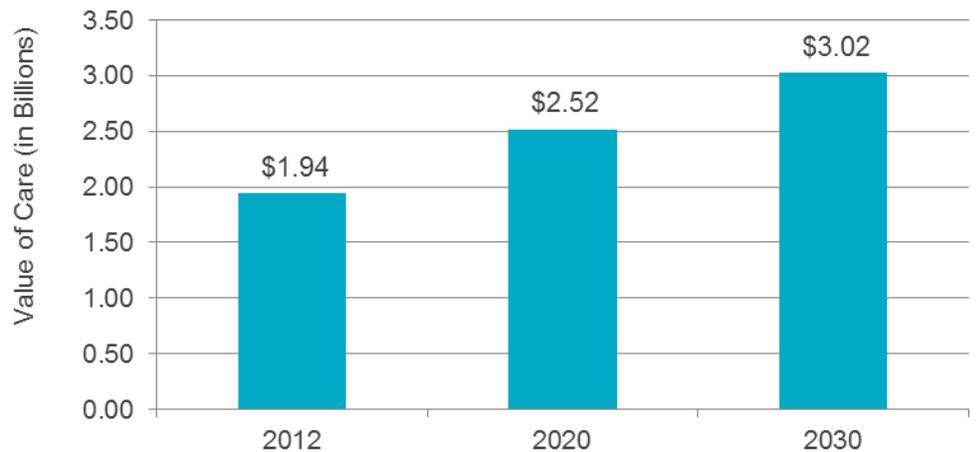
increase in San

Diegans living with ADOD will require more than 213,300 unpaid caregivers to provide nearly 242.8 million hours of care a year. The economic value of this care is estimated to be worth \$3.02 billion dollars (in 2013 dollars).

**In 2012, more than 136,800 San Diegans provided an estimated 156 million hours of unpaid care for those living with ADOD in San Diego County.**



Estimated Value of Care Provided to San Diego County Residents with Alzheimer's Disease and Other Dementias by Unpaid Caregivers in San Diego County, 2012-2030



Source: County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics, Alzheimer's Disease and Other Dementias Database.

# CAREGIVER COSTS

The work required of all caregivers, including physical tasks, organization, and planning can lead to increased emotional stress, depression, and financial hardships. Financial hardships can result from both personal finances used to cover costs of care and loss of wages due to missing work. These stressors can result in poor health for caregivers. In addition, the added demands on caregivers of people living with ADOD can leave little time for managing their own health.



In San Diego County, the health care costs to caregivers due to the physical and emotional impact of caregiving were approximately \$75.4 million dollars in 2012. By 2030, if nothing else changes, the health care costs of unpaid caregivers will increase to \$117.6 million dollars a year (in 2013 dollars).

**By 2030, if nothing else changes, the health care costs of unpaid caregivers in San Diego County will increase to an estimated \$117.6 million dollars a year (in 2013 dollars).**

Estimated Health Care Costs to Caregivers of San Diego County Residents Living with Alzheimer's Disease and Other Dementias, San Diego County, 2012-2030



Source: County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics, Alzheimer's Disease and Other Dementias Database.

# CAREGIVER COSTS



The distribution of unpaid caregivers providing services to those with ADOD is unequally spread throughout the Health and Human Service Agency Regions. East Region had the highest proportion of caregivers at 24.8% of the 136,800 unpaid caregivers residing in the region in 2012, followed by North Inland Region at 17.6%. Following this trend, East Region caregivers provided the highest estimated amount of care of all the regions at 38.6 million hours of unpaid care in 2012, with an estimated economic value of \$480.4 million dollars. Similarly, the health care costs due to the physical and emotional impact of caregiving were highest in East Region, with health care costs to caregivers averaging nearly \$18.7 million dollars in 2012. If nothing else changes, by 2030 there will be approximately 21,500 people age 55 years and older with ADOD in East Region requiring more than 49,000 unpaid caregivers to provide nearly 55.8 million hours of care a year. The economic value of this care is estimated to be worth \$694.5 million dollars (in 2013 dollars).

