Colorectal Cancer in New Mexico

A White Paper
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Executive Summary

Commissioned by the New Mexico Cancer Council, this White Paper reflects the most recent New Mexico colorectal cancer (CRC) epidemiological and screening data, reviews of the medical literature, and perspectives from key policy makers, stakeholders, researchers and cancer survivors. The White Paper is intended to provide an overview of CRC control issues for New Mexico, including epidemiology, risk factors, screening modalities, and treatment options. The White Paper also addresses insurance coverage, costs, screening and treatment capacity, and policy issues.

CRC is an important public health concern in New Mexico. CRC is the fourth most common cancer diagnosed in New Mexico (790 cases estimated for 2010) and the third leading cause of cancer death (340 deaths estimated for 2010).

CRC screening reduces cancer incidence and mortality but is underutilized. Screening tests—which include stool blood tests, endoscopic procedures such as colonoscopy and flexible sigmoidoscopy, and radiographic imaging such as barium enema and CT colonography—detect precancerous polyps and curable early-stage colorectal cancers. High-quality research studies show that screening programs using fecal blood tests or flexible sigmoidoscopy reduce CRC deaths and the risk of cancer diagnosis. Screening rates in New Mexico are low; only about 50% of adults age 50 and older are currently screened. Consequently, the majority of cancers are being diagnosed at an advanced stage, when treatment is more expensive and less effective.

Cancer control programs must ensure the full spectrum of services and anticipate the full costs of diagnosing and treating CRC. An optimal cancer control program requires sufficient resources for screening, diagnosis, treatment, and disease surveillance, as well as for survivor support.

Colorectal cancer control programs must make efficient and appropriate use of limited resources. Appropriate screening or surveillance tests should be performed at recommended intervals based on evidence-based guidelines, patients with abnormal tests should receive appropriate and timely diagnostic follow-up, and testing should not be offered to patients who are too sick or elderly to benefit. Implementing strategies to readily identify patients who are due for screening, track abnormal results, and ensure appropriate follow-up might improve the effectiveness of screening. Screening rates might be increased by educating providers about screening and surveillance guidelines, supporting performance measures for screening and surveillance, educating the public about the rationale for CRC screening, and establishing policies requiring health plans to provide broad coverage for CRC screening. New Mexico could also consider strategies such as training non-specialists to perform screening endoscopy and using teleradiology to support radiographic imaging to increase screening, particularly among rural populations. CRC control programs will face challenging decisions for allocating scarce resources, including prioritizing screening high-risk patients with colonoscopy versus screening everyone over age 50 with fecal blood tests; prioritizing screening versus surveillance testing; and treating advanced-stage cancers. Health care reform, by increasing access to care, emphasizing prevention, reducing patient costs for screening tests, and providing resources for health information systems, could facilitate CRC control in New Mexico.

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A White Paper

Submitted by the Colorectal Cancer Workgroup of the
New Mexico Cancer Council and the New Mexico Clinical Prevention Initiative

Introduction

This report was commissioned by the New Mexico Cancer Council, which first targeted colorectal cancer as a priority area in 2009. The report is intended to serve as a comprehensive overview of relevant colorectal cancer issues for New Mexico, including a description of colorectal cancer epidemiology, risk factors, screening tests, treatments, costs, survivorship, programs, and policy recommendations culled from reviewing the medical literature, state tumor registry and screening data, key informant interviews, and stakeholder meetings. This information can inform policy decisions by the Legislature, healthcare systems, and stakeholder advocacy groups for allocating resources to colorectal cancer screening, surveillance, and treatment programs in the state.

Colorectal cancer (CRC) is an important public health concern in New Mexico. The American Cancer Society estimates that (1):

- ➢ 1 out of every 19 New Mexicans will be diagnosed with CRC in their lifetime

- ➢ Approximately 35% of New Mexicans with CRC will die within 5 years of diagnosis

- ➢ In 2010, there will be 790 new cases of CRC in New Mexico and 340 CRC deaths

Screening is the process of performing tests to look for early-stage colorectal cancer and pre-cancerous lesions (adenomatous polyps) in people who do not have any signs or symptoms of the disease. Precancerous lesions can be removed by colonoscopy or surgery while early-stage cancers may be cured with treatment. Early detection and treatment interventions may help reduce the public health burden of colorectal cancer.

- ➢ High-quality research studies have shown that screening with stool blood tests reduces both colorectal cancer deaths and the risk of colorectal cancer diagnosis. (2)

- ➢ A high-quality research study showed that screening with flexible sigmoidoscopy reduces both colorectal cancer deaths and the risk of colorectal cancer diagnosis (3). Even though colonoscopy is both a diagnostic and therapeutic test, no high-quality studies demonstrate its efficacy.

Treatment is more effective when offered to patients whose colorectal cancer is diagnosed at an early stage. Treatments for advanced-stage cancers are generally palliative and substantially more expensive than treatments for early-stage cancers.

Cancer Control Goals

The US Centers for Disease Control and Prevention and the National Institutes of Health have targeted colorectal cancer by establishing the following colorectal cancer-specific goals in the Healthy People 2010 guidelines program (4):

- ➢ Decrease age-adjusted colorectal cancer death rates in the US from 21.1 deaths per 100,000 people to 13.3

- ➢ Increase the percentage of adults over age 50 who have been screened for colorectal cancer from 35% to 50%

Using these guidelines, the New Mexico Cancer Council defined the following colorectal cancer-specific goals in the *New Mexico Cancer Plan 2007-2011* (5)*:*

- ➢ Increase by 7 percentage points, from 51% to 58%, the proportion of New Mexican men and women ages 50 years and older who have been screened following current guidelines for colorectal cancer using colonoscopy, sigmoidoscopy, fecal occult blood test (FOBT) using a take-home kit, or double-contrast barium enema, by 2011.

- ➢ Increase physician performance of complete diagnostic evaluation for individuals with an abnormal colorectal cancer screening result (other than colonoscopy), by 2011.

- ➢ Increase by 4 percentage points, from 41% to 45%, the proportion of colorectal cancer cases diagnosed at an early stage (in situ or local), by 2011.

While these federal and state goals for reducing the burden of colorectal cancer are clear, the issues surrounding how to realize and evaluate them are not. We compiled the information in this paper with the intent of clarifying the actions needed to address these goals.

Description of Colorectal Cancer

Colorectal cancer, which can occur in either the large bowel (colon) or rectum, arises following a series of genetic alterations influenced by environmental, behavioral, and hereditary factors that gradually transform normal tissue to precancerous polyps and eventually to cancers (6). The risk for polyps becoming malignant is higher if the polyps are large and/or numerous or have abnormal microscopic features. Generally, colorectal cancer is slow-growing and generally takes at least 10 years to transform normal tissue to cancer. Screening tests, such as fecal blood tests, sigmoidoscopy, colonoscopy, and radiographic studies (CT colonography, barium enema) are used to detect precancerous polyps and colorectal cancers.

