



# *The Economic Burden of Chronic Disease in San Diego County*



OCTOBER 2010

*The Economic Burden  
of Chronic Disease in  
San Diego County*

County of San Diego  
Health and Human Services Agency  
Public Health Services

*October 2010*

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**PAM SLATER-PRICE**  
CHAIRWOMAN  
SUPERVISOR, THIRD DISTRICT  
SAN DIEGO COUNTY BOARD OF SUPERVISORS

*Serving the  
communities*

*of ...*

*Cardiff*

October 19, 2010

*Carmel  
Mountain*

*Carmel Valley*

*Del Mar*

Dear San Diego County Residents,

*Del Mar Heights*

*Del Mar Mesa*

*Encinitas*

I am pleased to present ***The Economic Burden of Chronic Disease in San Diego County***. This report estimates the direct medical costs associated with the care and treatment of major chronic diseases. This report makes clear that preventing chronic disease will save lives and millions of dollars spent each year on treatment.

*Escondido*

*La Jolla*

*Leucadia*

On July 13, 2010, I was proud to lead your County of San Diego Board of Supervisors as we embarked on a ten-year Health Strategy Agenda. The Health Strategy Agenda will guide County services in support of healthy communities as part of our vision of a San Diego County that is healthy, safe and thriving.

*Mira Mesa*

*Navajo*

*Olivenhain*

*Pacific Beach*

*Rancho  
Bernardo*

Sincerely,

*Rancho  
Penasquitos*

**PAM SLATER-PRICE**  
Chairwoman, Third District

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*Solana Beach*

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*Torrey Pines*



NICK MACCHIONE, FACHE  
DIRECTOR

TERRY HOGAN  
CHIEF OPERATIONS OFFICER

## County of San Diego

HEALTH AND HUMAN SERVICES AGENCY

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(619) 515-6555 • FAX (619) 515-6556

October 8, 2010

Dear San Diegans:

We are pleased to present this report entitled "*The Economic Burden of Chronic Disease in San Diego County*". Chronic diseases are a leading cause of death and disability in San Diego County. This report estimates the direct medical costs for seven chronic diseases: cancer, heart disease, stroke, diabetes, pulmonary disease, hypertension and mental health disorders.

On July 13, 2010, we launched the *Health Strategy Agenda: Building Better Health*, our ten year plan to achieve a San Diego County where children, adults and older adults thrive in communities that support health and well-being. The Health Strategy Agenda is built on four major themes: 1) building a better service delivery system, 2) supporting healthy choices, 3) pursuing policy changes for a healthy environment and 4) changing the culture from within.

As we move forward with the implementation of the Health Strategy Agenda, this report will help our entire community measure its effects in reducing the impacts of chronic disease on all San Diegans in the years to come.

Sincerely,

NICK MACCHIONE, M.S., M.P.H., FACHE  
Director

WILMA J. WOOTEN, M.D., M.P.H.  
Public Health Officer  
Public Health Services

MARSHALL LEWIS, M.D.  
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Wilma Wooten, MD, MPH, Public Health Officer  
Dean Sidelinger, MD, MEd, Deputy Public Health Officer  
Marcy Metz, RN, CEN, Chief of Emergency Medical Services  
Marshall Lewis, MD, Clinical Director of Behavioral Health Services

*An effort of this magnitude requires visionary leadership. We are fortunate to have Nick Macchione as the Director of the Health and Human Services Agency, and Wilma J. Wooten as the Public Health Officer.*

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## Foreword

### Building Better Health

In July 2010, the Board of Supervisors adopted the Health Strategy Agenda, the first of three focused approaches to provide innovation and integrated delivery of services to the residents of San Diego in the areas of Health, Safety and Thriving. The Health Strategy Agenda, the first of three approaches, has the potential to positively impact the health of San Diegans through strategies that support healthy choices and pursue policy and environmental changes. The 3-4-50 principle is the foundation for this innovative plan to address chronic disease in San Diego. This report provides information to describe the economic burden of selected chronic disease in our region.

### Key Themes

*Health Strategy Agenda: Building Better Health* supports the County direction on collaborating with community partners and businesses as well as aligning County services to promote health. Four major themes are identified that combined can affect the health of residents:

- Building a Better System
- Supporting Healthy Choices
- Pursuing Policy Changes for a Healthy Environment
- Changing the Culture From Within

### Putting Themes Into Action

Below are examples of the steps the County will take to support the four themes identified in the *Health Strategy Agenda: Building Better Health*.

#### Building a Better System

The County of San Diego is dedicated to continuous improvement of its systems. This theme continues the County's commitment to maximize quality, eliminate waste and optimize resources to build a better system for the most vulnerable populations. The County will continue to:

- Provide quality and efficient care
- Ensure access to care
- Improve its systems



#### Supporting Healthy Choices

Ultimately individuals are responsible for their own health. This theme provides information to encourage healthy eating, physical activity, and living tobacco, alcohol and drug free lives. Residents need access to information so that they are able to make informed decisions about:

- Healthy eating
- Active living
- Tobacco, alcohol and drug free lives

#### Pursuing Policy Changes for a Healthy Environment

The environment in which one lives and works impacts the ability for people to make healthy choices. To make it easier for residents, this theme calls for pursuing policy and environmental changes that support:

- Access to healthy foods
- Active communities
- Tobacco, alcohol and drug free communities

#### Changing the Culture From Within

Focuses on increasing employee knowledge about health, promoting employee wellness, and implementing internal policies and practices that support employee health. Healthy County employees play a vital role in a healthier San Diego community. To support that goal the County will:

- Increase employee knowledge about health
- Promote employee wellness
- Strengthen existing policies and practices for employee health

Through these four themes, the County of San Diego has launched a ten year effort to build better health for all San Diegans.

## Introduction

More than half of all Americans suffer from one or more chronic diseases, and each year, millions of people are newly diagnosed with chronic disease.<sup>1</sup> Chronic diseases are currently the leading cause of death in the United States, and in San Diego County. In fact, three behaviors—*smoking, poor nutrition, and physical inactivity*—lead to four major chronic diseases—*cancer, heart disease and stroke, type 2 diabetes, and pulmonary diseases such as asthma*—that are responsible for more than 50% of all deaths in the United States<sup>2</sup> and 57% of deaths in San Diego County.<sup>3</sup>

The most common chronic diseases cost the United States economy more than \$1 trillion annually, and threaten to reach \$6 trillion by the middle of the century.<sup>1</sup> Much of this cost is avoidable through effective prevention and lifestyle changes.

Despite advancements in the diagnosis and treatment of chronic diseases, disease rates have continued to rise dramatically, as have their associated costs. The gains made by improved treatment outcomes and lowered mortality are threatened by the persistent rise in chronic disease prevalence rates.<sup>1</sup> This is due in large part to the growing rate of obesity, which is fueled by poor diet and physical inactivity.



Furthermore, current research shows a significant relationship between chronic disease and mental disorders.<sup>4</sup> Chronic disease has a profound impact on an individual's mental health. In fact, depression is one of the most common complications of chronic disease; as many as one out of every three people with a chronic disease is at risk of developing depression.<sup>5</sup>

Poor mental health status also affects an individual's ability to participate in healthy behaviors and to pursue appropriate treatment to manage their chronic disease. Persons with depression are significantly more likely to be obese, to be a current smoker, to be physically inactive, and to drink heavily, than people without depression.<sup>5</sup>

Chronic diseases, including mental disorders, directly affect the friends, family, and the person who is ill, and thus the total cost of chronic diseases is impossible to measure. However, this analysis seeks to conservatively estimate the economic burden of the most common chronic diseases in San Diego County.

