Tobacco Related Disease Research Program Policy Initiative Bears Fruit

> Phillip Gardiner, Dr. P.H. Public Health, Public Policy and Economics Program Officer

Tobacco-Related Disease Research Program (TRDRP)

 Supported by 5% of Proposition 99 Cigarette Surtax Revenues

"The Legislature hereby requests the University of California to establish a comprehensive grant program to support the research efforts related to the prevention, causes, and treatment of tobacco-related diseases."

• UC Office of the President (UCOP), Research and Grants Program Office

Culmination of a 3-year process

- TRDRP begins to align its research priorities more closely to the needs of tobacco control in the state of California in 2008
- Launches Policy Initiative with the establishment of a Statewide Policy Advisory Board, including the Health voluntaries, CTCP CDE, and representatives of priority populations
- Cost of Smoking to state deemed key issue

Scientific Teams

- Requests for Qualifications and Peer Review, April June 2009
- Scientific Teams selected July 2009:

Stanton Glantz, Ph.D. P.I.	UCSF
Jim Lightwood, Ph.D.	UCSF
Wendy Max Ph D co-PI	UCSE
Hai-Yen, Sung, Ph.D.	UCSF
John Pierce, Ph.D.	UCSD
Karen Messer, Ph.D.	UCSD

Policy Initiative Bears Fruit

- Pierce J, Messer K, White MM, Kealey S, Cowling DW.,
 Forty years of faster decline in cigarette smoking in California explains current lower lung cancer rates, Cancer, Epidemiology, Biomarkers, and Prevention, 2010 Nov;19(11):2801-10.
- Pierce J, White MM, Messer K, Cowling DW, Thomas DP.
 Prevalence of Heavy smoking in California and the United States, 1965-2007, *JAMA*, 2011 Mar 16;305(11):1106-12.

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- Max W, Sung H, Lightwood J. The Impact of Changes in California Tobacco Control Expenditures on Healthcare Expenditures, 2012 – 2016, Final Report to the Tobacco-Related Disease Research Program, 2011.
- Lightwood J, Glantz S. Predicted Effect of California Tobacco Control Educational Funding on Smoking Prevalence, Cigarette Consumption, and Healthcare Costs, 2012-2016. Final Report to the Tobacco-Related Disease Research Program, 2011.

Priority 3: Research that will expand the Scientific Basis to Inform the Regulation of Nicotine and Tobacco Products at the Local, State and National Levels



As a result of the <u>Family Smoking Prevention and Tobacco Control Act of 2009</u>, the U.S. Food and Drug Administration (FDA) now has authority to oversee and regulate tobacco products. At the same time and in response to regulatory and market pressures, the tobacco industry has intensified the development and marketing of a host of new products. Harm reduction claims, often made by health professionals, are increasingly associated with some of these. Yet little research has been done to determine the long-term health effects and addiction potential of inhaled vaporized nicotine or the ingestion of orally delivered nicotine. The FDA's responsibility to protect the health of the public provides an unprecedented role for the government and multiple research opportunities for the scientific community.



Smoking prevalence among California and US-CA adults, 1984-2009



Source: Behavioral Risk Factor Surveillance System (BRFSS) 1984-1992, BRFSS and California Adult Tobacco Survey data is combined for 1993-2008. The data is weighted to the 2000 California population. State BRFSS data is weighted to 2000 national population based on each states population.

Note an adjustment was made to address the change of smoking definition in 1996 that included more occasional smokers. Prepared by: California Department of Public Health, California Tobacco Control Program, March 2010.

COPH

Endangered Investment

- Proposition 99 spending
 - CDPH/CDE expenditures
 - 1988-1989: \$220.2 million in 2010 dollars
 - 2009-2010: \$71.5 million in 2010 dollars
 - 2011-2012 budget:\$69.6 million
 - TRDRP expenditures show similar declines



What Next?

- TRDRP: three studies examine the effect of the California Tobacco Control Program
 - Effects on health
 - Effects on health care cost savings
 - Estimates effect of continued erosion, but also reinvigoration

• Reinvigoration?