Risk Factors for Colorectal Cancer

Factors that increase the risk for colorectal cancer include age greater than 50 years, male sex, a family history of colorectal cancer or adenomatous polyps, or a personal history of colorectal cancer, adenomatous polyps or inflammatory bowel disease (6). About 30% of cancers arise among people with a family history of colorectal cancer or polyps. Several rare syndromes that increase the chances of early onset disease include familial adenomatous polyposis (FAP) and

hereditary non-polyposis colorectal cancer (HNPCC). These syndromes account for less than 5% of cancer diagnoses. About two-thirds of colorectal cancers arise in people of average risk, usually after age 50. Observational and case-control studies, which are susceptible to numerous biases, suggest that physical inactivity, alcohol, and diets high in fat and red meat might increase the risk for colorectal cancer.

Protective Factors for Colorectal Cancer

Physical activity and diets high in fiber, fruits, and vegetables have been suggested to decrease the risk of colorectal cancer, though their protective effect has not been demonstrated in any experimental studies (7). Hormone replacement therapy reduces colorectal cancer risk in women but is not recommended due to side effects (8). Experimental studies have shown that anti-inflammatory medications, including aspirin, and calcium supplements may reduce the risk for developing colorectal cancer, especially in people with polyps. However, aspirin is not recommended for routine use by average-risk patients (9). Screening programs using either fecal blood tests (2) or flexible sigmoidoscopy (3) reduce the risk for developing colorectal cancer.

Epidemiology of Colorectal Cancer in New Mexico

A detailed description of colorectal cancer epidemiology in New Mexico is provided in Appendix A. Overall, colorectal cancer is the fourth most frequently diagnosed cancer in New Mexico after cancers of the prostate, breast, and lung, and colorectal cancer is the third leading cause of cancer death for both sexes. Over 800 cases of colorectal cancers are diagnosed in New Mexico each year. In New Mexico, Hispanic and non-Hispanic white men have the highest risks of developing the disease. American Indians in New Mexico have relatively low rates of colorectal cancer. Cancer incidence and mortality rates appear to vary by geographic area of the state. According to the most recent estimates by the American Cancer Society (for the period 2001-2005), overall age-adjusted colorectal cancer incidence for the United States was 61.2 cases per 100,000 men, and 44.8 per 100,000 women, while in New Mexico, the overall risk for colorectal cancer was lower for both sexes (50.8 per 100,000 men, 35.4 per 100,000 women) (1).

Colorectal Cancer Screening Overview

We define cancer screening as performing tests on subjects who have no signs or symptoms of cancer to potentially identify early-stage cancer or pre-cancerous polyps. Colorectal cancer screening tests include those that detect traces of blood in the stool, directly visualize all or part of the colon with fiberoptic scopes, or radiographically image the entire colon. An abnormal stool test or radiographic imaging study should be followed up by colonoscopy to make a definitive diagnosis of a cancer or precancerous polyp.

Colorectal cancer screening can reduce the burden of disease by leading to the detection of early-stage cancers that have not spread beyond the wall of the colon, which are potentially curable with surgery. This can reduce the chance of dying from colorectal cancer, prevent suffering

from advanced cancers, and reduce treatment costs. Screening can also lead to detecting pre-cancerous polyps, which can be removed by colonoscopy or surgery, thus preventing the development of cancer.

The natural history of colorectal cancer makes it an ideal target for screening because there is a large window of opportunity for detecting polyps and early cancers. The period of transition from normal tissue to adenomatous polyp to early-stage cancer, which is a result of a series of genetic alterations, can take up to 10 years; the transition from an early-stage (curable) cancer to more advanced stage can take an additional several years (6).

Colorectal cancer screening is also cost effective, particularly because the medications for treating advanced-stage cancer are substantially more expensive than the costs of treating early-stage disease. A common measure for cost effectiveness is the cost per quality-adjusted life year (QALY) saved—a metric that recognizes that quality of life should be considered in evaluating efforts to prolong life. By convention, interventions with costs less than $50,000/QALY, the cost-effectiveness achieved by screening mammography, are generally considered appropriate from a public health perspective. Estimates for the cost-effectiveness ratios of the colorectal cancer screening tests listed in the next section are all below this benchmark (10, 11).

Screening Tests

Tests to detect blood in the stool

Tests that detect the presence of blood in the stool can indicate a colorectal cancer or a pre-cancerous polyp (12). The guaiac-based fecal occult blood test detects the presence of bleeding in the gastrointestinal tract but can have false positive tests for colorectal disease from medications causing gastric irritation or certain foods. Patients need to follow dietary and medication restrictions while completing the tests. Newer fecal immunochemical tests do not detect bleeding from the stomach and detect only human blood, so medication and dietary restrictions are unnecessary. Patients perform fecal blood tests at home, using kits to collect stool specimens from several bowel movements, and send the specimens to a laboratory or back to the doctor's office for testing. Studies have shown that regular screening with stool tests compared to no screening reduces the chance of being diagnosed with colorectal cancer by 20% (13) and reduces the chance of dying from colorectal cancer by 15% to 33% (2). Stool tests are the least expensive form of screening, costing between $9 and $25 per kit. Disadvantages include limited accuracy—about one in three patients with colorectal cancer will test negative even with newer tests, including the immunochemical test and high sensitivity guaiac-based tests; the requirement for annual testing; and the need to perform a colonoscopy to evaluate an abnormal test.

Endoscopic tests (colonoscopy, flexible sigmoidoscopy)

Colonoscopy

A colonoscope is a flexible fiberoptic scope that can visualize the entire colon (12). The advantages of colonoscopy are that it is both diagnostic and therapeutic—endoscopists can biopsy cancers and remove pre-cancerous polyps. The test is highly accurate, and guidelines recommend that screening colonoscopy (assuming a normal result) need to be performed only once every 10 years. There are no data from controlled trials (the highest level of evidence) on the efficacy of colonoscopy for reducing the chance of dying from colorectal cancer; however, case-control studies estimate that colonoscopy reduces the risk by 30% to 60% (14).

The disadvantages of screening with colonoscopy include the requirement for an extensive bowel preparation and sedation during the procedure, which requires that the patient be driven home. About 1 in 200 procedures can result in a complication, which can include bleeding, perforation, and, rarely, death (12).

Colonoscopy requires trained and experienced providers to competently perform the test. Colonoscopy is an expensive test, with charges that can exceed $1,500, especially with biopsy. Medicare and some health plans cover screening (and diagnostic) colonoscopy, though out-of-pocket co-payment costs are variable. The capacity to perform colonoscopy in New Mexico is relatively limited, particularly in rural areas (15).