## What is Economic Burden?

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

*Direct costs* are the actual costs of medical treatment incurred, and are represented by both service and product costs. Service costs include procedures performed by physicians or other healthcare professionals, hospital or other inpatient care, outpatient care, and nursing home stays. Product costs for this analysis include prescription and nonprescription drugs. Direct costs are also called treatment expenditures.

*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. Productivity loss due to presenteeism is enormous. Some literature suggests that for certain chronic diseases, output loss due to presenteeism can be up to fifteen times greater than for absenteeism.<sup>1</sup> Indirect costs are also called lost productivity.



This analysis does not attempt to estimate the indirect costs for major chronic conditions in San Diego County. It is important to note that excluding the analysis for indirect costs was due to lack of local data, not to significance. Indirect costs are likely to be much larger than direct costs.

**In 2003, the total cost of chronic disease in the United States was \$1.3 trillion. Of this, \$277 billion was attributed to direct treatment expenditures, and \$1.0 trillion was due to indirect cost, or lost productivity.<sup>6</sup>**



A national level analysis conducted by the Milken Institute estimates that the indirect financial burden of chronic diseases is 80% of total costs.<sup>1</sup> Thus, the direct treatment expenditures estimated in the following sections comprise only about 20% of the total costs of chronic disease in San Diego County.

This report estimates the direct costs, or treatment expenditures, of seven chronic diseases, including cancer, heart disease, stroke, diabetes, pulmonary conditions, hypertension, and mental health disorders for San Diego County.

## Prevalence of Chronic Disease

Prevalence data used for this analysis showed that the total number of *cases* of the seven chronic conditions was nearly 1.7 million in San Diego County in 2007. The number of San Diego County residents suffering from these chronic diseases, however, is smaller because many have more than one of these conditions. For example, a person who has hypertension might also develop diabetes, heart disease, or stroke.

The number of *people* suffering from one or more chronic diseases cannot be measured locally with the available data sources. However, nationally it is estimated that more than one in three Americans of all ages report having at least one of the seven diseases discussed in this report.<sup>1</sup>

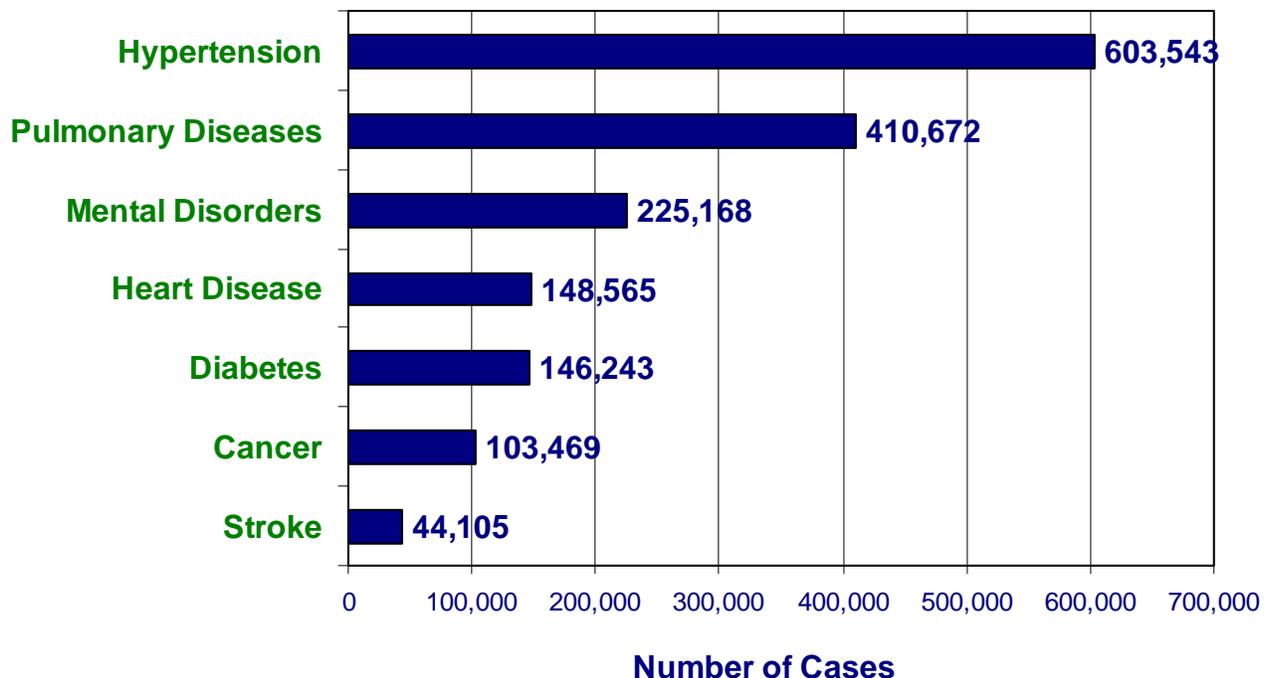
Assuming that one in three San Diego County residents have at least one of these chronic diseases as well, approximately one million San Diegans have one or more of the seven chronic diseases described in this report.

Nationally, more than one in three Americans have at least one of these chronic diseases:<sup>1</sup>

**Cancer, Heart Disease,  
Stroke, Diabetes,  
Pulmonary Diseases,  
Hypertension,  
Mental Disorders**

The chart below shows the estimated prevalence (number of cases) of each of the seven chronic diseases in San Diego County. Of these, hypertension was most common, with one in four San Diego County adults reporting the disease (603,543 cases). Next in prevalence were pulmonary disorders, with 410,672 reported cases, and mental disorders with 225,168 reported cases. The least prevalent diseases were cancer and stroke, with 103,469 and 44,105 reported cases, respectively.

