



Progress in the Control of Colorectal Cancer in Rhode Island, 1987-2000

Leanne Chiaverini, John P. Fulton, PhD, Dorothy M. Darcy, CTR

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PROFILE

About 5000 Rhode Island residents alive today were diagnosed with colorectal cancer in the past (2323 men and 2664 women in 1998); about 800 are newly diagnosed each year (408 men and 359 women in 2000); and about 300 succumb to the disease annually (125 men and 153 women in 1999). Colorectal cancer is among the top four most prevalent cancers in the state (and the nation), along with cancers of the lung, breast, and prostate. In Rhode Island, colorectal cancer accounted for 12% of all newly diagnosed cancers in 2000, and 11% of all cancer deaths in 1999.

CONTROL STRATEGY

Until 1999, it was believed that high-fiber diets helped reduce the incidence of colorectal cancer,¹ but The Nurses' Health Study demonstrated no relationship between intake of dietary fiber and incidence of colorectal cancer in a carefully designed prospective study of 88,757 women in the United States.² Thus, although the US Department of Health and Human Services continues to promote a high-fiber diet rich in fruits and vegetables for its general effect on health, the strategy is unlikely to decrease the burden of colorectal cancer in the United States.

A preferred strategy for the control of colorectal cancer is early detection with sigmoidoscopy or colonoscopy, followed by multidisciplinary, state-of-the-art treatment, if necessary. A number of clinical trials have demonstrated the effectiveness of screening for the reduction of colorectal cancer mortality.³ Screening with sigmoidoscopy or colonoscopy has the added advantage that precancerous polyps may be removed during the procedure, thus preventing the development of cancer. The Rhode Island Cancer Control Plan,⁴ published in September 1998, recommends:

COLORECTAL CANCER SCREENING

- All persons should receive an annual digital rectal examination beginning at age 40.
- All persons 50 years of age and over should receive fecal occult blood testing annually and flexible sigmoidoscopy every 5 years.
- Persons positive by either screening test should be referred for colonoscopy.

- Persons at elevated risk for the development of colorectal cancer should be referred for diagnosis and management if there is:
 - a family history of hereditary syndromes associated with a high incidence of colon cancer (polyposis syndromes),
 - at least one first degree relative with colorectal cancer,
 - a personal history of colon adenomas or colon cancer,
 - inflammatory bowel disease involving the colon.

BASIC TREATMENT INFRASTRUCTURE

- Promote and support the adoption of American College of Surgeons (ACOS)-approved cancer programs in all acute care hospitals in Rhode Island.
- Assure accurate tumor staging with American Joint Committee on Cancer (AJCC) staging methodology.

2010 TARGETS

*Healthy People 2010*⁵ suggests the following targets for the control of colorectal cancer:

SCREENING

- By 2010, increase the proportion of adults aged 50 years and older who have ever received a sigmoidoscopy to 50% (baseline = 37% in 1998). Increase the proportion of adults aged 50 years and older who have received a fecal occult blood test (FOBT) within the preceding two years to 50% (baseline = 35% in 1998).

MORTALITY

- By 2010, reduce the colorectal cancer death rate to 13.9 deaths per 100,000 population (age-adjusted to the year 2000 standard population of the United States; baseline = 21.2 deaths per 100,000 population in 1998).

TRENDS

Screening

The proportion of Rhode Island men of all races aged 40 and over who had ever received a colorectal screening exam (proctoscopic, sigmoidoscopic, or colonoscopic) increased from 32% in 1995 to 37% in 1999. Among all the states, the median proportion of men of all races aged 40 and over who had ever received a colorectal screening exam increased from 32% in 1995 to 34% in 1999. (Table 1)

The proportion of Rhode Island women of all races aged

40 and over who had ever received a colorectal screening exam (proctoscopic, sigmoidoscopic, or colonoscopic) increased from 26% in 1995 to 37% in 1999. Among all the states, the median proportion of women of all races aged 40 and over who had ever received a colorectal screening exam increased from 27% in 1995 to 33% in 1999. (Table 2)