Flexible sigmoidoscopy

A sigmoidoscope is a flexible fiber optic scope that can visualize the left side of the colon (12). Sigmoidoscopy requires a less extensive cathartic bowel preparation than colonoscopy and no sedation during the procedure. Sigmoidoscopy can be performed by non-gastroenterologists and is reasonably accurate. A recent study from the United Kingdom found that a one-time flexible sigmoidoscopy reduced the risk of developing colorectal cancer by 23% and reduced the risk of dying from colorectal cancer by 31% (3). Sigmoidoscopy is a relatively inexpensive test, with charges usually less than $200. Medicare covers screening sigmoidoscopy. The disadvantages of sigmoidoscopy include the requirement for a cathartic bowel preparation, a small risk for perforation and bleeding, that a positive test must be further evaluated with colonoscopy, and poorer diagnostic accuracy in women. Few providers in New Mexico perform screening sigmoidoscopy.

Radiographic studies

CT colonography (CTC)

This radiographic test provides two- and three-dimensional reconstructions of the entire colon and rectum that can identify colorectal cancers and polyps (12). Sedation is not required and testing can be completed within a few minutes. The test is quite accurate, comparable to colonoscopy. The effectiveness of CTC for reducing the risks of being diagnosed with or dying

from colorectal cancer has not been evaluated in any clinical trials. Disadvantages include the need for a cathartic bowel preparation, having to refer patients with abnormal findings for colonoscopy, radiation exposure, and the costs and risks associated with finding extra-colonic abnormalities. Optimal testing requires advanced CT scanners and sophisticated software, and well-trained and experienced radiologists to interpret the examinations. CTC is also expensive, costing up to $900, and Medicare recently decided against reimbursing the procedure. In New Mexico, availability of CTC is relatively limited, particularly in rural areas.

Barium enema

This radiographic test provides images of the entire colon and rectum and can identify colorectal cancers and polyps (12). A cathartic bowel preparation is required; the highest-quality studies (double-contrast) are obtained by insufflating contrast and air into the rectum, though no sedation is required. No studies have determined whether screening with barium enema reduces the chance of being diagnosed with or dying from colorectal cancer. Disadvantages include a prolonged procedure time and discomfort. The test is not very accurate, and an abnormal study would require further evaluation with colonoscopy. Fewer of these studies are being performed by radiologists, and it is becoming less of a viable option for colorectal cancer screening, especially in rural areas.

Guideline recommendations for screening by risk groups

Average risk

Colorectal cancer screening guidelines for asymptomatic average-risk adults (no family or personal history of colorectal neoplasia, no inflammatory bowel disease) age 50 years and older were issued by both the United States Preventive Services Task Force (USPSTF) (16) and the American Cancer Society-Multi-Society Task Force (ACS-MSTF) (12) in 2008 (Table 1).

The evidence-based USPSTF gave an overall "A" rating to CRC screening—indicating strong evidence for efficacy and a recommendation for routine screening. The optimal strategies included colonoscopy every 10 years, annual screening with a sensitive fecal blood test, or flexible sigmoidoscopy every 5 years with a mid-interval sensitive fecal blood test. The Task Force no longer recommended barium enema and felt that there was insufficient evidence to determine whether the benefits of CT colonography outweighed the harms. The USPSTF recommended against routine screening in adults over age 75. Screening recommendations in adults ages 76 to 85 should be individualized and no screening should be offered to those older than age 85 because harms outweigh any potential benefits.

The ACS-MSTF strongly recommended colorectal cancer screening and endorsed all screening modalities, including CT colonography and double-contrast barium enema.

Table 1. Colorectal Cancer Screening Recommendations for Average-Risk Adults

	USPSTF (2008)	ACS-MSTF (2008)
Test	Frequency	Frequency
Fecal occult blood testing	Annual (high sensitivity)	Annual
Fecal immunochemical testing	Annual	Annual
Flexible sigmoidoscopy	Every 5 years with high-sensitivity fecal blood test every 3 years	Every 5 years
Colonoscopy	Every 10 years	Every 10 years
CT Colonography	Not recommended	Every 5 years
Double-contrast barium enema	Not recommended	Every 5 years

Increased risk

Patients with a significant family history of colorectal cancer or advanced pre-cancerous polyps are considered at increased risk for colorectal cancer. About one-third of cancers arise in this risk group. Screening colonoscopy is recommended, and the age to begin testing depends upon the age that relatives were diagnosed with cancer or polyps (12).

High risk

Patients in this group include those with hereditary conditions such as HNPCC, FAP, and also long-standing inflammatory bowel disease. Less than 10% of all colorectal cancers arise from this risk group. Screening colonoscopy is recommended for these patients, and often begins in the second or third decade of life for those affected by hereditary conditions (12). Genetic counseling and testing may also be appropriate for family members of patients with hereditary conditions.

Polyp Surveillance

Patients who have had pre-cancerous colorectal polyps removed are still at increased risk for cancer. Periodic surveillance testing—looking for recurrent polyps or cancer—with colonoscopy is recommended for these patients (12). The frequency of testing depends upon the size, number, and microscopic appearance of the polyps. The costs of surveillance need to be considered in allocating resources for colorectal cancer screening.

Screening Rates in New Mexico

The New Mexico Department of Health conducts the Behavioral Risk Factor Surveillance System, a telephone survey developed by the Centers for Disease Control and Prevention. The most recent New Mexico data, from 2008, indicate that only about half of New Mexicans are considered current with colorectal cancer screening, either with a fecal blood test or lower endoscopy (Table 2 presents combined data from 2006 and 2008). Minorities, those with low education and income, and those without health insurance are least likely to be currently screened.

Table 2. Colorectal cancer screening (%) in New Mexico adults ages 50 and older (2006, 2008 Behavioral Risk Factor Surveillance System)

Group	Never screened	Current with FOBT	Current with lower endoscopy	Current with screening
Total	34.5	12.5	50.8	55.4
Sex				
Males	34.2	13.4	51.4	56.8
Females	34.8	11.8	50.2	54.3
Age				
50-64	40.9	10.5	44.3	49.0
65-74	24.3	15.1	63.0	67.3
75+	25.0	16.2	58.6	63.4
Race/ethnicity				
White	28.1	13.4	56.5	61.2
Hispanic	45.9	11.1	42.0	46.5
American Indian	52.8	8.0	28.7	33.5
Black	31.0	13.8	43.3	47.0
Health insurance				
Yes	30.7	13.3	54.4	59.1
No	68.1	6.5	18.9	23.4

Notes: FOBT refers to fecal occult blood test (home blood stool test). Lower endoscopy refers to sigmoidoscopy or colonoscopy. BRFSS refers to Behavioral Risk Factor Surveillance System. "Current with FOBT" defined as FOBT in the past year; "current with lower endoscopy" defined as lower endoscopy in the past 10 years; "current with screening" defined as FOBT in the past year and/or lower endoscopy in the past 10 years. Data provided by Elizabeth Bruggeman, PhD, New Mexico Department of Health.