- Quickest way would be to increase excise taxes on cigarettes
- LAO estimated last year the fiscal effects of dedicating 20% of a \$1 cigarette excise tax increase for tobacco control
 - Would bring 2011-2012 funding levels back to original 1989-1990 level

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Thank You; A Team Effort

- UCOP External Relations
 - State Governmental Relations: Angela Gilliard; Steve Juarez
 - Communications: Andy Evangelista, Wallace Ravven and Leslie Sepuka
- UCOP Health Sciences and Services: Jasmine Kiai
- UCOP Academic Affairs, Office of Research and Graduate Studies
 - Research Grants Program Office: Mary Croughan
 - TRDRP: Bart Aoki, Kamlesh Asotra, M.F. Bowen and Jewel Charles

TRDRP Legislative Briefing

5/12/2011



Lung cancer deaths in California vs the rest of the USA

Karen Messer, Ph D Director of Biostatistics Moores UCSD Cancer Center



Cancer Epidemiol Biomarkers Prev November 2010 19; 2801

Research Article

Cancer Epidemiology, Biomarkers & Prevention

Forty Years of Faster Decline in Cigarette Smoking in California Explains Current Lower Lung Cancer Rates

John P. Pierce¹, Karen Messer¹, Martha M. White¹, Sheila Kealey¹, and David W. Cowling²



Lung cancer

• 80% to 90% of lung cancer deaths are attributed to smoking.

http://www.cdc.gov/cancer/lung/basic_info/risk_factors.htm

- At the population level, death rates correlate with cigarette consumption.
 - There is a lag of 15-20 years. (Peace, 1985, UK data)



What is the effect of the California Tobacco Control Program on lung cancer deaths?

- Compare trends in cigarette consumption, CA vs US, over 40 years
 - (from two independent governement data sources)
- Do these correlate with Tobacco Control?
- Do these correlate with lung cancer deaths?



Lung cancer rates

National Center for Health Statistics ("SEER" data from NCI)

- Annual age adjusted lung cancer mortality rates, age 35 years and older
- Standardized to 2000 US census population
- California vs. US



38 years' data on lung cancer mortality, CA vs US



- CA lung cancer is higher from 1970 to1985
- CA declines rapidly from 1987
- US declines more slowly, from 1993



LUNG CANCER DEATH RATES IN CA ARE 25% LOWER THAN THE REST OF THE US. (2007)

CAN CIGARETTE CONSUMPTION EXPLAIN THESE TRENDS?

Per Capita cigarette consumption

- Taxable Cigarette Sales

 CA Department of Finance (Orzechowski and Walker)
- Population survey data

 CDC and Census Bureau
 (TUS-CPS and NHIS)



~50 years' data on per capita cigarette sales, CA vs US



- CA
 consumption
 is ≥ US until
 1968
- CA declines rapidly from 1974
- US declines more slowly, from 1981
- WHY?



Summary of consumption

Survey and tax data agree:

- Californians smoked MORE than US until first big CA cigarette excise tax in 1968
- Over next 20 years, consumption in CA dropped faster than in rest of US

- Attributable to greater tobacco control activity in CA

• This "smoking gap" accelerated in 1988 with the CA Tobacco Control Program

Put it all together:

 % difference in consumption rates, CA vs US

 % difference in lung ca rates, CA vs US

• Over the last ~40 years





🐸 AACR Event Brings U.S. Surgeon General to Capitol Hill - Mo... 📃

🕷 AACR Event Brings U.S. Surg... 👘

AACR EVENT BRINGS U.S. SURGEON GENERAL TO CAPITOL HILL

Surgeon general, AACR leaders urge increased investment in research to tackle tobacco epidemic

Stemming the global tide of tobacco-related death and suffering and promoting public health will require an intensification of tobacco control efforts and further research to better understand initiation, addiction and the countless harmful effects of tobacco, emphasized U.S. Surgeon General Regina Benjamin, along with other research experts, at a March 1 Capitol Hill briefing hosted by the AACR.



U.S. Surgeon General Regina Benjamin

Benjamin, speaking to congressional aides and representatives from the health research and advocacy communities, praised the public health efforts that have led to the remarkable decline in smoking rates over the past four decades, but noted that this decline has stalled in recent years. About one in five American adults still smoke and every day, nearly 4,000 youths try their first cigarette. She cited the ongoing need for more scientific discovery in tobacco to drive the development of more effective policies and treatments.

Benjamin also pointed to successful anti-smoking policies at the state level as models for the rest of the nation. California's 40-year-long tobacco control program, for instance, has resulted in lung cancer rates that are nearly 25 percent lower than other states.

National impact

March 1 Capitol Hill briefing by Surgeon General:

"California's 40-year-long tobacco control program, for instance, has resulted in lung cancer rates that are nearly 25 percent lower than other states."



HOWEVER-we are now losing ground

- Data from the California Tobacco Survey on youth smoking rates
 - California Department of Public Health
- We are losing the kids! They are now smoking more than previously.

