Progress Towards Controlling Lung Cancer in Rhode Island

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Background

Lung cancer (cancer of the lung and bronchus) is the leading cause of cancer death in Rhode Island and the U.S. overall.[1] Currently, it is the most common cancer to be diagnosed in Rhode Island (*second* most common among males, after prostate cancer, and *second* most common among females, after breast cancer), and second most common to be diagnosed in the U.S.[2] Annual *counts* of new lung cancers and deaths have increased over the past 25 years in Rhode Island (19% and 2%, respectively), despite great strides in prevention, although annual *age-adjusted rates* of new lung cancers and deaths tell a slightly different story.

In the United States, tobacco use is the leading cause of lung cancer, followed in importance by exposure to radon gas indoors.[3] Ongoing work to decrease human exposure to these carcinogens will diminish morbidity and mortality from this disease, as may new recommendations for lung cancer screening issued by the United States Preventive Services Task Force.[4]

Lung cancer trends are tracked nationally by the Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Institute, the National Program of Cancer Registries (NPCR) of the Centers for Disease Control and Prevention (CDC), the North American Association of Central Cancer Registries (NAACCR), the National Center of Health Statistics (NCHS) of the CDC, and the American Cancer Society (ACS) and other private organizations. Locally, lung cancer trends are tracked by the Rhode Island Cancer Registry (RICR). RICR is an organizational unit of the Rhode Island Department of Health (HEALTH), operated by the Hospital Association of Rhode Island (HARI) under contract with HEALTH. RICR contributes to the national cancer statistics published annually by NPCR and NAACCR.

New Cases and Deaths in Context (Table 1)

In the period 1987–1991 (the first full five years of RICR's operation), cancers of the lung accounted for 15% of all invasive cancers[5] newly diagnosed among Rhode Island residents, and 26% of all cancer deaths among Rhode Island residents (6.5% of *all* resident deaths). In 2006–2010, cancers of the lung accounted for 14% of all invasive cancers newly diagnosed among Rhode Island residents, and 28% of all cancer deaths among Rhode Island residents (6.6% of *all* resident deaths).

From 1987–1991 to 2006–2010, average annual counts of lung cancer cases rose 19% (from 736 to 878), while average annual counts of lung cancer deaths rose 2% (from 619 to 637).

Currently, lung cancer ranks 1st among all cancers newly diagnosed in Rhode Island, and 1st among all cancer deaths.

Table 1.

RHODE ISLAND	1987–91	←Δ→	2006–10
Cases*			
All cancers	24,584	+24 %	30,586
Colon-rectum	3,884	-27 %	2,818
Lung-bronchus	**3,679**	+19 %	**4,391**
Female Breast	3,726	+15 %	4,267
Prostate	2,487	+63 %	4,045
Urinary Bladder	1,289	+34 %	1,732
Deaths			
All causes of death	47,947	<+1 %	48,125
All cancers	11,932	-6 %	11,176
Colon-rectum	1,560	-37 %	987
Lung-bronchus	**3,097**	+2 %	**3,183**
Female Breast	1,103	-33 %	743
Prostate	671	-24 %	512
Urinary Bladder	274	+21 %	332

* Includes all invasive cases and *in situ* cases of the urinary bladder.
Sources: RICR; NCHS

Table 2.

LUNG CANCER	1987–91	←Δ→	2006–10
Age-adjusted Incidence Rates* §			
Rhode Island	**68.5**	+5 %	**72.2**
United States	68.2	-12 %	60.0
Age-adjusted Mortality Rates* §			
Rhode Island	**57.2**	-10 %	**51.4**
United States	57.8	-14 %	49.5

* Age-adjustment permits meaningful comparison of rates across populations with very different age structures.

§ Rates are expressed as average annual counts of newly diagnosed cases or of deaths, per 100,000 persons at risk. Rates are age-adjusted using the year 2000 population of the U.S. as the "standard population."

Sources: RICR; SEER; NCHS

Age-adjusted Rates and Trends (Table 2)

In Rhode Island from 1987–1991 to 2006–2010, the average annual age-adjusted incidence rate rose 5% (from 68.5 to 72.2 new cases per 100,000 persons). In contrast, the analogous statistic for the nation as a whole fell 12%.

In Rhode Island from 1987–1991 to 2006–2010, the average annual age-adjusted mortality rate fell 10% (from 57.2 to 51.4 deaths per 100,000 persons). In contrast, the analogous

statistic for the United States fell further (14%).

As a result, the position of Rhode Island vs. the United States has worsened with regard to lung cancer incidence and mortality.

A closer look at age-adjusted lung cancer incidence trends in Rhode Island (**Figure 1**) – by gender – reveals two countervailing trends: for males, a sustained decrease after 1994; for females, a substantial increase after 1987 that seems to have peaked in 2007 or 2008.

It is believed, but poorly documented, that the difference observed between gender-specific lung cancer incidence trends in Rhode Island reflects an earlier difference in gender-specific tobacco-use trends, i.e., that men experienced an earlier "epidemic" of tobacco use than women – an earlier increase and decrease – reflective of gender-specific cigarette marketing trends.