Barriers and Facilitators to Colorectal Cancer Screening

The relatively low proportions of adults who report being current with recommended screening tests highlight the challenges of achieving screening. The medical literature has identified numerous patient, provider, healthcare system/practice, and policy factors that are associated with screening uptake.

Patient factors

Sociodemographic and health behavior variables associated with increased screening adherence include older age, female sex, non-Hispanic white race/ethnicity, higher education, higher income, having health insurance, having a usual source of care, and engaging in other health prevention behaviors (17-20). One of the most important factors for screening adherence is a physician recommendation to be tested. Cognitive and psychosocial factors also are correlated with screening adherence. Achieving screening is less likely when patients are unaware of disease severity and risk and prevention strategies. Colorectal disease and testing often engenders negative attitudes that present barriers to screening, including fear of finding cancer, fatalism, and an aversion to dealing with gastrointestinal functions. Limited health literacy and not speaking English as a primary language are also barriers, while knowing someone with colorectal cancer, especially a family member, is associated with higher adherence. Additionally, the requirements for performing tests, particularly a total colon exam with colonoscopy, CT colonography, or double-contrast barium enema, can be onerous, including the need to perform a cathartic bowel preparation, the time required to perform the test, and the need to have a driver if a patient is sedated during the procedure.

The New Mexican population is particularly susceptible to experiencing barriers to screening. Almost half of the population (44.4%) reports being of Hispanic origin, and over one-third report speaking a language other than English in the home (21). While 78% are high school graduates, only 23.5% report having earned a bachelor's degree or better. Nearly one in five people live below the federal poverty line and the median household income is approximately $10,000 less than that of the US as a whole. An estimated 22.7% of residents did not have health insurance in 2006-2007 (41).

Effective strategies for increasing screening uptake that target patients include interventions that tailor messages to a person's specific needs, concerns, emotions, and values; mailed or telephone reminders; interventions to reduce structural barriers to screening by mailing stool test kits directly to patients or inviting them to attend a clinic where they receive test kits; educational and motivational interventions including decision aids; and programs that help patients successfully navigate the healthcare system in order to schedule and complete tests. Studies have suggested that screening interventions targeting Hispanics need to address acculturation and language preference (22, 23). The new fecal immunochemical tests have been associated with significantly higher testing adherence because there is no need for dietary or medication restrictions (42-44).

Provider factors

Potential barriers for providers in delivering colorectal cancer screening can include being unaware of or unconvinced by the evidence for screening or being confused by the complex and often conflicting guidelines for offering screening (24-28). Physicians also often fail to recommend screening during office visits, either due to competing medical issues that take substantial time to address or not being prompted to offer screening. Few primary care providers still perform flexible sigmoidoscopy, which limits screening options. There are also barriers to effective screening—behaviors that undermine the potential benefits of screening—including not automatically referring patients with abnormal stool tests for diagnostic colonoscopy and performing fecal blood tests with digital rectal examinations during an office visit (which is not considered appropriate screening).

Effective screening interventions that target providers include utilizing clinical reminders; educating providers about cancer screening options and guidelines; training providers to better communicate with low literacy patients; teaching motivational interviewing; and implementing assessment and feedback interventions that evaluate the provider's performance in delivering or offering screening services and compare it against a goal or standard (24-28).

Healthcare system/practice factors

Numerous practice-level factors have been shown to positively influence colorectal cancer screening uptake by targeting either patients or providers (26, 29,30). One key message is that effective screening requires a commitment by the healthcare system to align office policies, reminder systems, and communication strategies towards supporting screening efforts. These can include defining an overall commitment to increasing access to screening, identifying high risk patients, implementing systematic strategies for identifying patients due for testing and tracking test results, and ensuring that patients with abnormal colorectal screening tests undergo a colonoscopy. Utilizing a routine prevention visit or prevention clinic has been associated with increasing cancer screening. Some healthcare systems have also expanded the number of endoscopists available for performing screening and surveillance tests, while others have trained non-physicians to perform screening endoscopy (31).

Public policy

Public policy strategies also can promote cancer screening. Public policy strategies that aim to promote increased screening typically fall into several categories, including health insurance regulation (whether that insurance is public or privately funded); appropriations to increase service provision, outreach, and general awareness for uninsured persons; and employer-based programs that offer incentives for participation in high-quality preventive services and health management programs. Specific examples of federal and state level policy developments include Medicare's decision to begin covering screening colonoscopy in 2001, federal and state program initiatives such as the National Breast and Cervical Cancer Control Program (which has informed the creation of the Colorectal Cancer Control Program), and the incorporation of colorectal cancer screening as a Healthcare Effectiveness Data and Information Set (HEDIS) measure. HEDIS is a quality performance measurement tool used by more than 90% of

American healthcare plans. The national healthcare reform bill, which will increase access to healthcare, intends to provide for expanded and sustained national investments in prevention and public health programs.

Costs of Colorectal Cancer Screening

Estimating the cost of screening in New Mexico is difficult. Screening and diagnostic tests vary greatly in price due to negotiated contracts for service between clinicians, labs and insurance companies. Insurance coverage for colorectal cancer screening is often unclear, and co-pays vary according to plan and employer. Other issues in estimating the cost of screening include the indirect costs such as travel, childcare, and time away from work, which are difficult to quantify and vary by circumstance. Based on reviewing the medical literature (32) and contacting gastroenterology and surgical groups in New Mexico, we estimated that screening costs for stool blood tests range from $9 to $25, sigmoidoscopy from $125 to $550, and colonoscopy $350 to $1600, CT colonography $500 to $900, and double-contrast barium enema $250 to $450. Appendix B shows an example of the variation in charges quoted by different practices for colorectal cancer screening for an average-risk, 50-year-old man obtained from an informal telephone survey conducted by UNM in fall 2009.

New Mexico's Capacity for Colorectal Cancer Screening

Endoscopic capacity

New Mexico has limited capacity for screening with colonoscopy, particularly in rural areas. A 2001 statewide study supported by the New Mexico Department of Health and the Clinical Prevention Initiative surveyed gastroenterologists and colorectal surgeons to evaluate New Mexico's capacity to provide screening and surveillance colonoscopy (15). The study identified New Mexican gastroenterologists from state licensing data and from endoscopic manufacturers and surveyed gastroenterologists on their weekly number of colonoscopies, capacity for additional screening colonoscopies, and barriers to increasing capacity. The group used census data, published data on the yield of screening colonoscopy, and professional society guidelines for cancer/polyp surveillance to estimate the additional number of colonoscopies required to increase the state's prevalence of endoscopic screening. In the end, 40 gastroenterologists, representing all 11 group practices in the state, and 9 of 12 solo practitioners responded. They estimated that their weekly procedure capacity could be increased by 41%, from 832 to 1174 colonoscopies. We estimated an annual capacity increase of 14,880 procedures, which could increase the prevalence of endoscopic colorectal cancer screening from the current 35% to about 50% over five years. Lack of support staff, space, and physicians were barriers to increasing screening. The study concluded that implementing a screening colonoscopy strategy could achieve the goal of a higher level of colorectal screening. Achieving more universal screening, however, would require additional testing modalities.