30-day smoking prevalence for California, New York and U.S. high school (9th-12th grade) students, 2000-2008



Source: The 2000, 2002, 2004 and 2006 data is from the California Student Tobacco Survey. The 2000 data collection used passive parental consent, 2002 and 2004 used active parental consent, and 2006 and 2008 data collection used a mixed parental consent procedure. New York data from the New York Youth Tobacco Survey, 2000-2008. The U.S. data is from the National Youth Tobacco Survey. Prepared by: California Department of Public Health, California Tobacco Control Program, March 2011.

30-day smoking prevalence among 8th, and 10th, graders in California, 1996-2008 and the average price of a pack of cigarettes



Source: The 2000 data is from the National Youth Tobacco Survey collected by the American Legacy Foundation, which used passive parental consent. The 2002, 2004, 2006, and 2008 data is from the California Student Tobacco Survey. The 2002 and 2004 data collection used active parental consent while the 2006 and 2008 data collection used a mixed parental consent procedure.

Prepared by: California Department of Health Services, Tobacco Control Section, February 2009.
Conclusions

- After 1st big CA cigarette tax in 1968, the 'smoking gap' started: CA vs US
- The 1988 Tobacco Tax Health Promotion Act, doubled the rate of the "smoking gap"
- As predicted, from 1986, a corresponding "lung cancer death gap" appeared.

The CA Tobacco Control Program should continue to prevent lung cancer deaths for decades to come.

BUT ONLY IF IT IS FUNDED.

THE IMPACT OF CHANGES IN CALIFORNIA TOBACCO CONTROL FUNDING ON HEALTHCARE EXPENDITURES: 2012-2016

> Wendy Max, Ph.D. Hai-Yen Sung, Ph.D. James Lightwood, Ph.D. UCSF

> > Legislative Briefing Sacramento, CA May 12, 2011

Plan for Today

Strategy
Healthcare expenditures

 How we estimate them
 Our findings

Mortality implications: exploratory findings
Policy implications

Strategy

We have been modeling smoking-attributable costs in the US and CA for over 20 years
Develop models using most current data
Use the models to estimate the impact on healthcare expenditures and mortality
Compared 2 CTCP funding scenarios

Funding Scenarios

- Baseline Case (status quo): tobacco control funding continues at current level of 5 cents/pack
- \$1.00/pack tax increase in 2012: 25 cents/pack (5 cents existing tax plus 20 cents additional from tax increase)

Prevalence

 The 2 scenarios are incorporated into the models by projecting smoking prevalence in each case
Prevalence projections

Used co-integrated time series regression model comparing CA prevalence and prevalence in control states

Then disaggregated current prevalence into light, moderate, and heavy using proportions from CA data

Smoking Prevalence Under 2 Scenarios of CTCP Funding: 2011-2016



Smoking Prevalence by Intensity Under 2 Scenarios of CTCP Funding: 2011-2016



Baseline





Healthcare Expenditures

Conceptual Framework: Impact of Smoking on Healthcare Expenditures



Conceptual Framework: Impact of Smoking on Healthcare Expenditures



Methods: Healthcare Expenditure Models

- Series of microeconomic econometric models
 - based on individual data
 - 60 equations
- Estimated using national survey data
 - Medical Expenditures Panel Survey
 - National Health Interview Survey
- Models are then applied to California data

Savings in Healthcare Expenditures from the Tax Compared to Baseline: 2012-2016 (\$ millions 2009)



Cumulative saving (2012-2016): \$3.345 billion

Mortality

Exploratory Look at the Impact on Mortality Epidemiologic model using published relative risks of death smoking prevalence Calculate a smoking-attributable fraction and apply that to deaths Exploratory, because we changed only the smoking prevalence under each scenario Didn't change total deaths, population

Smoking-Attributable Deaths Compared to Baseline Case: 2012-2016



Cumulative impact (2012-2016): 4,174 lives saved

Policy Implications

Baseline Case

Smoking prevalence will increase

- **12.2% (2011) to 12.7% (2016)**
- Reflecting the erosion of CTCP expenditures due to inflation

\$1 Tax per Pack

Smoking prevalence will fall with a large initial drop due to the combined effect of CTCP spending and the tax

12.2% (2011) to 10.4% (2016)

Between 2012 and 2016, compared to baseline:

Healthcare expenditures will fall by \$3.3 billion

4,174 fewer smokers will die

THE EFFECT OF CALIFORNIA TOBACCO CONTROL PROGRAM

JAMES LIGHTWOOD STANTON GLANTZ UCSF

Sacramento, CA May 12, 2011

The program has had big effects on

- □ Smoking
- Heart disease
 - Effects occur quickly
- Lung cancer
- Health care costs

