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POLICY NOTE

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Chronic Obstructive Pulmonary Disease Burden in California and Southern California, 2011

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Executive Summary

Chronic Obstructive Pulmonary Disease (COPD) is a significant health burden, affecting approximately 1.1 million or 4% of California adults. Among them, more than half (550,000) live in Southern California (Los Angeles, Orange, Ventura, San Bernardino, Riverside, San Diego and Imperial Counties), and nearly one-fifth of California adults with COPD, or approximately 197,000 people, reside in Los Angeles County.

Key findings of this policy note include:

California's COPD profile is complex

- While a third of adults with COPD in California are age 65 and older, one quarter of adults with COPD in California (25.4%) are under the age of 45.
- Three-fifths of Californians with COPD (59.1%) are women, and more than two-fifths (43.7%) belong to minority populations.
- More than one-third of Californians with COPD
 (35.7%) live below 130% of the federal poverty level
 (FPL). Another 20.5% live between 131-249% of the FPL.
- More than one-third of adults with COPD (37.4%) never smoked.

Many Californians with COPD need better access to care

- Around two-fifths, or 42.9%, have seen a doctor for symptoms related to COPD, and 17.5% have visited an emergency room or been admitted to the hospital due to COPD in the past 12 months.
- Approximately one-third of California adults with COPD (30.4%) reported never having received a breathing test (i.e. spirometry), the only approved method for diagnosing COPD.
- Compared to Californians without COPD, twice as many Californians with COPD reported that the cost of health care was an obstacle to receiving medical care (27.7% vs. 14.7%).
- Among Californians with COPD, 19.4% do not have a personal health care provider.

Californians with COPD fare less well than their counterparts without COPD

- Although smoking is the most well-known risk factor for developing and worsening COPD, a third of adults with COPD are current smokers (33.7%) compared to one in ten adults without COPD who are current smokers (10.8%). A quarter of adults with COPD are exposed to household smoking, which is double that of respondents without COPD (25.2% vs. 12.5%).
- Approximately two-fifths of respondents with COPD (42.8%) report poor/fair health status, compared to 17.4% among those without COPD.
- Nearly a third of respondents with COPD (29%) report poor mental health, compared to 10.5% among those without COPD.

Chronic Obstructive Pulmonary Disease (COPD), referring to chronic bronchitis and emphysema, is characterized by obstruction to airflow that makes emptying air from the lungs progressively difficult. Chronic lower respiratory disease, primarily COPD, is a major cause of disability and death; it was the third leading cause of death in the United States, and the fourth leading cause of death in California and Los Angeles County in 2009. 1-3 Currently, approximately 14.8 million people in the U.S. are diagnosed with COPD, and there may be just as many who have the disease and do not know it. 4-7 Major symptoms of COPD include coughing, mucus production, wheezing and shortness of breath. COPD is largely preventable, but not curable. The most well-known associated risk factor for developing COPD is cigarette smoking, but COPD has also been linked to air pollution exposure, recurrent infection, diet and genetic factors. Treatment can control symptoms and slow disease progression.8

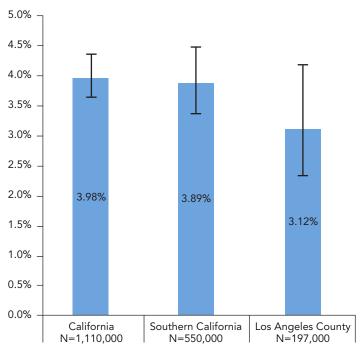
This policy note represents the first time that data has been made available to characterize adults with COPD in the state of California, as well as the regions of Southern California and Los Angeles County. The policy note uses California Behavioral Risk Factor Surveillance System (BRFSS) data to detail COPD prevalence, COPD health care utilization and outcomes, and characteristics of Californians with COPD. It provides the estimation of overall prevalence of COPD for California as a whole, as well as by region (Southern California and Los Angeles County), and also provides descriptive statistics for COPD-related care and quality of life. Demographic, social and behavioral characteristics are compared among those with COPD versus those without.

Prevalence of COPD in California, Southern California and Los Angeles County

According to the Centers for Disease Control and Prevention's 2011 BRFSS, nearly 4%, or approximately 1.1 million Californians, have been diagnosed with COPD (Exhibit 1). Among them, more than half (3.9% or 550,000) live in Southern California (Los Angeles, Orange, Ventura, San Bernardino, Riverside, San Diego and Imperial Counties), and nearly one-fifth of California adults with COPD, or approximately 197,000 people (3.1%), are residents of Los Angeles County. Detailed prevalence data by demographic characteristics for California, Southern California and Los Angeles County are in Exhibit A in the Appendix.