The Centers for Disease Control and Prevention also modeled screening capacity in New Mexico in 2004 (New Mexico Survey of Endoscopic Capacity (33)) and found that the most efficient and feasible use of colonoscopy would be to follow up abnormal fecal blood tests. Attempting to perform colonoscopy on all unscreened adults would lead to a shortfall of 206,000 colonoscopies.

The Colorectal Cancer Workgroup telephoned gastroenterologists and general surgeons practicing in New Mexico in the fall of 2009 to determine whether they provided screening and diagnostic colonoscopies. Of the 68 gastroenterologists on our list of verified addresses, 45 (65%) were located in Albuquerque and 10 (15%) were in rural areas. Overall, 29 (43%) of the gastroenterologists responded to our telephone survey, and 22 (76%) reported doing both screening and diagnostic colonoscopies. Of the 164 general surgeons, 91 (55%) had offices in Albuquerque and 56 (34%) were located in rural areas. Overall, 37 (23%) responded to the survey and 6 (31%) reported doing both screening and diagnostic colonoscopies. We mapped these offices using GIS techniques in order to see the geographic areas served by these practices (Appendix F). This map shows that the majority of these specialists are in the Albuquerque, Santa Fe and Las Cruces areas, although some operate in more remote parts of the state.

In New Mexico, gastroenterologists and general surgeons usually perform colonoscopy; however, in other states, primary care providers–physician and non-physician–have been trained to provide screening colonoscopy safely and effectively

New Mexico Department of Health Colorectal Cancer Program

The mission of the New Mexico Department of Health Colorectal Cancer Program (CRCP), recently funded by the CDC, is to help reduce the burden of colorectal cancer throughout the state. The CRCP received about $900,000 to pursue the following objectives: increasing evidence-based, age-appropriate colorectal cancer screening among all adults; providing colorectal cancer screening services at no cost to CRCP-eligible adults in partnership with healthcare providers throughout the state; and supporting the development of policies conducive to removing barriers to colorectal cancer control. CRCP screening modalities will include high-sensitivity guaiac-based fecal occult blood tests (FOBT) and fecal immunochemical tests (FIT), flexible sigmoidoscopy, colonoscopy, and barium enema, although the decision as to which of these screening tests to use will be left to the primary care provider and the patient. Eligibility for the CRCP is defined as asymptomatic men and women ages 50 and older who live at or below 200% of the federal poverty level guidelines and are uninsured or underinsured. Persons at high risk for CRC due to inflammatory bowel disease or genetic syndromes are not eligible to participate in the CRCP per federal restrictions.

Initially, the CRCP will start working with a federally qualified healthcare system in the greater Albuquerque area to initiate a screening program for their eligible patients. The CRCP also plans to work with clinics and healthcare providers in both the Navajo Area Indian Health Service and the Albuquerque Area Indian Health Service to reach CRC Program-eligible

American Indians. The Center for Native American Health at the University of New Mexico also will serve as a partner to tailor successful outreach efforts for this population.

The New Mexico CRCP also will include initiatives to: mobilize communities to increase awareness of the importance of screening for colorectal cancer; provide education and awareness opportunities for healthcare providers and the general public; conduct strategic planning and ongoing evaluation of all initiatives and surveillance; and assist in the development of policies supporting programmatic goals. The New Mexico CRCP will be incorporated into the Department of Health's Cancer Prevention and Control Section and integrated with the Breast and Cervical Cancer Early Detection Program, utilizing many of the same screening and diagnostic service providers. Programmatic goals will be in alignment with the New Mexico Cancer Plan's goals and objectives.

Insurance Coverage for Colorectal Cancer Screening

Insurance coverage of colorectal screening modalities influences patients' use of the services. To find out what current insurance coverage may be available to New Mexicans, we conducted a convenience sample of healthcare plans covering State employees. We found that although most of the plans covered colorectal cancer screening, the policies were often difficult to interpret for patients, clinicians, and the insurance customer service representatives as well. Appendix C has examples of the vocabulary and phrasing used in several large-sized plans to describe colorectal cancer screening coverage in the consumer handbook. Additionally, the need for and amount of co-pays is often unclear, and policies often did not explicitly address which screening modalities (FOBT, endoscopy, radiographic imaging) were covered, instead using phrases such as "periodic colon examination" or "preventive services". Determining the costs of a covered service was also challenging. These factors create barriers for accomplishing colorectal cancer screening, particularly given the need to get pre-approval for many procedures.

House Bill (HB) 510 (passed during the 2007 New Mexico State Legislative Session) required insurers to cover periodic colorectal cancer (CRC) screening tests by adding new sections to Chapter 59a, Articles 22 and 23, NMSA 1978 and new sections to the Health Maintenance Organization Law and to the Nonprofit Health Care Law. Each section of law amended pursuant to HB 510 guarantees coverage "as determined by the healthcare provider, in accordance with the evidence-based recommendations established by the United States Preventive Services Task Force." The insurance plans directly affected by HB 510 are only those plans subject to state regulation. Some insurers voluntarily choose to align their other health insurance benefits with state standards, even for those plans that fall under federal, but not state, regulation. Similarly, some self-insured businesses and large employers subject only to federal regulation occasionally choose to purchase coverage for their employees to allow access to a wider suite of preventive services.

The Patient Protection and Affordable Care Act (HR 3590) recently passed by Congress and signed into law by the president, stipulates that a group health plan and a health insurance issuer offering group or individual health insurance coverage shall provide coverage for and shall not impose any cost sharing requirements for evidence-based items or services that have in effect a rating of 'A' or 'B' in the current recommendations of the US Preventive Services Task Force.

Treating Colorectal Cancer

Three types of treatment are standard for colorectal cancer: surgery, chemotherapy and radiation therapy (34, 35). The extent and types of these treatments offered depend on where the cancer is located (colon versus rectum), if the cancer has spread (the stage of disease), if pain reduction due to extensive disease is needed, and if the treatment facility has the means to administer the treatment (Table 3). Cancer stage is based on the size of the tumor, whether the cancer is invasive or non-invasive, whether lymph nodes are involved, and whether the cancer has spread beyond the colon or rectum. Appendix D shows a diagram of colorectal cancer stages.