Incidence

The age-adjusted incidence of invasive colorectal cancer (2000 standard) among Rhode Island men of all races decreased from about 94 cases per 100,000 men in 1987-1991 to about 76 cases per 100,000 men in 1996-2000 (based on five-year moving averages). The age-adjusted incidence of invasive colorectal cancer (2000 standard) among US men of all races decreased from 75 cases per 100,000 men in 1987-1991 to about 65 cases per 100,000 men in 1995-1999. US rates for men were lower than Rhode Island rates for men across the period observed.

The age-adjusted incidence of invasive colorectal cancer (2000 standard) among Rhode Island women of all races decreased from about 59 cases per 100,000 women in 1987-2000 to about 56 cases per 100,000 women in 1996-2000 (based on five-year moving averages). Similarly, the age-adjusted incidence of invasive colorectal cancer (2000 standard) among U.S. women of all races decreased from about 52 cases per 100,000 women in 1987-1991 to about 48 cases per 100,000 women in 1995-1999. US rates for women were

lower than Rhode Island rates for women across the period observed.

In Rhode Island, the analogous rates for *in situ* colorectal cancer increased slightly over the 1987-2000 period, from 6 cases per 100,000 men in 1987-1991 to 7 cases per 100,000 men in 1996-2000, and from 3 cases per 100,000 women in 1987-1991 to 4 cases per 100,000 women in 1996-2000. When age-adjusted incidence rates of invasive cancer are broken down by stage of disease at diagnosis, one may observe a decrease in the incidence of local, regional, and distant tumors in men. There was no significant change in the incidence rates for tumors of unknown stage in men. In women, one may observe a decrease in the incidence of local and regional tumors. There was no significant change in the incidence rates of distant tumors and tumors of unknown stage in women.

Basic Treatment Infrastructure

From 1989 through 1999, the percentage of Rhode Island men or women newly diagnosed with colorectal cancer who were treated at in-state ACOS-approved cancer programs varied between 52 and 64%. In 2000, this percentage increased to 72% for Rhode Island men and 79% for Rhode Island women.

Prior to a change in the Rules and Regulations of the Rhode Island Cancer Registry in 1992, only about 65% of the colorectal cancer cases newly diagnosed among Rhode Island men and women were staged using the AJCC system, an im-

Table 1.
 * Percent of men ages 40 and over who have ever been screened for colorectal cancer (proctoscopic exam, sigmoidoscopy, or colonoscopy)
 ** Average annual age-adjusted colorectal cancer incidence rates by summary stage of disease at diagnosis among men of all races
 *** Percents of cases in RI ACOS-approved treatment programs, of cases with AJCC staging, and of localized cases with recommended treatment
 [a] Average annual colorectal cancer mortality rates among men of all races

Place	Measure	Source	Year(s) of Observation												
			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
RI	% Screened *	[a]													
U.S.	% Screened										32.0	NA	38.2	NA	37.4
											32.1	NA	34.6	NA	33.9
RI	Incidence - In Situ **	[b]	6.2	6.2	6.0	6.0	5.9	6.0	6.5	7.4	7.0	7.1			
RI	Incidence - Local	[b]	34.5	34.4	33.0	31.5	30.0	28.3	27.8	27.7	27.9	30.3			
RI	Incidence - Regional	[b]	39.0	37.0	34.6	33.8	32.2	30.6	30.1	30.5	29.8	28.7			
RI	Incidence - Distant	[b]	15.1	14.8	13.8	14.1	13.8	13.9	14.2	13.8	12.7	12.1			
RI	Incidence - Unknown Stage	[b]	5.6	4.8	4.4	4.9	4.9	5.5	5.8	5.5	5.2	4.7			
RI	Incidence - All Invasive ***	[b]	94.1	91.0	85.8	84.4	80.9	78.3	77.8	77.5	75.7	75.9			
U.S.	Incidence - All Invasive	[c]	75.0	73.6	72.2	70.4	68.2	66.6	66.1	65.6	65.1	NA			
RI	% Cases in RI ACOS Tx Pgms	[b]	52	52	53	53	59	59	57	58	56	64	56	72	
RI	% Cases with AJCC Staging	[b]	65	64	68	68	89	92	92	92	91	95	90	92	
RI	Mortality	[d]	37.0	36.9	34.5	34.1	32.7	33.1	31.4	31.9	30.2	NA			
U.S.	Mortality	[d]	30.3	29.9	29.4	29.0	28.4	27.9	27.3	26.7	26.1	NA			