**Prevalence of Chronic Disease in San Diego County, 2007**



Sources: CHIS, CCR, SANDAG

## Cost per Person Reporting the Condition

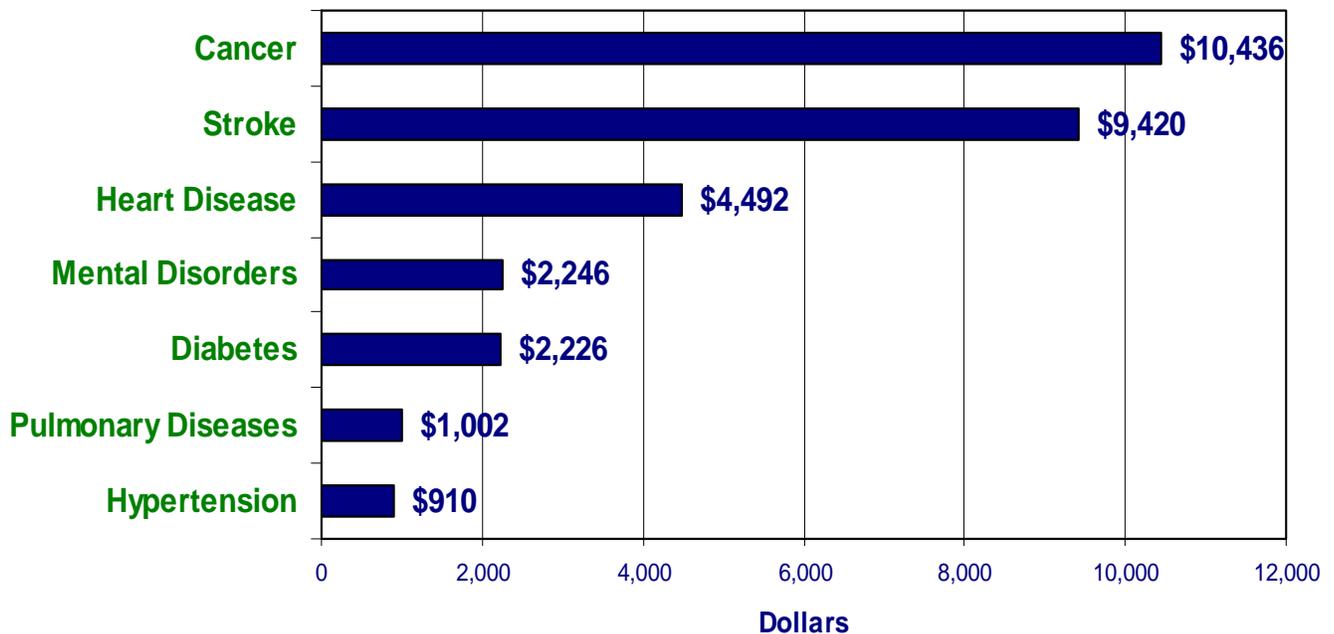
Data used to estimate the direct cost per person of each of the seven chronic diseases for this analysis were only available at the state level. Therefore, it is assumed that the cost per person of each disease for San Diego County was comparable to the cost per person for California.

The per-capita expense for cancer, heart disease, stroke, diabetes, pulmonary conditions, hypertension, and mental disorders in California was approximately 22% higher than for the entire Western Region of the United States.



The chart below shows the estimated direct cost per person for each of the seven chronic diseases in California. Of these, cancer was the most costly, at \$10,436 per person reporting cancer in 2007. The second most costly per person reporting the condition (PRC) was stroke, at \$9,420. The least costly per PRC were pulmonary diseases, at \$1,002 per PRC, and hypertension, at \$910 per PRC. Hypertension, though lowest in direct cost per person, is often a precursor to other chronic diseases, such as diabetes, heart disease, and stroke.

Cost per Person of Chronic Disease in California, 2007



Sources: CHIS, CCR, SANDAG, MEPS, CCS

## Treatment Expenditures for Chronic Diseases

In 2007, when adjusted for medical inflation, the combined total treatment expenditures (direct cost) for the seven chronic diseases in San Diego County were \$4.6 billion.

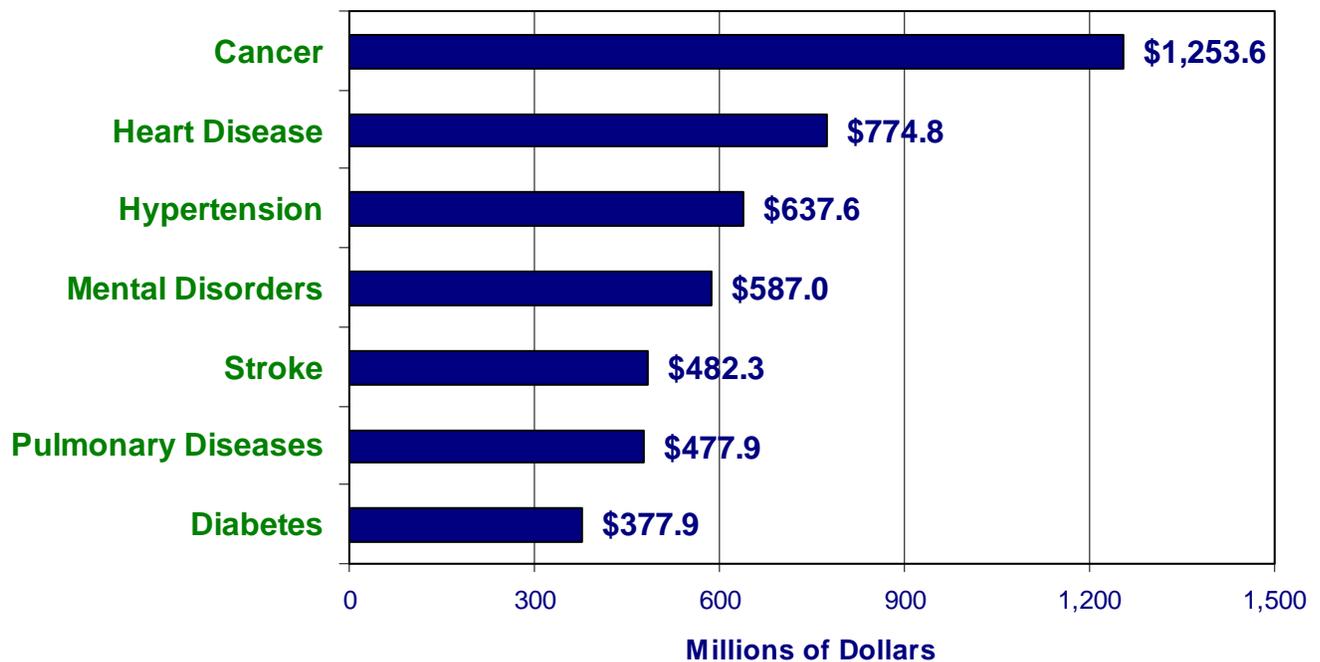
**In 2007, the direct cost of the chronic disease in San Diego County was \$4.6 billion.**

Cancer was the most costly at nearly \$1.3 billion, followed by heart disease, at \$775 million, and hypertension at \$638 million. Mental disorders ranked fourth at \$587 million, followed by stroke at \$482 million; pulmonary conditions at \$478 million; and diabetes at \$378 million.



Based on research by the Milken Institute, the state of California spent \$31.2 billion on these seven chronic diseases in 2007, when adjusted for medical inflation.<sup>6</sup> This means that while San Diego County comprised 9% of the state population, San Diegans incurred nearly 15% of total expenditures for direct medical care of chronic diseases in the state.

**Treatment Expenditures for Chronic Diseases in San Diego County, 2007**



Sources: CHIS, CCR, SANDAG, MEPS, CCS

# The Economic Burden of Chronic Disease in San Diego County

The treatment expenditure estimates for chronic diseases in San Diego County were conservative in three ways:

First, since prevalence data were not available, costs for the institutionalized population were excluded. This population, including individuals living in jails or nursing homes, often suffers from multiple chronic diseases.