## 2012 Regional Estimates

Location	Number of Alzheimer's Disease and Other Dementias Caregivers	Hours of Unpaid Care	Value of Unpaid Care	Higher Health Care Costs of Caregivers
San Diego County	136,812.66	155,738,260.67	\$ 1,939,166,860.74	\$ 75,437,101.85
Central Region	21,734.97	24,741,618.35	\$ 308,068,975.28	\$ 11,984,440.91
East Region	33,895.34	38,584,154.08	\$ 480,428,589.75	\$ 18,689,541.98
North Central Region	19,906.24	22,659,916.93	\$ 282,148,778.24	\$ 10,976,098.32
North Coastal Region	18,207.48	20,726,166.86	\$ 258,070,789.72	\$ 10,039,420.97
North Inland Region	24,028.86	27,352,829.85	\$ 340,582,339.64	\$ 13,249,269.65
South Region	19,039.76	21,673,574.61	\$ 269,867,388.12	\$ 10,498,330.01

## 2030 Regional Projections

Location	Number of Alzheimer's Disease and Other Dementias Caregivers	Hours of Unpaid Care	Value of Unpaid Care	Higher Health Care Costs of Caregivers
San Diego County	213,281.81	242,785,565.84	\$ 3,023,031,858.10	\$ 117,601,412.64
Central Region	35,655.66	40,587,986.37	\$ 505,379,203.36	\$ 19,660,166.03
East Region	48,999.45	55,777,658.06	\$ 694,512,611.17	\$ 27,017,798.03
North Central Region	35,188.22	40,055,880.64	\$ 498,753,716.58	\$ 19,402,422.60
North Coastal Region	27,367.09	31,152,843.41	\$ 387,898,011.04	\$ 15,089,934.94
North Inland Region	35,055.96	39,905,333.66	\$ 496,879,188.62	\$ 19,329,500.06
South Region	31,017.71	35,308,459.33	\$ 439,641,446.78	\$ 17,102,848.27

# CAREGIVER COSTS

North Inland Region caregivers provided the second highest estimated amount of care at 27.4 million hours of unpaid care in 2012, with an estimated economic value of \$340.6 million dollars. North Inland Region had the second highest health care costs to caregivers at an estimated total of \$13.2 million dollars.

If nothing else changes, by 2030 there will be approximately 15,400 people age 55 years and older with ADOD in the North Inland Region requiring more than 35,000 unpaid caregivers to provide nearly 40 million hours of care a year. The economic value of this care is estimated to be worth \$496.9 million dollars.

**North Inland Region had the second highest health care costs to caregivers at an estimated total of \$13.2 million dollars in 2012.**



# SUMMARY

In 2012, approximately 60,000 San Diego County residents were living with Alzheimer's disease and other dementias (ADOD) while more than 136,800 San Diegans provided 156 million hours of unpaid care, estimated to be worth \$1.94 billion dollars. The health care costs to caregivers due to the physical and emotional impact of caregiving were approximately \$75.4 million dollars.

The lifetime costs, which include direct and indirect medical costs as well as loss of income and productive services to the market economy, totaled between \$13.5 billion and \$27 billion in 2012. In the same year, there were nearly 17,000 ADOD hospitalizations among San Diego County residents 55 years and older, accounting for nearly \$886 million in direct hospitalization charges. Individuals with a principal diagnosis of ADOD were hospitalized for an average of 27 days with an average charge of \$46,818 per hospitalization.

Individuals with ADOD are more likely to have co-occurring medical conditions than those without ADOD.<sup>11</sup> These comorbidities result in higher health care utilization than those without such conditions. In 2012, the three most frequently co-occurring principal diagnoses among ADOD hospitalizations for residents 55 year and older were septicemia, urinary tract infections (UTIs), and pneumonia. One out of every five hospitalizations for septicemia, one out of every three hospitalizations for UTI and nearly one out of five hospitalizations for pneumonia included an ADOD diagnosis as a co-occurring diagnosis.



# SUMMARY



Additionally, a hospitalization with any mention of ADOD and a co-occurring diagnosis was more likely to result in discharge to a skilled nursing or intermediate care facility for further care. Notably, studies among Medicare recipients show the average yearly payment for an individual with ADOD in a skilled nursing facility was nearly ten times higher than the payments to individuals without ADOD.<sup>1</sup>

In San Diego County alone, ADOD prevalence is expected to increase by 30%, from 60,000 to 77,956 in 2020 and by an additional 20%, from 77,956 to nearly 94,000 in 2030. Due to this increase, lifetime costs are projected to nearly double in 2030 to anywhere between \$21 billion to \$42 billion.