* Percent of men ages 40 and over who have ever been screened for colorectal cancer (proctoscopic exam, sigmoidoscopy, or colonoscopy)

** Incidence and mortality rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1997-2000), age adjusted to the 2000 U.S. standard population, expressed as cases per 100,000.

*** Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown

[a] Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention

[b] Rhode Island Cancer Registry, Rhode Island Department of Health

[c] National Cancer Institute. *SEER Cancer Statistics Review 1973-1999*. Bethesda, MD: National Cancer Institute, 2002.

[d] CDC Wonder, Centers for Disease Control and Prevention

NA Data not available or not applicable

Table 2. Percent of women ages 40 and over who have ever been screened for colorectal cancer (proctoscopic exam, sigmoidoscopy, or colonoscopy)
 Average annual age-adjusted colorectal cancer incidence rates by summary stage of disease at diagnosis among women of all races
 Percent of cases in RI ACOS-approved treatment programs, of cases with AJCC staging, and of localized cases with recommended treatment
 Average annual colorectal cancer mortality rates among women of all races

Place	Measure	Source	Year(s) of Observation														
			1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000			
RI	% Screened *	[a]															
U.S.	% Screened									25.6	NA	31.6	NA	37.2			
										27.1	NA	30.4	NA	32.6			
RI	Incidence - In Situ **	[b]	2.9	2.9	3.2	3.2	3.3	3.6	3.9	3.9	4.0	4.0					
RI	Incidence - Local	[b]	21.5	22.2	22.2	22.2	20.1	18.7	18.9	18.6	19.7	20.7					
RI	Incidence - Regional	[b]	25.0	23.1	24.0	23.0	22.3	22.4	24.3	23.6	23.8	22.6					
RI	Incidence - Distant	[b]	9.1	9.0	9.0	8.9	8.8	9.4	9.3	9.3	9.6	9.3					
RI	Incidence - Unknown Stage	[b]	3.2	3.4	3.7	3.9	3.7	3.9	4.1	3.8	3.5	3.5					
RI	Incidence - All Invasive ***	[b]	58.9	57.6	59.0	57.9	54.8	54.5	56.5	55.3	56.6	56.2					
U.S.	Incidence - All Invasive	[c]	51.7	51.0	50.3	49.4	48.5	47.8	47.6	47.7	47.6	NA					
RI	% Cases in RI ACOS Tx Pgms	[b]	58	53	53	56	58	58	58	60	60	64	63	79			
RI	% Cases with AJCC Staging	[b]	65	59	62	68	87	90	96	90	90	90	92	90			
RI	Mortality	[d]	22.7	22.7	22.2	21.0	20.7	20.6	20.2	19.5	20.2	NA					
U.S.	Mortality	[d]	20.9	20.5	20.3	20.0	19.7	19.4	19.1	18.8	18.5	NA					

* Percent of women ages 40 and over who have ever been screened for colorectal cancer (proctoscopic exam, sigmoidoscopy, or colonoscopy)
 ** Incidence and mortality rates are based on five years' data (e.g., 1989 = 1987-1991; 1998 = 1997-2000), age adjusted to the 2000 U.S. standard population, expressed as cases per 100,000.
 *** Invasive includes the following stages of disease at diagnosis: local, regional, distant, and unknown
 [a] Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention
 [b] Rhode Island Cancer Registry, Rhode Island Department of Health
 [c] National Cancer Institute. *SEER Cancer Statistics Review 1973-1999*. Bethesda, MD: National Cancer Institute, 2002.
 [d] CDC Wonder, Centers for Disease Control and Prevention
 NA Data not available or not applicable

portant basis for choosing appropriate treatments. After the Rules change, about 91% have been staged using the AJCC system.