Second, individual disease costs represent only those that could be directly attributed to the treatment of the disease, and excluded the costs of co-morbidities and secondary effects.<sup>1</sup> However, the total treatment expenditures, in aggregate,

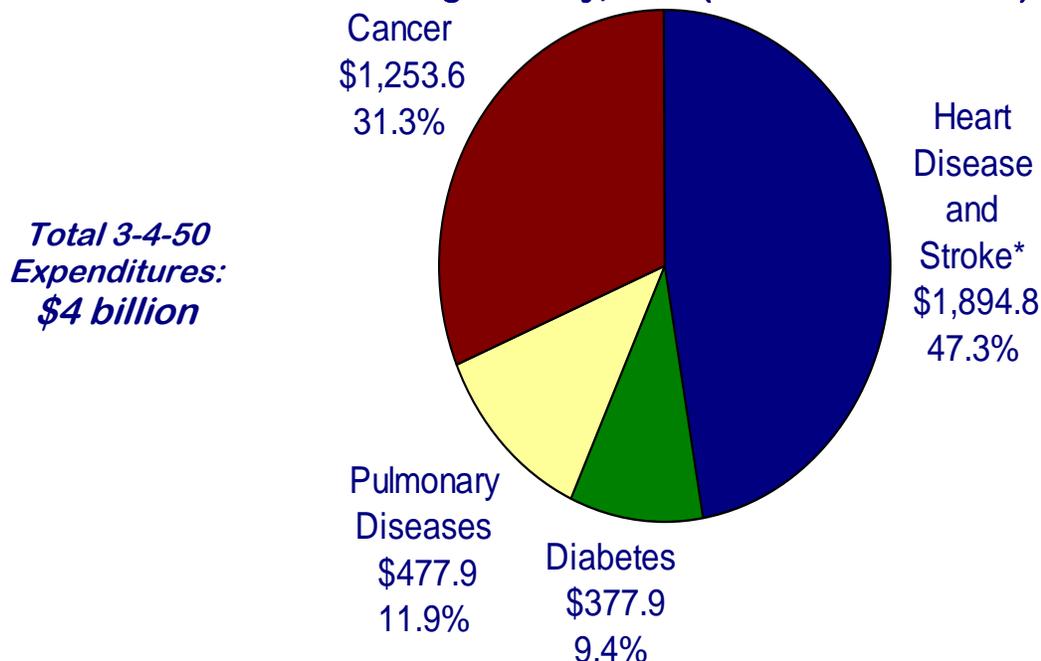
included the cost of co-morbidities and secondary effects if they occurred in one of the chronic diseases described here. For example, if a person with hypertension later develops diabetes, costs associated with diabetes are captured separately from the costs related to hypertension.

Third, for heart disease, diabetes, hypertension, stroke, and mental disorders, prevalence for San Diego County was estimated for only the adult population, ages 18 and older, due to lack of local data. Thus, children who suffered from one or more of these conditions were excluded from this analysis, resulting in a likely underestimate of treatment expenditures.

## 3- 4- 50 Chronic Disease Concept

The 3-4-50 concepts<sup>2</sup> mean that three behaviors (poor diet, physical inactivity, and tobacco use) contribute to four chronic diseases (cancer, heart disease and stroke, type 2 diabetes, and pulmonary diseases such as asthma) that cause over 50 percent of all deaths. These chronic diseases are important to consider together because they are common causes of disability and death in San Diego County. They are also highly influenced by three unhealthy behaviors; behaviors that cause many cases of the specified chronic conditions that are preventable. In San Diego County in 2007, the 3-4-50 diseases, considered together, cost \$4 billion in direct treatment expenditures. Heart disease and stroke were the most costly at \$1.9 billion, comprising nearly half the total treatment expenditures for the 3-4-50 diseases.

### Treatment Expenditures for 3-4-50 Chronic Diseases in San Diego County, 2007 (in millions of dollars)



Sources: CHIS, CCR, SANDAG, MEPS, CCS  
\*Includes hypertension

## Cancer

Cancer is the second leading cause of death in the United States, second only to heart disease. Nationally, more than one million people are diagnosed with new cases of cancer every year,<sup>7</sup> and more than half a million die from the disease.<sup>8</sup>

### What is Cancer?

Cancer is a term used to describe a group of diseases in which abnormal cells divide without control and invade other tissues. Cancer cells can then spread to other parts of the body through the blood and lymph systems.<sup>9</sup> There are more than 100 different types of cancer, which are named for the organ or type of cell in which they start.



**Cancers that can be prevented through a healthy lifestyle, or detected earlier through screening, account for half of all cases in the United States.<sup>1</sup> Thus, promoting healthy behaviors, and making cancer screening, information, and referral services available and accessible is essential for reducing the rates of cancer morbidity and mortality, as well as the associated costs of treatment.**

**In 2007, it was estimated the direct cost of cancer in the United States was \$61.8 billion, and in California was \$6.0 billion.<sup>1</sup>**

### What was the Direct Cost of Cancer in San Diego County in 2007?

The financial costs of cancer are enormous both for the person with cancer and for society as a whole. In San Diego County, cancer was the most costly chronic disease, despite being less prevalent than most of the other chronic diseases.

### How Serious is Cancer?

Survival rates vary by type of cancer, but for all cancers combined, there is a relative 5-year survival rate of 65 percent. This means that 65 out of 100 people who were diagnosed with cancer will be alive after 5 years. Unfortunately, one out of every five cancer patients will die from the illness.<sup>10</sup> Based on rates from 2003-2005, the lifetime risk of being diagnosed with any type of cancer is 40 percent.<sup>11</sup> In other words, two out of every five people will be diagnosed with cancer in their lifetime.

- For each person reporting cancer, the annual cost was estimated to be \$10,436.
- According to the California Cancer Registry, the cancer prevalence in San Diego County was 103,469; 3.3% of the total population.<sup>12,13</sup>
- The estimated total treatment expenditures (direct cost) were nearly \$1.3 billion, representing 27.3% of treatment expenditures for the seven chronic diseases.

## Heart Disease

In the United States, heart disease is the leading cause of death;<sup>14</sup> it is also a major cause of illness, disability, and increases in health care costs. In 2006, more than 630,000 people died of heart disease.<sup>15</sup> Coronary heart disease (CHD) accounts for the greatest proportion of heart disease. It is estimated that 12 million people have CHD in the United States.<sup>16</sup>

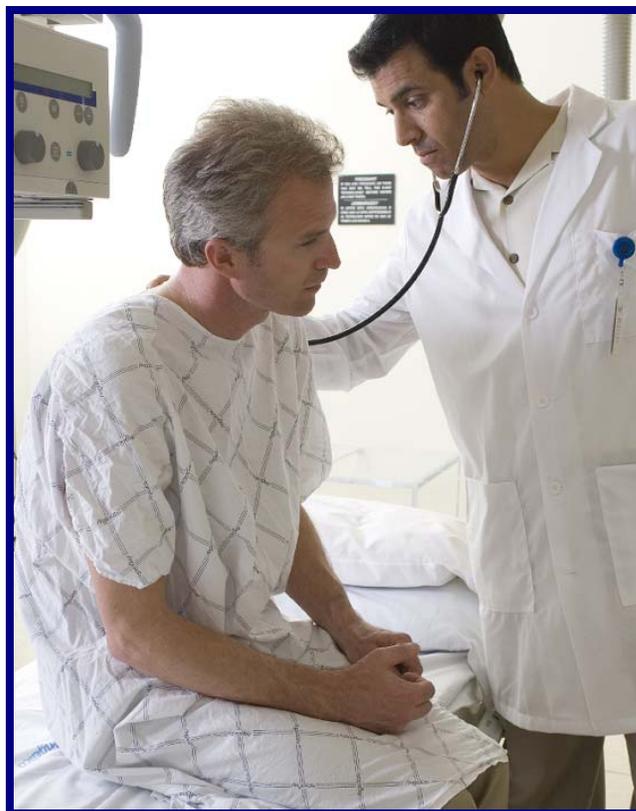
### What is Heart Disease?