Early-stage cancers are more successfully treated than advanced-stage cancers. If the cancer has not spread through the wall of the colon, the five-year survival percent is about 90%. The survival percent drops to about 70% if the cancer has spread to lymph nodes or nearby organs, and is only about 12% for cancers that have spread throughout the body (metastasized).

Table 3. Treatment types by stage at diagnosis

Stage 0	Polypectomy or colon resection
Stage I	Wide surgical resection
Stage II	Wide surgical resection of the tumor *Possible adjuvant chemotherapy in clinical trial**
Stage III	Wide surgical resection of the tumor *Possible adjuvant chemotherapy*
Stage IV	Surgical resection of locally recurrent cancers Surgical resection of obstructing masses Surgical resection of isolated metastases Palliative chemotherapy Palliative radiotherapy Clinical trials

* A clinical trial is a research study to evaluate new treatments.

Cancer Surveillance

Patients who have been diagnosed and treated for colorectal cancer are at increased risk for recurrent cancers or cancer progression. Periodic surveillance testing—looking for evidence of

this recurrence with colonoscopy, blood tests, physical examinations, or imaging studies—is recommended for these patients. Published guidelines provide specific surveillance recommendations according to the initial stage and treatment (36). Comprehensive colorectal cancer screening and treatment programs need to consider these additional costs.

Costs of Treating Colorectal Cancer

We were unable to determine actual cost data for treating colorectal cancer in New Mexico, despite querying insurance companies, health plans, and oncology practices. These data are often subject to proprietary or contractual restrictions that prevent their release. Additionally, cancer treatment plans are individually tailored to the particular cancer site and extent of disease, and to the patient's other health conditions, age, survival time and ability to pay—making it very difficult to estimate the average total costs of colorectal cancer treatment. However, colorectal cancer treatment costs are substantial, particularly for advanced-stage disease where patients receive chemotherapy that can cost well over $100,000 (37). Medicare data (Appendix E) estimate a $24,200 treatment cost for the first year after diagnosis of colorectal cancer (38). Applying this figure to New Mexico implies approximately $20 million for treating all newly diagnosed colorectal cancer cases. These estimates do not include the costs of surveillance visits and procedures, nor do they include treatment for side effects or any other indirect costs such as loss of income or travel time.

There are several reasons to expect cancer treatment costs to increase in the coming years. First, the US population is aging, and as the population ages the total number of cancer cases will likely increase, even if incidence rates (risk of disease) stay the same. That means more cases to treat and a corresponding increase in costs. However, some of the treatment costs could be mitigated if cancer screening shifted diagnoses more towards early-stage disease. On the other hand, costs will also likely increase as novel and effective treatments for advanced stage-cancers continue to be adopted as standards of care.

New Mexico's Capacity for Colorectal Cancer Treatment

We collected data on the treatment facilities available throughout the state and mapped them using GIS (Appendix F). There are 26 cancer treatment facilities in the state: 8 in the Albuquerque area, 6 in Las Cruces, 2 in Santa Fe, 2 in Farmington, and 8 in rural areas. Sixteen centers offer surgery, 21 centers offer chemotherapy, and 20 centers offer radiation therapy. More than half of the centers offer clinical trials and three-quarters offer hematology/oncology services on site. Most have patient education resources, although only half offer assistance with financial issues and insurance paperwork.

Colorectal Cancer Survivorship Issues

Colorectal cancer mortality rates have declined over the past two decades. However, this has created a new issue—how to support the increasing numbers of people completing treatment and potentially becoming long-term survivors.

When patients are undergoing cancer treatment, they often face emotional challenges. Psychosocial support interventions, such as group support, education, better nutrition, stress management, and counseling may help promote psychological well-being (39). Even after successful treatment, cancer recurrence is possible, particularly within the first five years after treatment. These cancer survivors face the rigors of intensive surveillance testing and the emotional challenges of uncertainty and vulnerability; cancer survivors may benefit from psychosocial support during and after treatment. Specific resources might include exercise and nutritional education courses, support groups specific to colorectal cancer, stress management training, individual and family counseling/consultation, and workshops on medical advances in the treatment of primary and recurrent colorectal cancer. However, such support resources may be difficult to find in New Mexico. For example, the Colon Cancer Alliance, a national organization dedicated to providing support and education to colorectal cancer survivors, does not have a link to New Mexico on its national website (www.ccalliance.org).

Although there is no centralized network of survivorship resources in New Mexico, many support organizations are active in the New Mexico Cancer Council. The resources available in New Mexico, such as the Survivorship and Colorectal Cancer Workgroups of the New Mexico Cancer Council, need better networking and sufficient funding to support cancer survivors. Appropriate entities that might provide these resources include both state and national organizations.

Future Directions/Policy Issues

Colorectal cancer is an important public health problem in New Mexico that is now increasingly affecting minority populations. Although colorectal cancer screening can reduce cancer incidence and mortality, efforts to reduce the burden of colorectal cancer suffering in New Mexico face daunting challenges including lack of access to healthcare. The availability of colonoscopy is limited in rural areas. Treatment costs, especially for advanced-stage cancer, can be substantial, though successful screening efforts could reduce the risk of being diagnosed at an advanced stage.

The Ideal

Resources allocated for colorectal cancer screening should be sufficient to provide coverage for the entire process of screening, treatment, and surveillance. This would mean offering screening tests to all eligible patients, providing diagnostic colonoscopy for all patients with abnormal screening tests, providing appropriate treatment for patients diagnosed with colorectal cancer,

and providing timely and appropriate surveillance testing for patients following treatment for colorectal cancer or removal of pre-cancerous polyps.

Healthcare providers would be able to systematically identify high-risk patients and provide appropriate screening and surveillance testing (usually colonoscopy) and, if indicated, genetic counseling. The population of eligible average-risk patients would be able to make informed decisions regarding colorectal cancer screening tests, including fecal blood tests, colonoscopy, flexible sigmoidoscopy, and possibly radiographic imaging techniques.

Screening and surveillance programs also would identify patients who are unlikely to benefit from colorectal cancer testing due to limited life expectancy and avoid unnecessary procedures and their associated harms and costs. Screening programs would be efficient and high quality, implying that appropriate testing would be performed at the highest level of proficiency in the appropriate patients at the appropriate intervals. Quality measures would also ensure that patients were receiving appropriate and timely cancer treatment and subsequent surveillance testing.