Exhibit 1.

Overall Age-Adjusted Prevalence of COPD in California, Southern California and Los Angeles



Notes:

Age-adjusted using the California Department of Finance 2010 population estimates.

Southern California: Los Angeles, Orange, Ventura, San Bernardino, Riverside, San Diego and Imperial Counties.

95% confidence interval.

Exhibit 2.

Age-Adjusted Distribution of Socio-Demographic Characteristics of Adults with COPD in California and Southern California

	California (CA)			Southern California (SC)					
Demographic Characteristics	Pop. N	%	95% C.I.	Pop. N	%	95% C.I.			
Age (CA SC)									
18 – 44 18 – 54	282,000	25.4	20.0 – 30.7	255,000	46.1	38.3 – 53.9			
45 – 54	197,000	17.7	14.4 – 21.1						
55 – 64	259,000	23.3	20.0 – 26.6	116,000	116,000 20.8				
65+	374,000	33.6	29.8 – 37.4	183,000	33.1	27.3 – 38.8			
Sex									
Male	454,000	40.9	35.3 – 46.8	230,000	42.8	34.0 – 52.0			
Female	658,000	59.1	53.2 – 64.7	324,000	57.2	48.0 – 66.0			
Race/Ethnicity	Race/Ethnicity								
White	670,000	56.3	50.4 – 62.0	295,000	49.4	41.0 – 57.8			
Latino	218,000	22.7	17.8 – 28.5	132,000	25.8	18.3 – 35.1			
African American	91,000	9.3	5.2 – 16.0	74,000	15.0**	7.9 – 26.5			
Asian/PI/Other*	133,000	11.8	8.2 – 16.7	53,000	9.8**	5.1 – 18.1			

Notes:

Age-adjusted using the California Department of Finance 2010 population estimates.

Southern California: Los Angeles, Orange, Ventura, San Bernardino, Riverside, San Diego and Imperial Counties.

*PI = Pacific Islander; Race category "Other" includes participants who self-identified as: American Indian, Alaska Native, and bior multi-racial who did not identify most with one of the other racial/ethnic categories.

**Coefficient of Variation > .3; estimates reported with caution.

Data Source: 2011 California Behavioral Risk Factor Surveillance System, CDC

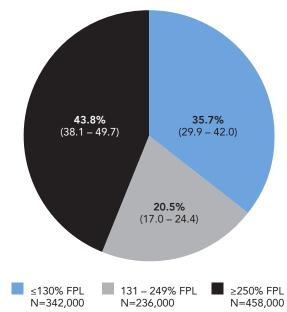
Socio-Demographic Characteristics of Adults with COPD in California

Among those with COPD in the state of California, the majority are older adults, though young adults are suffering from COPD as well. Specifically, 33.6% of adults are age 65 and older, 23.3% are between 55-64 years old, 17.7% are between 45-54 years old, and 25.4%

of adults are between 18-44 years old (Exhibit 2). Approximately three-fifths of adults with COPD in California (59.1%) are female. Just under half of adults with COPD belong to racial/ethnic minority groups. One-fifth (22.7%) are Latino, 9.3% are African American, and 11.8% are Asian/Pacific Islander/Other; the remaining 56.3% are White.

Exhibit 3.

Californians with COPD by Federal Poverty Level



Notes: Age-adjusted according to California Department of Finance 2010

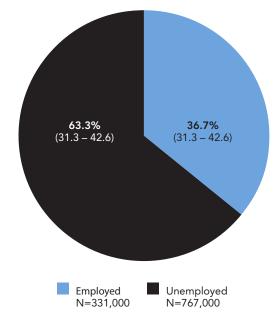
Numbers in parentheses are 95% confidence intervals.

Data Source: 2011 California Behavioral Risk Factor Surveillance System, CDC

As shown in Exhibit 3, more than one-third of Californians with COPD (35.7%) live below 130% FPL, which is equivalent to a family income less than \$2400 per month for a family of four in 2011. Another 20.5% live between 131-249% FPL, which is less than \$4700 per month for a family of four in 2011. Approximately two-thirds of adults with COPD (63.3%) are unemployed, due to either joblessness or retirement (Exhibit 4).