Control Strategy 1: Prevention (Table 3)

Eliminating tobacco use would prevent about 90% of all new lung cancers in the United States.[6] Locally, great progress has been made on this front, primarily because of Rhode Island's strong tobacco-control policies. (For example, Rhode Island's tobacco excise tax is the third highest in the nation: $3.50 in 2014.[7]) In fact, the deep decline in tobacco use among Rhode Island women since 1995 (44%) may, in future, improve the state's lung cancer profile compared to the nation as a whole.

Control Strategy 2: Screening

In 2004, the United States Preventive Services Task Force (USPSTF) "concluded that the evidence was insufficient to recommend for or against screening for lung cancer in asymptomatic persons with LDCT [Low-Dose Computed Tomography], chest radiography, sputum cytologic evaluation, or a combination of these tests." Then, after accumulating additional evidence,[8] the USPSTF revised its position, recommending *for* selective screening in an article published in the December 31, 2013 edition of *Annals of Internal Medicine*:

"The USPSTF recommends annual screening for lung cancer with low-dose computed tomography (LDCT) in adults aged 55 to 80 years who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years. Screening should be discontinued once a person has not smoked for 15 years or develops a health problem that substantially limits life expectancy or the ability or willingness to have curative lung surgery."[9]

The USPSTF grades its recommendations on the basis of available evidence. Its new recommendation for lung cancer screening is graded "B," meaning, "The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial."[10] Associated with a "B" grade is the suggestion to medical practitioners, "Offer or provide this service." Thus, a recommendation from the USPSTF graded "B" is a very strong one.

Unfortunately, at least *some* people ages 55–64 in Rhode Island "who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years" *may not have health insurance*, despite recent advances in the accessibility of health insurance. This is because people who continue to smoke, despite great declines in smoking over the past two decades, are disproportionately persons of low socio-economic status. Consider the following statistics from the CDC's Behavioral Risk Factor Surveillance System:

In 1995, (**Table 4**) about half as many college graduates as adults who did not graduate from high school smoked

Figure 1.

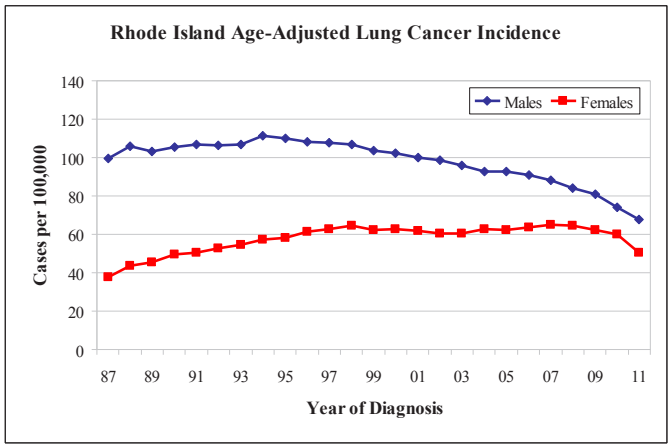

Table 3.

TOBACCO USE	1995	←Δ→	2010
	Percentage of Adults Who Are Current Smokers		
Males			
Rhode Island	**24 %**	-25 %	**18 %**
United States	25 %	-24 %	19 %
Females			
Rhode Island	**25 %**	-44 %	**14 %**
United States	21 %	-24 %	16 %

Sources: CDC: Behavioral Risk Factor Surveillance System

Table 4.

TOBACCO USE IN RI	1995	←Δ→	2012
	Percentage of Adults Who Are Current Smokers		
Educational Level			
Less than High School	**29 %**	**-3 %**	**28 %**
High School Diploma or G.E.D.	31 %	-35 %	20 %
Some post-High School	26 %	-27 %	19 %
College Graduate	**15 %**	**-53 %**	**7 %**
Income Level			
Less than $15,000	**30 %**	**+7 %**	**32 %**
$15,000- 24,999	34 %	-26 %	25 %
$25,000- 34,999	26 %	-15 %	22 %
$35,000- 49,999	23 %	-30 %	16 %
$50,000+	**16 %**	**-25 %**	**12 %**

Sources: CDC: Behavioral Risk Factor Surveillance System

in Rhode Island. In 2012, about one-forth as many college graduates smoked as adults who did not graduate from high school. Over the course of the intervening 17 years, college graduates in Rhode Island experienced a 53% decline in smoking, compared to a 3% decline in smoking among Rhode Island adults who did not finish high school.

A similar comparison may be made using income as a metric of socio-economic status, although the correlation between educational achievement and smoking behavior is stronger than the correlation between income level and smoking behavior.

The Future of Lung Cancer Control in Rhode Island

Clearly, the future of lung cancer control in Rhode Island depends on two things, namely, our resolve to resist tobacco industry marketing, and our effectiveness in getting *all eligibles* screened for lung cancer, despite the inequalities in health insurance status that may persist for some time. With regard to the latter, cancer control advocates would be well advised to begin by estimating the number of eligibles *with* access to health insurance and a good primary care home, and those *without* these essentials, and then designing specific strategies to achieve high rates of screening in *both* groups. If we do not do this systematically, we will inevitably contribute to *new* disparities in lung cancer survivorship attributable to differences (of various sorts) in access to lung cancer screening, as adherence to the new USPTF screening guidelines increases.

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