Opportunities

Perhaps the biggest opportunity for New Mexico to reduce the burden of suffering from colorectal cancer is passage of the healthcare reform legislation, the Patient Protection and Affordable Care Act, which will increase access to healthcare for 32 million additional Americans. The legislation establishes a Prevention and Public Health Fund to provide for expanded and sustained national investments in prevention and public health programs. States will be encouraged to provide services deemed appropriate by the US Preventive Services Task Force, which has given an "A" recommendation to colorectal cancer screening. This should substantially increase the proportion of the 50- to 64-year-old population with access to colorectal cancer screening. Additionally, Medicare must cover screening without cost-share, which benefits the older population. Funding will be available for demonstration projects that aim to improve health outcomes, payment, and delivery.

The NM Department of Health has already received funding from the Centers for Disease Control and Prevention to support colorectal cancer screening and surveillance among low-income adults. A substantial proportion of this funding will go to support infrastructure, including systems to identify subjects due for screening or surveillance and to track testing results. This will provide an important opportunity to develop strategies for delivering care to underserved populations within New Mexico.

Healthcare systems will need to address issues related to resource allocation for cancer screening relatively quickly due to the expected influx of patients who will be given access to care through healthcare reform and as a result of the aging of the population. This could provide an important opportunity for the various healthcare systems to collaborate in developing efficient and

effective strategies for implementing population-based colorectal cancer screening in New Mexico. The New Mexico Cancer Council and Department of Health can have instrumental roles in supporting such processes.

Another important opportunity for New Mexico is the Health Information Technology for Economic and Clinical Health (HITECH) Act, part of the 2009 stimulus law. Physicians who treat Medicare patients can receive up to $44,000 over five years for meaningful use of a certified health information system. These grants will encourage smaller physician groups, including those in rural areas, to adopt electronic health records. Utilizing information technology for colorectal cancer screening to identify patients due for screening or surveillance and tracking test results would meet criteria for meaningful use. In addition to targeting individual practices, the legislation also supports state-level health information exchanges and the development of regional extension centers to support providers using health information technology. New Mexico has already begun implementing the New Mexico Health Information Collaborative through federal funding to LCF Research (formerly Lovelace Clinic Foundation).

Strategies

Given the limited resources for colorectal cancer screening, healthcare entities need to efficiently maximize the benefits of screening. Developing the infrastructure for health informatics will support efforts to systematically identify patients who are due for screening or surveillance testing and track results. A statewide system could allow providers to track a patient's colorectal cancer screening history across healthcare systems to avoid offering redundant or inappropriate testing.

New Mexico will likely depend on screening tests other than colonoscopy, including stool blood tests, flexible sigmoidoscopy, and radiographic imaging, in order to substantially increase screening rates. The use of the fecal immunochemical test (FIT) will likely increase; although more expensive than the older guaiac-based test, FIT is more accurate, easier to perform, and leads to greater detection of colorectal cancers and pre-cancerous polyps. Training non-specialists, including nurse practitioners and physician assistants, to perform flexible sigmoidoscopy and possibly colonoscopy, could address the limited availability of endoscopists in rural areas. One cost-effective potential strategy for screening colonoscopy, based on modeling studies, is to provide a one-time screening procedure at age 60 or 65 years, though such a program would be expected to save fewer lives than performing colonoscopy every 10 years beginning at age 50 (40). Adopting new technologies, such as a CT colonography telemedicine program, could also lead to expanding screening services in rural, underserved areas—though the lack of current Medicare coverage and uncertain risk profile are important barriers.

Other efforts to increase screening could include educating patients and the public about the rationale for colorectal cancer screening and the benefits and risks for the various screening modalities. Providers also be educated about screening and surveillance guidelines, including

the strong evidence base for fecal blood tests and flexible sigmoidoscopy. Health coverage plans can be required to cover all screening modalities and inform patients of this coverage in clearly written policies. Performance measures can target both under- and over-use of screening and surveillance tests.

Ultimately, however, healthcare entities will need to make decisions about how to allocate resources. These decisions include determining whether to target resources for screening high-risk patients with colonoscopy, who have the most to gain but represent a relatively small proportion of the population, or trying to achieve higher overall screening rates in a general patient population using fecal blood tests or other modalities. Decisions need to be made whether to target resources for screening or surveillance testing; patients with previous cancers or pre-cancerous growths are at increased risk for developing cancer compared to the general population. These efforts would require systems to be able to readily identify eligible patients, educate them about screening options, and ensure that tests are performed and results tracked. Decisions also need to be made regarding resource allocation for treating cancer, including providing novel therapies for advanced-stage disease.

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Appendices

Appendix A: *Descriptive Epidemiology of Colorectal Cancer in New Mexico*

Appendix B: *Variation in Charges Quoted by Different Practices for Colorectal Cancer Screening for an Average Risk Man, Age Fifty*

Appendix C: *Overview of Language Used in Selected Healthcare Plans to Describe Colorectal Cancer Screening Coverage*

Appendix D: *Diagram of Colorectal Cancer Staging*

Appendix E: *Estimates of US National Expenditures for Medical Treatment for the 15 Most Common Cancers*

Appendix F: *Maps with Locations of Colorectal Cancer Screening and Treatment Resources in New Mexico*

Appendix G: *Contributors to the White Paper*

Appendix A

An Overview of the Descriptive Epidemiology of Colorectal Cancer in New Mexico, 2000-2005

As submitted to the Colorectal Cancer Workgroup of the New Mexico Clinical Prevention Initiative

June 26, 2009

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Introduction

This is a preliminary report on the basic descriptive epidemiology of colon cancer in New Mexico during recent years. We begin with an overview of the state population and then describe the following key cancer indicators in New Mexico:

- ➢ Incidence rates and case counts for patients diagnosed from 2000 to 2004,
  - o by sex, age, race and ethnicity, and tumor location (Table 1)
  - o by sex, race and ethnicity and stage at diagnosis (Table 2)
- ➢ Mortality rates and death counts for patients who died during 2000 to 2004,
  - o by sex, age, race and ethnicity (Table 3)
- ➢ Geographic variation of incidence and mortality rates
  - o by county during 2001 to 2005 (Figures 2 and 3)

This report will serve as the first step in a series of increasingly in-depth analyses of colorectal cancer trends in the New Mexico population. These analyses, in conjunction with a detailed overview of colorectal cancer risk factors, screening modalities and policy recommendations culled from interviews and stakeholder meetings, will serve as a roadmap for future colorectal cancer reduction and surveillance programs in the state.

We would like to thank Ron Darling, Dr. Chuck Wiggins, and all the employees of the New Mexico Tumor Registry for sharing the expertise they have gained over many years of active surveillance and data they have so diligently collected.