Exhibit 4.

Employment Status of Californians with COPD



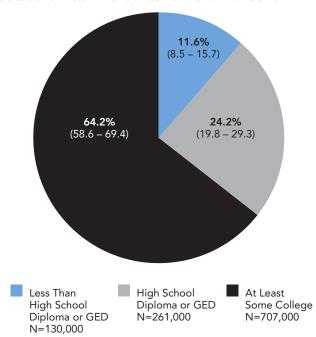
Notes: Age-adjusted according to California Department of Finance 2010

figures.

Numbers in parentheses are 95% confidence intervals.

Exhibit 5.

Educational Attainment of Californians with COPD



Notes: Age-adjusted according to California Department of Finance 2010

figures.

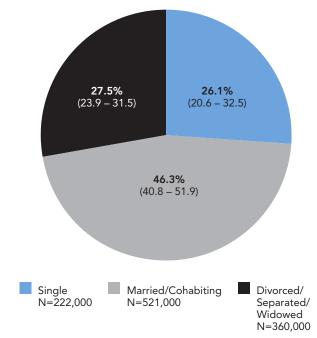
Numbers in parentheses are 95% confidence intervals.

Data Source: 2011 California Behavioral Risk Factor Surveillance System, CDC

Most Californians with COPD have attended some college (64.2%), while 24.2% have received a high school diploma or GED and 11.6% have not finished high school (Exhibit 5). One-quarter of adults in California with COPD (26.1%) are single (never married), and another quarter (27.5%) are divorced, separated or widowed; the other half of adults with COPD (46.3%) are married or cohabiting (Exhibit 6).

Exhibit 6.





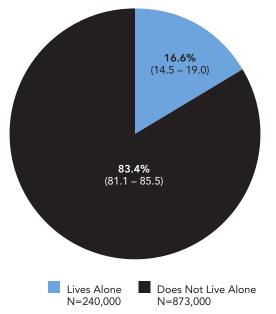
Notes: Age-adjusted according to California Department of Finance 2010

figures.

Numbers in parentheses are 95% confidence intervals.

Exhibit 7.

Percentage of Californians with COPD Who Live Alone



can be used as a proxy for social support (Exhibit 7). The distributions of socio-demographic characteristics among adults in Southern California with COPD are approximately the same as the distributions of socio-demographic characteristics of adults with COPD in the entire state (see details in Exhibit B in the Appendix). Sample size limitations preclude accurate estimates of socio-demographic distributions for those with COPD in Los Angeles County.

Among Californians with COPD, 16.6% live alone, which

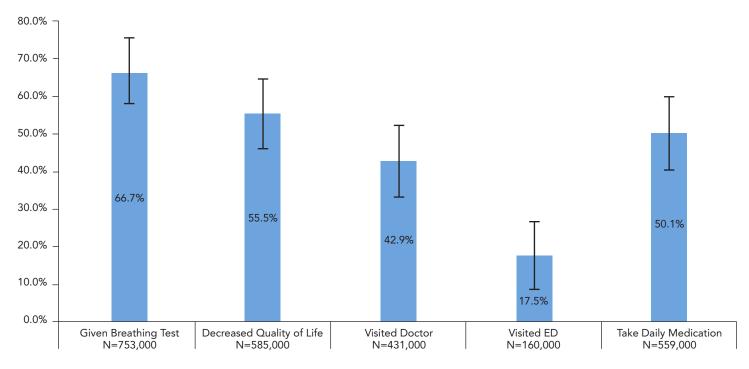
Notes: Age-adjusted according to California Department of Finance 2010

figures.

Numbers in parentheses are 95% confidence intervals.

Exhibit 8.





Notes: Age-adjusted according to California Department of Finance 2010 figures.