Heart disease refers to any acute or chronic condition that involves the heart or its blood vessels: the muscle itself, valves, blood flow, and beating rhythm.<sup>17</sup> Heart disease primarily affects older adults, and includes CHD, cardiomyopathy, cardiac arrhythmias, and congestive heart failure. Heart disease, together with stroke, make up cardiovascular disease. For the purpose of this analysis, heart disease is considered separately from hypertension due to the debilitating symptoms it presents on its own, which serve as an enabler for many other diseases.

**Behavioral and lifestyle changes can affect the factors leading to heart disease. As the U.S. population ages, the economic impact of heart disease on the nation's health care system will become even greater. Primary prevention to promote heart-healthy behaviors is a key strategy in reducing development of heart disease.<sup>16</sup>**

### What are the Modifiable Risk Factors of Heart Disease?

The most common risk factors for heart disease include physical inactivity, obesity, hypertension, cigarette smoking, high cholesterol, and diabetes. More than one-third of all U.S. adults reported having two or more of these risk factors in 2003.<sup>18</sup>



**In 2007, it was estimated the direct cost of heart disease in the United States was \$83.1 billion, and in California was \$7.6 billion.<sup>1</sup>**

### What was the Direct Cost of Heart Disease in San Diego County in 2007?

In San Diego County, heart disease was the second most costly of the chronic diseases.

- For each person reporting heart disease, the annual cost was estimated to be \$4,492.
- According to the California Health Interview Survey, the prevalence of diagnosed heart disease among adults in San Diego County was 6.4%, or 148,565 people.<sup>13,19</sup>
- The estimated total treatment expenditures (direct cost) were \$775 million, representing 16.9% of treatment expenditures for the seven chronic diseases.

## Hypertension

In 2006, more than 56,000 people died of hypertension, or high blood pressure, in the United States.<sup>20</sup> It is estimated that one in three adults has hypertension in the U.S.,<sup>21</sup> but since there are typically no symptoms, nearly one-third of these people are unaware they have it.<sup>22</sup> Often called the “silent killer,” it is during this time that major damage can occur to the heart, blood vessels, kidneys, and other parts of the body.

### What is Hypertension?

Hypertension, or high blood pressure, is a serious condition that can lead to a variety of health problems and diseases, including diabetes, heart disease, and stroke. Hypertension is a condition in which the blood pressure, or the force of the blood pushing against artery walls, is chronically elevated.

**Reducing hypertension through lifestyle modifications, including increased exercise, healthy diet, and low alcohol consumption, can lead to a reduction in the prevalence of other chronic diseases, such as heart disease and stroke. This, in turn, can potentially reduce the cost of direct medical care attributed to these diseases.**

### Can Hypertension be Prevented?

Hypertension can be prevented through a healthy lifestyle, including diet, exercise, limiting alcohol consumption, and the management of stress. For people who already have hypertension, lifestyle changes and medication can help to reduce it to an appropriate level.



**In 2007, it was estimated the direct cost of hypertension in the United States was \$41.2 billion, and in California was \$3.9 billion.<sup>1</sup>**

### What was the Direct Cost of Hypertension in San Diego County in 2007?

In San Diego County, hypertension was the most prevalent, and the third most costly of the chronic diseases.

- For each person reporting hypertension, the annual cost was estimated to be \$910.
- According to the California Health Interview Survey, the prevalence of hypertension in San Diego County was 26.0%, or 603,543 people.<sup>13,19</sup>
- The estimated total treatment expenditures (direct cost) were \$638 million, representing 13.9% of treatment expenditures for the seven chronic diseases.

## Mental Health Disorders

Mental health disorders, which include mood, anxiety, and personality disorders, as well as alcohol and drug-related disorders, are common in the United States. Approximately 58 million, or one in four adults, suffer from a diagnosable mental disorder in a given year.<sup>23</sup> Even though mental disorders are widespread in the population, the main burden of the illness is concentrated in a much smaller population. Roughly 6 percent, or one in seventeen, suffer from a serious mental illness.<sup>23</sup> Mental disorders are the leading cause of disability in the United States, and many people suffer from multiple mental disorders.<sup>23</sup>

### What is a Mental Health Disorder?

Mental disorders include both mental illness and substance use or abuse. The causes of mental illness are complex. Mental illnesses are medical conditions that disrupt one's thinking, feeling, mood, ability to relate to others, and daily functioning, and often result in an inability to cope with the daily demands of life.<sup>24</sup>

**The burden of mental disorders to the individual and to society is great. However, both widespread and targeted prevention efforts may help large segments of the population suffering from these disorders.**

The more serious mental illnesses include major depression, schizophrenia, bipolar disorder, obsessive compulsive disorder (OCD), panic disorder, post traumatic stress disorder (PTSD), and borderline personality disorder.<sup>24</sup> Substance use or abuse includes drug and alcohol related abuse, dependence, or psychoses, and can contribute to mental illness, especially depression.<sup>1</sup>



### How are Mental Disorders Treated?

Strategies to manage stress and to acquire good coping skills can help individuals with a broad spectrum of illnesses. In addition, recognizing mental disorders as diseases that can be managed can help remove the stigma of mental illness, and improve the chances that individuals will seek and receive appropriate medical and social assistance.

**In 2007, it was estimated the direct cost of mental disorders in the United States was \$55.9 billion, and in California was \$5.2 billion.<sup>1</sup>**

### What was the Direct Cost of Mental Disorders in San Diego County in 2007?

In San Diego County, mental disorders were the third most prevalent disease.

- For each person reporting a mental disorder, the annual cost was estimated to be \$2,246.
- According to the California Health Interview Survey, the prevalence of mental disorders serious enough to require help among adults in San Diego County was 9.7%, or 225,168 people.<sup>13,19</sup>
- The estimated total treatment expenditures (direct cost) were \$587 million, representing 12.8% of treatment expenditures for the seven chronic diseases.

## Stroke

In the United States, stroke is the third leading cause of death,<sup>14</sup> and a major cause of illness, disability, and increases in health care costs. In 2006, nearly 150,000 people died of stroke.<sup>25</sup> About four million people have cerebrovascular disease, the most common type of which is stroke.<sup>25</sup> Nearly 800,000 strokes occur each year in the United States.<sup>16</sup>

### What is Stroke?

Stroke is a distinct type of cardiovascular disease, also called cerebrovascular disease. Specifically, stroke is a disease that affects the arteries leading to and within the brain. A stroke occurs when a blood vessel that carries oxygen and nutrients to the brain is either blocked by a clot, or ruptures. When this happens, part of the brain cannot get blood and oxygen, and begins to die.<sup>26</sup>



**Only 10% of stroke victims recover almost completely, leading to reduced quality of life, ongoing medical care, and increased costs of ongoing medical treatment. Making healthy lifestyle choices and managing adverse medical conditions can help in preventing stroke.**

**In 2007, it was estimated the direct cost of stroke in the United States was \$16.5 billion, and in California was \$1.6 billion.<sup>1</sup>**

### What was the Direct Cost of Stroke in San Diego County in 2007?

Stroke was the least prevalent of the chronic diseases, but the second most expensive per person reporting the condition.

- For each person reporting stroke, the annual cost was estimated to be \$9,420.
- According to the California Health Interview Survey, the prevalence of stroke among adults in San Diego County was 1.9%, or 44,105 people.<sup>13,19</sup>
- The estimated total treatment expenditures (direct cost) were \$482 million, representing 10.5% of treatment expenditures for the seven chronic diseases.