Additionally, by 2030, ADOD hospitalizations among residents 55 and older are expected to increase by 66%, from 16,897 to 28,128, with direct hospitalization charges increasing from nearly \$886 million to almost \$1.5 billion. This increase in San Diegans living with ADOD will require more than 213,300 unpaid caregivers to provide nearly 242.8 million hours of care per year.

The economic value of this care is estimated to be worth \$3.02 billion dollars. The health care cost to caregivers due to the emotional and physical impact of caregiving is expected to rise to \$117.6 million dollars a year. The costs of ADOD among the local, state, and federal levels are compared on the table below.

COSTS	SAN DIEGO COUNTY	CALIFORNIA	UNITED STATES
<b>LIFETIME</b>	\$13.5 BILLION	\$ 130.6 BILLION	\$1,170.8 BILLION
<b>HOSPITALIZATION</b>			
<b>PRIMARY DIAGNOSIS</b>			
PER PERSON	\$46,818	-	-
TOTAL	\$886 MILLION	-	-
<b>ANY MENTION OF ADOD</b>			
PER PERSON	\$52,412	-	-
TOTAL	\$840 MILLION	-	-
<b>CAREGIVING</b>	\$1.94 BILLION	\$21.9 BILLION	\$220.2 BILLION

By recognizing, understanding and anticipating the magnitude of Alzheimer’s disease and other dementias and their impact on our communities, we can better prepare for and ensure that San Diegans can continue to live healthy, safe and thriving lives.

# DATA GUIDE AND DEFINITIONS

## Data Guide

Caution must be used when exploring data from multiple sources or even the same data prepared by different analysts; comparisons may not be appropriate. Attention to accompanying information is important in order to note differences, including, but not limited to: data sources, data preparation, diagnoses/case definitions, rate constant (i.e., per 100,000 or 1,000), geographic units, persons included in the data (i.e., location of occurrence vs. location of residence, or among live births not total pregnancies).

## Geography: Understanding Geographic Units Used in Health Data

Many different geographic units are used throughout San Diego County. In this document, boundaries for Regions used here are based on census tracts and approximate Health and Human Service Agency Region (HHS Region) boundaries, which are based on zip codes.

## Numbers, Proportions, Prevalence, and Rates

The data in this report includes numbers, proportions, and crude rates (from this point forward referred to as rates) for Regional level data:

The number and proportion (or percent) represent the burden to the community of which the data is being reported.

The prevalence is the estimated number of people with a particular condition. In the case of this report, prevalence is the estimated number of people living with Alzheimer's disease and other dementias (ADOD).

A rate is the number of cases divided by the population, usually multiplied by a constant. For example 987 cases, divided by population of 654,321 multiplied by 100,000 would be a rate of 150.8 per 100,000 population. The rate can be interpreted as an individual's risk and the odds of an outcome occurring.

## Medical Encounters

Any mention of ADOD in a medical record refers to review of the 25 diagnosis fields within a medical record to find if any of the identified International Classification of Diseases (ICD) 9 codes associated with ADOD are reported in any of the 25 fields. A principal diagnosis of ADOD was determined using the principal diagnosis field in the 2012 patient discharge database (PDD). A secondary diagnosis of ADOD was determined using the 24 other diagnosis fields in the PDD.

## Population Estimates and Projections

Population estimates and projections were obtained from the San Diego Association of Governments (SANDAG) website at <http://www.sandag.org/>.

# DATA GUIDE AND DEFINITIONS

## Prevalence Estimates

The distribution of individuals with hospital admissions with any mention of ADOD in 2012 was applied to the county-wide estimate of 60,000 individuals with ADOD to estimate the prevalence of residents currently living with ADOD by Health and Human Services Agency Regions.

## Projections

The 2012 to 2020 percent change for the 55-64, 65-74, 75-84, and 85 years and older age group populations of each sub-regional (SRA) was applied to the 2012 ADOD prevalence estimates and ADOD patient discharges for the corresponding SRA to obtain the 2020 ADOD prevalence estimates and ADOD discharges by SRA and Health and Human Services Agency Regions. ADOD projections for SRAs within each region were summed to find the projection for the corresponding HHS Region. The regions were added to determine the projection for San Diego County. This was repeated using the 2020 to 2030 population projections to obtain the 2030 ADOD prevalence estimates. The same methodology was applied to the hospitalizations to obtain hospitalization projections for 2020 and 2030. Additionally, the same methodology was applied to caregiving to find the 2030 projections of caregiving costs, value of care, and caregiver health care costs for San Diego County and the Health and Human Services Agency Regions.