95% confidence interval

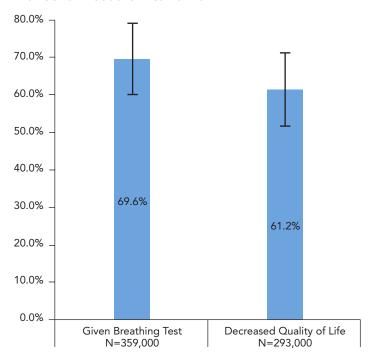
Data Source: 2011 California Behavioral Risk Factor Surveillance System, CDC

COPD-Related Health Care and Outcomes among Adults with COPD in California and Southern California

Among adults who report having been diagnosed with COPD in California, only 66.7% report having received a breathing test to diagnose COPD, chronic bronchitis or emphysema, even though spirometry is the only approved method for diagnosing COPD (Exhibit 8). Around two-fifths, or 42.9%, have seen a doctor for symptoms related to COPD, and 17.5% have visited an emergency room or been admitted to the hospital due to COPD in the past 12 months. Half of all adults with COPD in California (50.1%) take at least one COPD medication daily. More than half (55.5%) report that shortness of breath affects their quality of life.

Exhibit 9.

Percentage of COPD Care and Outcomes among Adults with COPD in Southern California



Notes: Age-adjusted according to California Department of Finance 2010 figures.

Southern California = Los Angeles, Orange, Ventura, San Bernardino, Riverside, San Diego and Imperial Counties

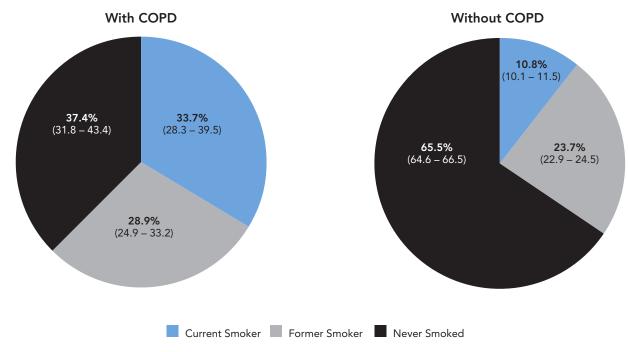
90% confidence interval

Data Source: 2011 California Behavioral Risk Factor Surveillance System, CDC

Among Southern Californians with COPD, 69.6% have been given a breathing test to diagnose COPD, chronic bronchitis or emphysema, and 61.2% feel that shortness of breath negatively affects their quality of life (Exhibit 9). Southern California estimates were reported at a 90% confidence level. Los Angeles County estimates were not reliable, and therefore not reported, due to limited sample size.

Exhibit 10.

Smoking Status among Adults with vs. without COPD in California



Notes: Age-adjusted according to California Department of

Finance 2010 figures.

Numbers in parentheses are 95% confidence intervals.

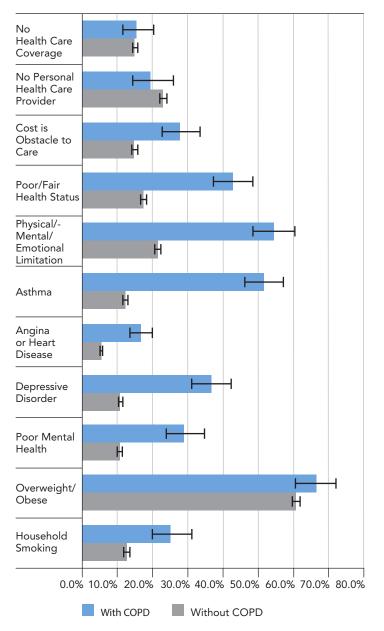
Data Source: CDC, Behavioral Risk Factor Surveillance System, 2011

Californians with COPD Have More Risk Factors and Worse Health Than Their Counterparts without COPD

Smoking is the most well-known risk factor for developing and subsequently worsening COPD; however, more respondents with COPD are current smokers (33.7%) compared to respondents without COPD (10.8%; Exhibit 10). At the same time, the percentage of respondents with COPD who are exposed to smoke in the home is almost double that of respondents without COPD (25.2% vs. 12.5%; Exhibit 11). As anticipated, more respondents with COPD are former smokers (28.9%) compared to respondents without COPD (23.7%); however, 37.4% of adults with COPD never smoked.

Exhibit 11.