### What are the Modifiable Risk Factors of Stroke?

Similar to heart disease, the most common risk factors for stroke include physical inactivity, obesity, hypertension, cigarette smoking, high cholesterol, and diabetes. More than one-third of all U.S. adults reported having two or more of these risk factors in 2003.<sup>18</sup>

## Pulmonary Disease

Pulmonary, or respiratory, diseases such as asthma and chronic obstructive pulmonary disease (COPD) are a significant public health problem in the United States. More than 23 million adults and children in the United States currently have asthma, and another 13.6 million adults currently have COPD.<sup>27,28</sup> In 2006, there were 13.3 million visits, with asthma as the primary diagnosis, to physician offices, hospital outpatient clinics, and emergency departments; there were 444,000 hospitalizations for asthma.<sup>27</sup> Asthma and COPD are among the ten leading causes of restricted activity, and asthma is the second most common cause of chronic disease in children.



**There are numerous behaviors and diseases that impact respiratory health and function, including smoking, tuberculosis, lung cancer, AIDS, pneumonia, and occupational lung diseases.<sup>29</sup> The number one way to prevent respiratory diseases such as asthma and COPD is to stop smoking.**

**In 2007, it was estimated the direct cost of pulmonary diseases in the United States was \$54.4 billion, and in California was \$5.1 billion.<sup>1</sup>**

### What are Asthma and COPD?

Asthma is a chronic inflammatory disease of the respiratory system which causes the airways of the lungs to constrict and become inflamed in response to certain triggers. It is the most common chronic disease in children and can also be found in adults. COPD is a disease that makes it hard to breathe. The disease is progressive, meaning it gets worse over time, and includes chronic bronchitis and emphysema.<sup>28</sup> Cigarette smoking is the leading cause of COPD; however, long-term exposure to environmental tobacco smoke and other lung irritants, such as air pollution, chemical fumes, or dust may also contribute to the disease. COPD occurs most often in older adults and may affect more than 10% of adults 65 years or older.<sup>27,30</sup>

### What was the Direct Cost of Pulmonary Disease in San Diego County in 2007?

In San Diego County, pulmonary diseases were among the least costly of the chronic diseases, despite being the second most prevalent.

- For each person reporting a pulmonary disease, the annual cost was estimated to be \$1,002.
- According to the California Health Interview Survey, the prevalence of pulmonary disease among adults and children over 1 year in San Diego County was 13.5%, or 410,672 people.<sup>13,19</sup>
- The estimated total treatment expenditures (direct cost) were \$478 million, representing 10.4% of treatment expenditures for the seven chronic diseases.

## Diabetes

Diabetes is a major cause of premature illness and death. In the United States, 23.6 million children and adults have diabetes, representing 7.8% of the population. Furthermore, diabetes is increasing in both new and total cases.<sup>31</sup> A total of 1.6 million new cases of diabetes were diagnosed in people ages 20 years or older in 2007.<sup>32</sup>

### What is Diabetes?

Diabetes mellitus is a serious disease in which the levels of blood glucose, or blood sugar, are above normal. It is possible to live without knowing one has the disease; in fact one out of four people with diabetes do not even know they have the disease.<sup>33</sup> Uncontrolled diabetes can cause major health problems and disability. People with uncontrolled diabetes are more likely to have heart disease and stroke, vision problems such as blindness, nerve damage to hands and feet leading to amputation, kidney failure, and loss of teeth.<sup>32</sup>

**People diagnosed with diabetes have medical expenditures that are about 2.3 times higher than they would be in the absence of diabetes. Approximately 1 in 10 health care dollars is attributed to diabetes, when including its co-morbidities; thus diabetes screening, prevention, and management activities can contribute to improved quality of life as well as reduced healthcare expenditures.<sup>32</sup>**

### What is Type 2 Diabetes?

Of the three types of diabetes (Type 1 diabetes, Type 2 diabetes, and gestational diabetes), Type 2 diabetes is most common, accounting for 90% to 95% of all diabetes cases. Type 2 diabetes is typically associated with obesity and physical inactivity, and most commonly occurs after the



age of 40.<sup>31</sup> Pre-diabetes occurs when blood glucose levels are higher than normal but not high enough to be diagnosed as diabetes. Pre-diabetes often leads to type 2 diabetes. In addition to Americans already diagnosed with diabetes, another 57 million have pre-diabetes, and 25% of these do not know they have the disease.<sup>34</sup>

**In 2007, it was estimated the direct cost of diabetes in the United States was \$34.7 billion, and in California was \$3.8 billion.<sup>1</sup>**

### What was the Direct Cost of Diabetes in San Diego County in 2007?

In San Diego County, diabetes was the least costly of the chronic diseases, when considering diabetes alone. Common secondary conditions or co-morbidities, such as hypertension, were not included in calculating the direct cost of diabetes.

- For each person reporting diabetes, the annual cost was estimated to be \$2,226.
- According to the California Health Interview Survey, the diabetes prevalence rate among adults in San Diego County was 6.3%, or 146,243 people.<sup>13,19</sup>
- The estimated total treatment expenditures (direct cost) were nearly \$378 million, representing 8.2% of treatment expenditures for the seven chronic diseases.

## **Summary**

The direct medical costs of the most common chronic diseases in San Diego County exceeds \$4 billion dollars each year.

Medical costs for chronic disease in the United States are expected to increase six-fold by 2050. If San Diego follows the same pattern, then the next generation of San Diegans can anticipate spending almost \$25 billion per year in 2050 on care for preventable chronic diseases.

Chronic diseases disproportionately impact older adults. These diseases are often the result of lifetimes of unhealthy exposures to tobacco, alcohol and other drugs, poor diets and physical inactivity.

As the average lifespan increases and the baby boom generation ages, the senior population in San Diego County is projected to increase by 40% in the next ten years.

Prevention is the key to reducing both the prevalence and the costs associated with chronic disease.

The Health Strategy Agenda has the potential to positively impact the health of San Diegans through prevention. By employing strategies that support healthy choices and pursuing policy changes for a healthy environment, as well as building a better system and changing the culture within, the County of San Diego is taking action to prevent chronic disease and to reduce the economic burden of these diseases.

The changes we make now as San Diegans are critical in both lowering the rates of chronic diseases and in the example set for the next generation. The ultimate impact of the economic burden of chronic disease will fall to the next generation.



## **Data Sources**

A combination of federal, state, and local data were used to estimate the prevalence of chronic disease and the cost of treating them in San Diego County. These data sources are described below.

### **Medical Expenditure Panel Survey (MEPS)**

The San Diego County chronic disease cost estimates rely heavily on data from the Medical Expenditure Panel Survey (MEPS).<sup>35</sup> MEPS was designed to continually provide policy-makers, healthcare officials, and others with timely, comprehensive data about healthcare use and associated costs in the United States. MEPS is a combination of surveys of families and individuals, their medical providers (doctors, hospitals, pharmacies, etc.), and employers across the United States. The survey is designed to collect information on health services used, frequency of use, cost of services, and mode of payment, as well as information on the cost, scope, and breadth of health insurance held by and available to U.S. workers.