Mortality

The age-adjusted mortality of invasive colorectal cancer (2000 standard) among Rhode Island men of all races declined from 37 per 100,000 in 1987-1991 to 30 per 100,000 in 1995-1999 (based on five-year moving averages). Similarly, the age-adjusted mortality of invasive colorectal cancer (2000 standard) among US men of all races declined from 30 in 1987-1991 to 26 in 1995-1999 (based on five-year moving averages). The rates in Rhode Island were higher than the rates in the US as a whole throughout the period of observation.

The age-adjusted mortality of invasive colorectal cancer (2000 standard) among Rhode Island women of all races declined from 23 per 100,000 in 1987-1991 to 20 per 100,000 in 1995-1999 (based on five-year moving averages). Similarly, the age-adjusted mortality of invasive colorectal cancer (2000 standard) among U.S. women of all races declined from 21 in 1987-1991 to 19 in 1995-1999 (based on five-year moving averages). The rates in Rhode Island were slightly higher than the rates in the US as a whole throughout the period of observation.

ASSESSMENT

From 1995 to 1999 Rhode Island edged ahead of the United States in the proportions of people ages 40 and over ever screened for colorectal cancer, and differences in the proportions of Rhode Island men and women ages 40 and over screened for colorectal cancer were eliminated.

Rhode Island also made progress toward the achievement of basic treatment infrastructure goals during the 1990s. The percentage of newly diagnosed colorectal cancer cases treated under the auspices of in-state ACOS-approved hospital cancer programs increased from 52% to 72% for men and from

58% to 79% for women during the period of observation. The proportion of cases staged with AJCC staging methodology increased from 65% in 1989 to 92% in 2000 for men, and from 65% in 1989 to 90% in 2000 for women.

Among Rhode Island men and women, increased use of colorectal screening exams in the 1990s was accompanied by increased incidence of *in situ* colorectal tumors, decreased incidence of local and regional colorectal tumors, decreased or unchanged incidence of distant colorectal tumors or tumors of unknown stage, and decreased colorectal cancer mortality. The increased

use of colorectal screening exams observed in the 1990s may have contributed to the observed trends in colorectal cancer incidence and mortality, although multiple factors were undoubtedly at play. Advances in treatment, for example, may have contributed substantially to the decrease in colorectal cancer mortality.

The *Healthy People 2010* goal for colorectal cancer mortality is aggressive, but not out of reach. Colorectal cancer screening tests, much like screening tests for cervical cancer, find dysplasias that can be removed before they progress into cancer, and thus are effective preventives. Public health efforts should continue to promote colorectal cancer screening, accompanied by state-of-the-art therapy.

REFERENCES

1. National Institutes of Health, National Cancer Institute. *Cancer Rates and Risks*. 4th edition, 1996.
2. Fuchs CS, Giovannucci EL, Colditz GA, et al. Dietary fiber and the risk of colorectal cancer and adenoma in women. *NEJM* 1999; 21: 169-76.
3. US Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: US Government Printing Office, 2000.
4. RI Department of Health. Cancer Control Rhode Island - Strategic Plan for 1998-2005. Providence, RI: RI Department of Health, 1998.

Leanne Chiaverini is Research Associate, Asthma Control Program, Division of Disease Prevention and Control, Rhode Island Department of Health.

John P. Fulton, PhD, is Associate Director of Health, Division of Disease Prevention and Control, Rhode Island Department of Health, and Clinical Associate Professor of Community Health, Brown Medical School.

Dorothy M. Darcy, CTR, is Director, Cancer Information System, Hospital Association of Rhode Island.