Percentage of Health-Related Outcomes by COPD Status among Adults in California



In addition, Californians with COPD fare less well than their counterparts without COPD in many respects. For example, adults with COPD may have more difficulty paying for medical care. More than one-quarter of Californians with COPD (27.7%) report that cost is an obstacle to care compared to only 14.7% of those without COPD (Exhibit 11). Californians with COPD also have a lower level of perceived health and functionality and suffer from more co-morbidities. Approximately two-fifths of respondents with COPD (42.8%) report poor/fair health status, and nearly a third (29%) report poor mental health, compared to 17.4% and 10.5%, respectively, among those without COPD. More than half of those with COPD (54.5%) feel physically, emotionally or mentally limited compared to only 21.3% of those without COPD. More respondents with COPD report having co-morbidities, such as asthma (51.7% vs. 12.3%), angina or heart disease (16.5% vs. 5.4%), and depressive disorder (36.7% vs. 10.8%). Among Californians with COPD, 15.2% do not have health coverage, and 19.4% do not have a personal health care provider (Exhibit 11), which are comparable distributions to those among Californians without COPD.

The estimates of health-related characteristics among Southern Californians are reliable at a 90% confidence level (See Exhibit B in the Appendix). Similar estimates for Los Angeles County are not shown to be reliable due to sample size limitations.

Notes: Age-adjusted according to California Department of Finance 2010

95% confidence interval.

Conclusion and Recommendations

COPD remains a significant public health burden. The most recent figures reported by the National Institutes of Health estimate that the direct cost of treating COPD and asthma in the United States is approximately \$53.7 billion annually. Early intervention could go a long way to decrease these costs, as it can curb the progression and severity of the disease.^{8,10} The American College of Physicians (ACP) updated its Diagnosis and Management of Stable Chronic Obstructive Pulmonary Disease guidelines in 2011.11 However, there is still ample room for improvement in adherence to these guidelines in California, because many of the primary prevention and treatment strategies are not well-followed. For instance, the ACP's first recommendation is to obtain a spirometry reading in order to diagnose and manage COPD. However, about a third of Californians with COPD report having never received a breathing test.

In addition, it is known that smoking is a major risk factor for developing and subsequently worsening COPD. Continued exposure to smoking or noxious particles, such as air pollution, increases the rate of decline in health status, and as the disease progresses, individuals will gradually lose their ability to breathe. Targeted programs are needed to help people with COPD or their family members stop smoking, because a third of Californians with COPD currently smoke and one-quarter are exposed to smoking at home. In addition, efforts should also be made to reduce exposure to air pollution and other environmental triggers, as suggested by the finding that two-fifths of adults with COPD never smoked.

It is important for people with COPD to have access to appropriate and quality care in a timely fashion. Currently, about 15% of Californians do not have insurance coverage, and more than a quarter of adults with COPD report that cost is a barrier to care. Therefore, many Californians with COPD are in need of financially-accessible and comprehensive health insurance coverage.

The findings presented in this report highlight the need to incorporate prevention, early detection and treatment strategies that aim at reducing activity limitations, emergency department visits and hospitalizations due to COPD, thereby increasing quality of life. In order to adequately and strategically reduce the negative impact of this disease, it is important to understand the characteristics and obstacles faced by those with COPD. Early and appropriate treatment and interventions to reduce the barriers to care will be influential in diminishing the social and economic impact of COPD in California.

Data Source

The BRFSS is an on-going, cross-sectional telephone survey established in 1984 by the Centers for Disease Control and Prevention (CDC) and is conducted in all states and multiple territories. BRFSS data provide information regarding health-related behaviors and chronic disease prevalence among non-institutionalized adults in California who are 18 years and older. The CA BRFSS is a collaborative effort between the CDC, the California Department of Public Health and the Public Health Institute. CA BRFSS data were collected from a randomly-selected sample of California adults with landline telephones between January 2 and December 31 of 2011. Total sample size included 17,481 adults, and interviews were conducted in English and Spanish.

All CA BRFSS respondents were asked, "Have you ever been told by a doctor or health professional that you have COPD, emphysema or chronic bronchitis?" For the first time in 2011, respondents who answered "yes" to this COPD question were asked a series of follow-up questions about COPD-related health care and quality of life. All estimates presented were age-adjusted to the 2010 California Department of Finance standard population. Weights were applied in all analyses so that data represent the California adult population according to 2010 California Department of Finance figures.

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The views expressed in this policy note are those of the authors and do not necessarily represent the UCLA Center for Health Policy Research, the Regents of the University of California, or collaborating organizations or funders.

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Appendix

Exhibit A.