Cigarette consumption dropped



Heart disease deaths dropped



So did industry sales



Source: Fichtenberg and Glantz (2000)

... and lung cancer incidence



Analysis of health care costs

- Analysis of first 15 years (through 2004)
- Dynamic model based on modern econometric methods
- Program expenditures >> changes in per capita cigarette consumption
- Changes in cigarette consumption >> changes in health costs
- Published in PLoS Medicine

The health cost savings grow



Source: Lightwood, Dinno and Glantz (2009)

Over first 15 years

- By 2004, the program was saving \$11 billion in health costs
 - 7.3% of all health costs)
- Cost tobacco industry over \$9 billion in lost sales
- Over the first 15 years the California program cost \$1.4 billion
- It saved \$86 billion

Emerging Man

□ Show the ad here, as an embedded video

The Future: A New Model

- Uses two measures of smoking behavior,
 - Prevalence of current smoking
 - Average cigarette consumption per smoker
- Used to predict the effect of future policies
- More stable estimates than old model
 - So more reliable for prediction

Results

- The qualitative forecast results of the new model are similar to the old model
 - Inflation is reducing the real value (and effect) of Proposition 99 program expenditures
 - Proposition 99 money alone will not produce sustained reductions in prevalence and cigarette consumption
- The CA tobacco control program has reduced health care costs through two channels of about equal importance
 - Reduced prevalence of current smoking
 - Reduced cigarette consumption in continuing smokers

Forecast Scenarios

- Continued funding level of five cents per pack in nominal dollars (Baseline Scenario)
- One dollar (nominal) tax imposed in 2012, with 20 cents per pack going to program funding in addition to the 5 cents per pack allocated by Proposition 99, plus 'backfill' funding to compensate for loss of revenue due to reduction in sales because of the tax increase.

Scenario 1: Status Quo (5 cents per pack)



Black circles: observed, open circle: model forecast for 2009, dashed line: model forecasts for 2010 to 2016, thick line: estimates of long run model, thin line: estimates of short run model (not shown for consumption per smoker because almost identical to long run estimates)

Prevalence increases from 12.9% in 2012 to 13.4% in 2016

Packs consumed *increases* from 879 million in 2012 to 1.032 billion 2016

TRDRP Advisory Meeting, Lightwood 4/6/2011

Scenario 2: Tax increase (20 cents per pack plus backfill)





Black circles: observed, open circle: model forecast for 2009, dashed line: model forecasts for 2010 to 2016, thick line: estimates of long run model, thin line: estimates of short run model (not shown for consumption per smoker because almost identical to long run estimates)

Prevalence decreases from 11.2% in 2012 to 10.9% in 2016

Total packs consumed *decreases* from 653 million in 2012 to 632 million in 2016

Total health care expenditures *decrease* by \$4.1 billion in 2012 to \$7.2 billion in 2016 compared to Baseline Scenario

The bottom line

Status quo

Smoking decline will reverse

- \$1 tax with 20 cents for tobacco control:
 - Smoking will decrease
 - Total health care expenditure will decrease by a total of \$28 billion between 2012 and 2016 compared to status quo



The FDA's scientific framework for regulation of tobacco products includes studies on:

- Toxicity: constituents, formulation and product design including in vitro, in vivo and human laboratory and clinical trial analyses
- Pharmacological addiction potential
- Abuse liability, i.e., use intensity and factors affecting use intensity in humans including product appeal, consumer perception, marketing and social influences;
- After-market prevalence of use and health outcomes
- Price and availability

Read about recent research estimating the impact of FDA mandated cigarette packaging pictorial health warnings.


<u>Read more on how tobacco products can be evaluated by Dr. Kenneth Warner at the University</u> of Michigan.

<u>Read the most recent Surgeon General's report on how tobacco smoke causes disease and research questions that remain.</u>



[SIDE BAR]

E-cigarettes have emerged as a highly controversial new product.



There is a lack of information on e-cigarettes regarding safety, abuse liability, and efficacy as aids to smoking cessation. <u>Read more...</u>

TRDRP has begun to support research with the potential to advance science in this critical new area:

Electronic Cigarettes: Are They Safe? [Insert link to abstract pdf]Principal Investigator Prudence Talbot. Ph.D. (20XT-0118)



Thank You; A Team Effort

- UCOP Sacramento: Angela Gilliard; Steve Juarez
- UCOP Oakland: Andy Evangelista; Jasmine Kiai; Wallace Ravven and Leslie Sepuka
- TRDRP: Bart Aoki, Kamlesh Asotra, M.F. Bowen and Jewel Charles