MEPS uses the Clinical Classification System (CCS)<sup>36</sup> to identify broad condition categories. CCS enables clustering patient diagnoses and procedures into a manageable number of clinically meaningful categories. The CCS was developed as part of the Healthcare Cost and Utilization Project (HCUP), a Federal-State-Industry partnership sponsored by the Agency for Healthcare Research and Quality (AHRQ). CCS collapses diagnosis and procedure codes from the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM), which contains more than 13,600 diagnosis codes and 3,700 procedure codes. The CCS categories used for this analysis and their associated ICD-9-CM codes are listed in the supplement to this report which describes the methodology. MEPS data provide cost per condition estimates for the entire Western Region, but do not provide more local (e.g., state or county) level data. For this analysis, 2007 MEPS data were used to estimate cost per condition for the Western Region of the United States.

### **Centers for Medicare and Medicaid Services (CMS), National Health Expenditure Accounts (NHEA)**

The Centers for Medicare and Medicaid Services (CMS) National Health Expenditure Accounts (NHEA)<sup>37</sup> are the official estimates of total health care spending in the United States. The NHEA are compiled with the goal of measuring the total amount spent in the U.S. on health care goods and services during the year, by state and point of service (e.g., hospital or physician). The CMS data provide a statewide estimate of health expenditure, but unlike MEPS, do not break down costs by condition. Because the latest available CMS data are for 2004, local population estimates were applied to these data and projected linearly to estimate California healthcare expenditures for 2007, in 2004 dollars.

### **California Health Interview Survey (CHIS)**

The California Health Interview Survey (CHIS)<sup>19</sup> is the nation's largest state health survey, lead by the UCLA Center for Health Policy Research. CHIS is a random-dial telephone survey conducted every two years in all California counties on a variety of health topics. Questions such as, "Has a doctor ever told you you have diabetes?" are asked during the interview, which allows for an estimate of the percentage of people reporting various conditions in each county. For this report, CHIS data were used to estimate prevalence for heart disease, stroke, diabetes, pulmonary conditions, hypertension, and mental disorders. For the chronic diseases described in this report, some CHIS questions used to estimate the population reporting the condition (PRC) were asked of adults only. When applicable, appropriate adjustments were

made to ensure accurate estimates for the percent of the PRC, as described in the methodology. The latest available CHIS data were for 2007, however for stroke, the latest available estimates for PRC were available for 2005. A linear projection for these diseases could not be applied due to lack of data. See the supplement to this report, which describes the methodology in more detail, for the CHIS survey questions that were used to estimate the PRC for this analysis.

## **California Cancer Registry (CCR)**

Cancer prevalence was determined using data from the California Cancer Registry (CCR).<sup>10</sup> The California Cancer Registry (CCR) is California's statewide population-based cancer surveillance system. The CCR collects information about nearly all cancers diagnosed in California, except for basal and squamous cell carcinoma of the skin and carcinoma in situ of the cervix. This information furthers the understanding of cancer and is used to develop strategies and policies for its prevention, treatment and control. County-level prevalence data, though not available on their website, were available via request only for the year 2009. Population estimates were used to project backward to estimate the cancer prevalence for 2007 for this analysis.

## **San Diego Association of Governments (SANDAG)**

Population estimates for San Diego County were obtained from the San Diego Association of Governments<sup>13</sup> (SANDAG). SANDAG is made up of the 18 cities and County government, and serves as the forum for regional decision making. To support this function, SANDAG creates and maintains a tremendous quantity of demographic and other data, including past and current population estimates, as well as long range population projections. For this analysis, 2007 population estimates were applied to prevalence as estimated by CHIS and CCR to estimate the population reporting each condition.

## **U.S. Census Bureau, Population Estimates Program (PEP)**

Population estimates for the Western Region of the United States and for the State of California were obtained from the U.S. Census Bureau, Population Estimates Program (PEP).<sup>38</sup> The PEP provides total population estimates for the nation, states, and counties. These estimates are used in federal funding allocations, as denominators for vital rates and per capita time series, and in monitoring recent demographic changes. For this analysis, 2007 population estimates for the Western Region and California were used to estimate the California cost per person for each of the chronic diseases in this report, as described in the methodology.

## **U.S. Department of Labor, Bureau of Labor Statistics (BLS)**

The Consumer Price Index (CPI)<sup>39</sup> is a measure of the average change in prices over time of goods and services purchased by households. The Medical Care Component of the Consumer Price Index (Medical CPI) includes costs associated with health care expenditures such as physician and hospital services and drugs. In order to estimate the 2007 treatment expenditures for San Diego County, the Medical Care CPI was used to determine the rate of inflation for San Diego County from 2004 to 2007, and applied to treatment expenditures, which were calculated in 2004 dollars based on the available CMS data. Additional detail is provided in a supplemental report describing the detailed methodology.

## **Analysis**

The process of estimating chronic disease expenditure in San Diego County involved several steps of analysis. Multiple data sources were available, but at different levels of geography and with varying levels of detail. For example, MEPS provided expenditure data by condition and point of service, but the geographic level was too large, encompassing the entire Western Region of the United States. CMS provided expenditure data at the state level by point of service, but the data were not broken down by condition. Finally, CHIS and CCR provided County level estimates of the number of people reporting each condition, but lacked associated expenditure data.

There were multiple steps in this analysis, as outlined below.

1. Use MEPS data to calculate the share of total expenditures each chronic condition represents for all points of service for the Western Region.
2. Apply the shares calculated for each chronic condition in the Western Region to CMS data for all conditions by point of service in California, to estimate the treatment expenditures for each chronic condition in California.
3. Calculate a ratio of per-capita expenditures for each chronic condition and point of service for the California and the Western Region.
4. Apply the California to Western Region per-capita expense ratio to MEPS estimates of cost per person reporting each condition, to determine the cost per-person reporting each condition for California.
5. Apply the cost per-person reporting each condition for California, to San Diego County estimates for number of persons reporting each condition (prevalence) to determine the total expense for San Diego County.
6. Adjust for inflation from 2004-2007 by applying the medical care CPI.

In addition to those described previously in the report, the following assumptions were made in this analysis:

1. The MEPS cost estimates for the Western Region were calculated in the same manner as the CMS cost estimates for California.
2. The share of cost that each chronic disease represents compared to all conditions was the same in the Western Region as in California.
3. The cost per person reporting the condition (PRC) for California was comparable to the cost per PRC for San Diego County.
4. California Health Interview Survey (CHIS) data used to estimate prevalence closely matched the number of PRC in San Diego County.

For more detail about the methodology used for this analysis, contact the Community Health Statistics Unit at (619) 285-6429, or email Holly Shipp at [Holly.Shipp@sdcounty.ca.gov](mailto:Holly.Shipp@sdcounty.ca.gov).