Age-Adjusted Prevalence of COPD among Adults by Socio-Demographic Characteristics in California, Southern California and Los Angeles County

	California (CA)			Southern California (SC)			Los Angeles County (LA)		
Demographic Characteristics	Pop. N	%	95% C.I.	Pop. N	%	95% C.I.	Pop. N	%	95% C.I.
Total	1,113,000	4.0	3.6 – 4.4	554,000	3.9	3.4 – 4.5	197,000	3.1	2.3 – 4.2
Age (CA SC & LA)					,				
18 – 44 18 – 54	282,000	2.0	1.5 – 2.6	255,000	2.5	1.9 – 3.3	101,000	2.1	1.2 – 3.6
45 – 54	197,000	3.8	3.1 – 4.6						
55 – 64	259,000	6.4	5.6 - 7.4	116,000	5.9	4.7 – 7.5	32,000	3.9	2.5 – 6.0
65+	374,000	8.8	7.9 – 9.8	183,000	8.6	7.4 – 10.0	64,000	7.1	5.3 – 9.4
Sex					,				
Male	454,000	3.4	3.0 – 4.0	230,000	3.3	2.6 – 4.1	81,000	2.6	1.7 – 4.0
Female	658,000	4.5	4.0 – 5.1	324,000	4.5	3.7 – 5.4	116,000	3.7	2.5 – 5.4
Race					,				
White	670,000	4.7	4.3 – 5.2	295,000	4.8	4.1 – 5.6	76,000	3.6	2.6 – 5.0
Latino	218,000	2.8	2.2 – 3.4	132,000	2.8	2.1 – 3.7	55,000	2.2	1.4 – 3.6
African American	91,000	5.7	3.4 – 9.2	74,000	7.7	4.4 – 13.3	52,000	9.2**	4.1 – 19.3
Asian/PI/Other*	133,000	3.0	2.1 – 4.2	53,000	2.5**	1.4 – 4.5	***	***	***
Federal Poverty Level (FPL)			•						
≤ 130% FPL	341,200	5.6	4.7 – 6.7	169,000	4.5	3.5 – 5.9	85,000	4.1	2.6 – 6.6
131-249% FPL	236,000	4.4	3.8 – 5.2	106,000	3.6	2.8 – 4.6	30,000	2.3	1.3 – 3.9
≥ 250% FPL	458,000	3.5	3.0 – 4.0	241,000	3.8	3.0 – 4.7	68,000	2.6	1.7 – 4.1
Marital Status									
Single	222,000	5.2	4.2 – 6.4	145,000	5.6	4.2 – 7.6	73,000	5.5	3.5 – 8.7
Married/Cohabiting	521,000	3.0	2.6 – 3.4	252,000	2.9	2.4 – 3.5	79,000	2.2	1.5 – 3.1
Divorced/Separated/Widowed	360,000	6.4	5.4 – 7.6	157,000	5.3	4.1 – 6.8	45,000	3.7	2.1 – 6.5
Employment Status									
Employed	331,000	2.6	2.2 – 3.1	163,000	2.5	2.0 – 3.2	40,000	1.6	1.1 – 2.5
Unemployed	435,000	6.0	5.2 – 6.9	234,000	5.7	4.5 – 7.1	106,000	5.2	3.4 – 8.0
Retired	332,000	3.6	2.6 – 4.9	157,000	8.1**	3.5 – 17.4	***	***	***
Educational Level									
Less than H.S. Diploma or GED	130,000	3.4	2.7 – 4.3	66,000	2.9	2.0 – 4.2	19,000	1.6	1.0 – 2.7
High School Diploma or GED	261,000	5.0	4.2 – 6.0	131,000	4.7	3.6 – 6.1	53,000	4.4	2.8 – 6.8
At Least Some College	707,000	4.0	3.5 – 4.5	358,000	4.0	3.3 – 4.9	126,000	3.3	2.1 – 5.1
Living Alone	240,000	6.6	5.5 – 8.0	451,000	3.6	3.1 – 4.2	166,000	3.0	2.1 – 4.1
Uninsured	132,000	3.2	2.5 – 4.3	63,000	2.6	1.8 – 3.9	19,000	1.7**	0.8 – 3.6
Smoking Status									
Current Smoker	337,000	11.2	9.6 – 13.1	170,000	11.0	8.5 – 14.1	62,000	9.5	5.6 – 15.8
Former Smoker	391,000	4.5	3.9 – 5.3	181,000	4.5	3.6 – 5.7	55,000	3.2	2.1 – 5.0
Never Smoked	384,000	2.3	1.9 – 2.7	203,000	2.3	1.8 – 2.9	80,000	1.9	1.2 – 3.1
Household Smoking	244,000	7.5	6.1 – 9.1	124,000	7.1	5.2 – 9.7	61,000	7.7	4.5 – 12.8

Notes:

Age-adjusted using the California Department of Finance 2010 population estimates.