## Cost or Charge Estimates

To estimate the current and projected lifetime costs for ADOD, the prevalence estimates for the regions and the county were multiplied by a published annual, per person estimate of the monetary cost attributable to dementia after diagnosis. This annual cost (in 2010 dollars) included the direct and indirect medical costs, as well as loss of income and productive services to the market economy, including valuation of forgone caregiver wages.

Hospitalization charges for San Diego County residents were calculated using the 2012 patient discharge data's total charges and were summed by Health and Human Services Agency Regions and county-wide using the patient's zip code of residence. To project hospitalization charges, the current 2012 average charge for ADOD discharges among residents 55 years and older was multiplied by the 2020 and 2030 projections for hospitalizations.

The same methodology was used as foundation for caregiving costs estimates. A proportion was used to create the caregiving costs for each of the Health and Human Services Agency Regions from the known San Diego County value.

# DATA GUIDE AND DEFINITIONS

## International Classification of Disease (ICD) 9 codes

The ICD-9 codes used to define Alzheimer’s disease and other dementias are listed in the table below:

ICD-9 Codes	Disease Name
331.0	ALZHEIMER'S DISEASE
046.1	CREUTZFELDT-JAKOB DISEASE
331.82	DEMENTIA WITH LEWY BODIES (DLB)
331.1	FRONTOTEMPORAL DEMENTIA
333.4	HUNTINGTON'S DISEASE
331.83	MILD COGNITIVE IMPAIRMENT
331.5	NORMAL PRESSURE HYDROCEPHALUS
332	PARKINSON'S DISEASE
290.4	VASCULAR DEMENTIA
294.0	KORSAKOFF SYNDROME
294.1	DEMENTIA IN CONDITIONS CLASSIFIED ELSEWHERE
331.2	SENILE DEGENERATION OF BRAIN
331.7	CEREBRAL DEGENERATION IN DISEASES CLASSIFIED ELSEWHERE
290.0	SENILE DEMENTIA, UNCOMPLICATED
290.1	PRESENILE DEMENTIA
290.2	SENILE DEMENTIA WITH DELUSIONAL OR DEPRESSIVE FEATURES
290.3	SENILE DEMENTIA WITH DELIRIUM
294.2	DEMENTIA, UNSPECIFIED
294.8	OTHER PERSISTENT MENTAL DISORDERS DUE TO CONDITIONS CLASSIFIED ELSEWHERE
797	SENILITY WITHOUT MENTION OF PSYCHOSIS

The ICD-9 codes used to define Septicemia, as defined by the Agency for Healthcare Research and Quality’s Clinical Classification Software, are:

3.1, 20.2, 22.3, 36.2, 38, 38.1, 38.11, 38.12, 38.19, 38.2, 38.3, 38.4, 38.41, 38.42, 38.43, 38.44, 38.49, 38.8, 38.9, 54.5, 449, 790.7, 995.91, 995.92, 771.81

The ICD-9 codes used to define Pneumonia, as defined by the Agency for Healthcare Research and Quality’s Clinical Classification Software, are:

3.22, 20.3, 20.4, 20.5, 21.2, 22.10, 31.0, 39.1, 52.1, 55.1, 73.0, 83.0, 112.4, 114.0, 114.4, 114.5, 115.05, 115.15, 115.95, 130.4, 136.3, 480.0, 480.1, 480.2, 480.3, 480.8, 480.9, 481.0, 482.0, 482.1, 482.2, 482.3, 482.31, 482.32, 482.39, 482.4, 482.41, 482.42, 482.49, 482.80, 482.81, 482.82, 482.83, 482.84, 482.89, 482.9, 483.0, 483.1, 483.8, 484.1, 484.3, 484.5, 484.6, 484.7, 484.8, 485.0, 486.0, 513.0, 517.1

The ICD-9 codes used to define Urinary Tract Infections, as defined by the Agency for Healthcare Research and Quality’s Clinical Classification Software, are:

32.84, 590.0, 590.01, 590.1, 590.11, 590.2, 590.3, 590.8, 590.81, 590.9, 595.0, 595.1, 595.2, 595.3, 595.4, 595.81, 595.82, 595.89, 595.9, 597.0, 597.8, 597.81, 597.89, 598.0, 598.01, 599.0

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# County of San Diego Board of Supervisors



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