## References

- 1 The Milken Institute, “An Unhealthy America: The Economic Burden of Chronic Disease.” (October 2007), <http://www.milkeninstitute.org/publications/> (Accessed May 15, 2010).
- 2 3Four50, [www.3four50.com](http://www.3four50.com) (Accessed July 2, 2010).
- 3 County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics Unit, (May 28, 2009).
- 4 Medscape Medical News “Significant Associations Between Mental Illness and Chronic Physical Illnesses.” (October 24, 2007), <http://www.medscape.com/viewarticle/564778> (Accessed July 20, 2010).
- 5 Centers for Disease Control and Prevention, “Anxiety and Depression.” <http://www.cdc.gov/features/dsBRFSSDepressionAnxiety/> (Accessed July 22, 2010).
- 6 The Milken Institute, “An Unhealthy America: The Economic Burden of Chronic Disease” Online Fact Sheets, [www.chronicdiseaseimpact.com](http://www.chronicdiseaseimpact.com) (Accessed August 2, 2010).
- 7 Centers for Disease Control and Prevention, “Cancer - A to Z.” <http://www.cdc.gov/cancer/az/> (Accessed March 7, 2009).
- 8 U.S. Department of Health and Human Services, “Cancer” in *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. (Washington, DC: U.S. Government Printing Office. November 2000), <http://www.healthypeople.gov/Document/HTML/Volume1/03Cancer.htm> (Accessed March 7, 2009).
- 9 National Cancer Institute, “What is Cancer?” (November 2008), <http://www.cancer.gov/cancertopics/what-is-cancer> (Accessed March 7, 2009).
- 10 California Cancer Registry (CCR), <http://www.ccrca.org/> (Accessed August 1, 2010).
- 11 National Cancer Institute, Surveillance Epidemiology and End Results, “SEER Stat Fact Sheets—Cancer, All Sites”, <http://seer.cancer.gov/statfacts/html/all.html> (Accessed March 7, 2009).
- 12 California Cancer Registry, 2009 County-level Prevalence Estimates (July 22, 2010).
- 13 San Diego Association of Governments, 2007 population estimates (October 2009).
- 14 Centers for Disease Control and Prevention, Division for Heart Disease and Stroke Prevention (DHDSP), “Health Topics,” (October 2008), <http://www.cdc.gov/DHDSP/> (Accessed April 1, 2009).
- 15 Centers for Disease Control and Prevention, Division for Heart Disease and Stroke Prevention (DHDSP), “Heart Disease Facts and Statistics,” (February 2009), <http://www.cdc.gov/heartdisease/statistics.htm>, (Accessed April 1, 2009).
- 16 U.S. Department of Health and Human Services. “Heart Disease and Stroke” in *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. (Washington, DC: U.S. Government Printing Office. November 2000), <http://www.healthypeople.gov/Document/HTML/Volume1/12Heart.htm>, (Accessed April 1, 2009).
- 17 Mayo Clinic, “Heart Disease: Definition,” <http://www.mayoclinic.com/health/heart-disease/DS01120>, (Accessed August 6, 2010).
- 18 Centers for Disease Control and Prevention, “Heart Disease Facts,” <http://www.cdc.gov/heartdisease/facts.htm> (Accessed July 19, 2010).
- 19 UCLA Center for Health Policy Research, California Health Interview Survey, “AskCHIS,” <http://www.chis.ucla.edu/main/> (Accessed July 14, 2010).
- 20 American Heart Association, “High Blood Pressure Statistics,” <http://www.americanheart.org/presenter.jhtml?identifier=4621> (Accessed July 19, 2010).
- 21 National Heart Lung and Blood Institute, National Institutes of Health, “What is High Blood Pressure?” [http://www.nhlbi.nih.gov/health/dci/Diseases/Hbp/HBP\\_WhatIs.html](http://www.nhlbi.nih.gov/health/dci/Diseases/Hbp/HBP_WhatIs.html) (Accessed April 2, 2009).

# The Economic Burden of Chronic Disease in San Diego County

- 22 American Heart Association, “High Blood Pressure,” <http://www.americanheart.org/presenter.jhtml?identifier=2114> (Accessed April 2, 2009).
- 23 National Institute of Mental Health, “The Numbers Count: Mental Disorders in America”, <http://www.nimh.nih.gov/health/publications/the-numbers-count-mental-disorders-in-america/index.shtml#Intro> (Accessed June 23, 2010).
- 24 National Alliance on Mental Illness, “What is Mental Illness: Mental Illness Facts,” [http://www.nami.org/Content/NavigationMenu/Inform\\_Yourself/About\\_Mental\\_Illness/About\\_Mental\\_Illness.htm](http://www.nami.org/Content/NavigationMenu/Inform_Yourself/About_Mental_Illness/About_Mental_Illness.htm) (Accessed August 7, 2010).
- 25 Centers for Disease Control and Prevention, Division for Heart Disease and Stroke Prevention (DHDSP), “Stroke Facts and Statistics,” (February 2009), [http://www.cdc.gov/Stroke/stroke\\_facts.htm](http://www.cdc.gov/Stroke/stroke_facts.htm), (Accessed April 1, 2009).
- 26 American Stroke Association, “What is Stroke?” <http://www.strokeassociation.org/presenter.jhtml?identifier=3030066> (Accessed August 6, 2010).
- 27 Centers for Disease Control and Prevention, “Chronic Obstructive Pulmonary Disease (COPD) - Includes: Chronic Bronchitis and Emphysema,” <http://www.cdc.gov/nchs/fastats/copd.htm> (Accessed July 19, 2010).
- 28 National Heart Lung and Blood Institute, Diseases and Conditions Index, “COPD,” [http://www.nhlbi.nih.gov/health/dci/Diseases/COPD/COPD\\_WhatIs.html](http://www.nhlbi.nih.gov/health/dci/Diseases/COPD/COPD_WhatIs.html) (Accessed April 16, 2009).
- 29 U.S. Department of Health and Human Services. “Respiratory Diseases”, in *Healthy People 2010: Understanding and Improving Health*. 2nd ed. Washington, DC: U.S. Government Printing Office, November 2000. <http://www.healthypeople.gov/Document/HTML/Volume2/24Respiratory.htm> (Accessed April 16, 2009).
- 30 Mayo Clinic, “COPD,” <http://www.mayoclinic.com/print/copd/DS00916/DSECTION=all&METHOD=print> (Accessed July 20, 2010).
- 31 National Institute of Diabetes and Digestive and Kidney Diseases, “Diagnosis of Diabetes”, (NIH Publication No. 09–4642, October 2008), <http://diabetes.niddk.nih.gov> (Accessed January 27, 2009).
- 32 American Diabetes Association, “All About Diabetes,” <http://www.diabetes.org/about-diabetes.jsp> (Accessed January 27, 2009).
- 33 National Diabetes Information Clearinghouse (NDIC), “National Diabetes Statistics, 2007,” <http://diabetes.niddk.nih.gov/dm/pubs/statistics/> (Accessed July 19, 2010).
- 34 County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics Unit, “Healthy People 2010: Health Indicators for San Diego County.” (May 2009), [http://www.sdcountry.ca.gov/hhsa/programs/phs/documents/CHS-HealthyPeople2010SanDiego\\_2009.pdf](http://www.sdcountry.ca.gov/hhsa/programs/phs/documents/CHS-HealthyPeople2010SanDiego_2009.pdf) (Accessed June 22, 2010).
- 35 U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey (MEPS), <http://www.meps.ahrq.gov/> (Accessed March 3, 2010).
- 36 Healthcare Cost and Utilization Project (HCUP) Clinical Classification Software (CCS), <http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccsfactsheet.jsp> (Accessed March 3, 2010).
- 37 U.S. Department of Health and Human Services, Centers for Medicare & Medicaid Services (CMS), <http://www.cms.hhs.gov/NationalHealthExpendData/> (Accessed March 3, 2010).
- 38 U.S. Census Bureau, Population Estimates Program (PEP), <http://www.census.gov/popest/estbygeo.html> (Accessed August 3, 2010).
- 39 U.S. Department of Labor, Bureau of Labor Statistics (BLS) Databases, Tables & Calculators by Subject, “Consumer Price Index—All Urban Consumers” (Series ID: CUUSA424SAM) <http://data.bls.gov/> (Accessed July 22, 2010).



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