*PI = Pacific Islander; Race category "Other" includes participants who self-identified as: American Indian, Alaska Native, and bior multi-racial who did not identify most with one of the other racial/ethnic categories.

**Coefficient of Variation > .3; estimates reported with caution.

***Not reportable due to instability.

Exhibit B.

Age-Adjusted Percentage of Selected Demographic and Health-Care Related Characteristics by COPD Status Among Adults in Southern California

	With COPD			Without COPD		
Demographic Characteristics	Pop. N	%	90% C.I.	Pop. N	%	90% C.I.
Marital Status						
Single	145,000	32.6	25.5 – 40.5	3,425,000	21.5	20.4 – 22.7
Married/Cohabiting	252,000	45.0	38.0 – 52.1	8,495,000	62.1	60.8 – 63.4
Divorced/Separated/Widowed	157,000	22.5	19.0 – 26.5	1,974,000	16.4	15.6 – 17.2
Employment Status						·
Employed	163,000	35.0	28.1 – 42.6	7,596,000	52.7	51.5 – 54.0
Unemployed	392,000	65.0	57.4 – 71.9	6,302,000	47.3	46.0 – 48.5
Educational Level						
Less Than H.S. Diploma or GED	66,000	11.0	7.2 – 16.3	2,298,000	16.6	15.7 – 17.6
High School Diploma or GED	131,000	24.2	18.8 – 30.6	3,181,000	21.6	20.5 – 22.7
At Least Some College	358,000	64.8	57.7 – 71.4	8,428,000	61.8	60.5 – 63.1
Federal Poverty Level (FPL)						
≤130% FPL	169,000	35.3	26.9 – 44.8	4,295,000	32.8	31.4 – 34.2
131-249% FPL	106,000	17.1	13.0 – 22.1	2,507,000	19.6	18.6 – 20.8
≥ 250% FPL	241,000	48.1	40.4 – 55.8	6,107,000	48.9	47.5 – 50.2
Living Alone	104,000	14.4	12.2 – 17.0	1,046,000	8.9	8.5 – 9.3
Health-Related Characteristics and Behaviors						
No Health-Care Coverage	63,000	15.2	10.5 – 21.6	2,479,000	17.5	16.4 – 18.6
No Personal Doctor/Health Care Provider	91,000	23.3	15.6 – 33.1	3,720,000	26.3	25.0 – 27.5
Cost Is Obstacle to Medical Care	136,000	30.0	22.7 – 38.5	2,202,000	15.6	14.6 – 16.7
Has Poor/Fair Self-Reported Health Status	246,000	42.5	34.5 – 50.9	2,355,000	17.1	16.2 – 18.1
Has Physical/Mental/Emotional Limitation	256,000	49.3	40.5 – 58.1	2,234,000	19.0	18.0 – 20.0
Ever Had Asthma	276,000	55.5	47.8 – 63.0	1,532,000	10.9	10.1 – 11.9
Ever Had Angina or Heart Disease	105,000	15.9	11.9 – 20.9	625,000	4.7	4.3 – 5.2
Ever Had Depressive Disorder	171,000	33.4	25.7 – 42.0	1,301,000	9.4	8.7 – 10.2
Has Self-Reported Frequent Poor Mental Health	145,000	30.0	22.5 – 38.9	1,492,000	10.7	9.9 – 11.6
Overweight/Obese	355,000	67.3	58.6 – 75.0	8,023,000	60.5	59.1 – 61.9
Smoking Status						
Current Smoker	170,000	33.6	26.6 – 41.5	1,525,000	10.7	9.9 – 11.5
Former Smoker	181,000	26.5	21.9 – 31.7	2,925,000	23.0	22.0 – 24.0
Never Smoker	203,000	39.9	32.5 – 47.7	9,468,000	66.3	65.2 – 67.5
Household Smoking	124,000	24.5	17.4 – 33.3	1,837,000	13.3	12.3 – 14.4

Notes: Age-adjusted using the California Department of Finance 2010

population estimates.

Southern California = Los Angeles, Orange, Ventura, San Bernardino,

Riverside, San Diego and Imperial Counties.