New Mexico Demographics

New Mexico is a geographically large state with a diverse population with few monetary resources. According to the US Census 1,984,356 people resided in New Mexico during 2008, with 25% of the population living in the metropolitan areas of Albuquerque, Santa Fe, Farmington and Las Cruces (1). Nineteen Native American tribes have lands within the borders of New Mexico. Three-quarters of the population live in small towns across the landscape of high desert, mountains, plains and plateaus totaling 121,590 square miles— an area larger than most US states and many countries (1). One-quarter of the residents are under the age of 18, 12% are over age 65 and 50.7% of New Mexico residents are women (1). US Census reports

the racial make-up of New Mexico's population as 84.5% White residents, 9.5% Native American residents, 2.8% Black residents and 1.4% Asian residents(1).   Almost half of the population (44.4%) reports being of Hispanic origin (1). Over one-third of New Mexico residents report speaking a language other than English in the home, 78% are high-school graduates and 23.5% report having earned a Bachelor's degree or better (1). Almost one in five people live below the federal poverty line and the median household income is approximately $10,000 less than that of the US as a whole; an estimated 22% of residents did not have health insurance in 2004 (1,2).

Language, distance to care, literacy, cultural expectations and poverty are all factors that have been associated with health disparities in the state (2). New Mexico's unique population mixture, extensive rural portions and large geographic area are all factors that contribute to a challenging healthcare environment in which colorectal cancer is one of many health issues. Colorectal cancer is the fourth most frequently diagnosed cancer in New Mexico after cancers of the prostate, breast, and lung and is the third leading cause of cancer death for both sexes (3). Over 800 cases of colorectal cancers are diagnosed in New Mexico each year (3).

Colorectal Cancer Incidence in New Mexico

Methods

Incidence rate comparisons by sex, race and ethnicity, age and tumor location for cases diagnosed from 2000 to 2004 are summarized in Table 1. Table 2 shows the number of new cases and incidence rates of colorectal cancer by sex, race and ethnicity and stage at diagnosis 2001-2004. Data for the denominator populations and new colorectal cancer cases during the period 2000 to 2004 were obtained from the New Mexico Tumor Registry, a member of the Surveillance, Epidemiology and End Results (SEER) program (4). Denominator populations were estimated on July 1 of each year, and were based on official US Census information. All cases were residents of New Mexico at the time of diagnosis and their cancer was histologically confirmed. For each gender, age group-specific incidence rates were calculated. Race and ethnic group, as well as tumor location and stage at diagnosis incidence rates, stratified by sex, were age-standardized to the US 2000 standard population using the direct method and the

SEER*stat program (4,5). The incidence rates were all expressed as rate per 100,000 persons, men or women as appropriate.

Results

Table 1 demonstrates that, as expected, risk of colorectal cancer increases as both men and women age: the incidence rate more than doubled for those over age 65 as compared to those aged 50 to 64 years. The incidence rate for Hispanic men is the highest of all the sex and race and ethnic groups, with 55.1 cases being diagnosed per 100,000 men in New Mexico during 2000 to 2001 as compared to 51.8 cases per 100,000 non-Hispanic White men and 34 per 100,000 Hispanic women and 37.7 per 100,000 non-Hispanic White women. Men were also at higher risk of tumors located on the right side of the colon and the rectum than women.

Table 2 documents differences in colorectal cancer incidence by sex, race and ethnicity and stage at diagnosis. Although Hispanic men had a higher risk of being diagnosed with colorectal cancer than Hispanic women during the time of this study, Hispanic women appear to be diagnosed at a later stage than Hispanic men, with a smaller proportion of cases diagnosed before the cancer has progressed to the regional and distant stage. For both sexes combined, a larger percentage of non-Hispanic whites were diagnosed with local disease (39% of all cases) as compared to Hispanic men and women (34.4%), American Indian men and women (26.7%) and Black men and women (18.2%). Although risk of disease, as represented by incidence rates, for Native Americans is low when compared to the other race and ethnic groups, the percentage of Native Americans with advanced disease (regional and distant combined) at diagnosis (67.4) is far greater than for non–Hispanic Whites (53.5%) and Hispanics (58.9%).

Colorectal Cancer Mortality in New Mexico

Methods

Table 3 indicates the number of deaths and mortality rates attributed to colorectal cancer by sex and race and ethnicity during 2000 to 2004. Denominator and colorectal cancer deaths during the period 2000 to 2004 were obtained from the New Mexico Tumor Registry, with death data originating from the National Center for Health Statistics (5, 6).   Denominator populations were estimated on July 1 of each year, and based on official US Census information. All

reported deaths were residents of New Mexico at the time of death. For each gender, age group-specific mortality rates were calculated. Race and ethnic-group mortality rates, stratified by sex, were age-standardized to the US 2000 standard population using the direct method and the SEER*Stat program (5, 6). These rates were all expressed as rate per 100,000 persons, men or women as appropriate.

Results

Data in Table 3 show a marked difference in risk of death from colorectal cancer when men and women at different ages are compared. Risk of death increases with age for both sexes, although men have a considerably higher risk of colorectal cancer death when compared to women for all age groups.   Mortality rates for men, regardless of race and ethnicity, are almost double that for women in the same race and ethnic category.   Hispanic and Black men are at highest risk for colorectal cancer death among men. Hispanic and non-Hispanic white women are at highest risk when compared to the other race and ethnic groups.

Geographic variation of incidence and mortality rates

Methods

Similar methods to those noted above were used to calculate age-adjusted, overall, colorectal cancer incidence and mortality rates by county using rate-calculating and map-making software from the National Cancer Institute at the State Cancer Profile Website (7). County by county, and thus urban and rural, differences in cancer incidence and mortality during 2001 to 2005 are shown in Figures 1 and 2. Owing to the large rural population in New Mexico and case counts smaller than 5, many of the counties do not have rates displayed on the maps.

Results

Many New Mexico counties have a lower colorectal cancer incidence rate than what is shown in Figure 1 for the rest of the United States (51.7 cases per 100,000) (7). These counties appear to be in the more populated center of the state. Few New Mexico counties meet the Healthy People 2010 goal of 13.9 colorectal cancer deaths for 100,000 people, shown in blue (7).

Conclusion

Age and male gender are both risk factors for diagnosis and death from colorectal cancer in New Mexico. Hispanic men exhibit an increased risk of the disease when compared to women and other racial and ethnic groups in New Mexico. Cancer incidence and mortality rates appear to vary by geographic area of the state. Next steps could include time trend analyses, more in-depth urban-rural comparisons as well as more detailed description of the ramifications of tumor location relative to screening modalities and access to care.

Table 1. Number of new cases and the age-adjusted incidence rates of colorectal cancer by sex, age at diagnosis, race and Hispanic ethnicity, and tumor location, New Mexico 2000-2004. Rates are adjusted to the US 2000 standard population and expressed per 100,000 population. New Mexico Tumor Registry data (4, 5).

	Males		Females		Combined	
	Case count	**Incidence Rate**	**Case count**	**Incidence Rate**	**Case count**	**Incidence Rate**
Total	2100		1769		3869	
Age at diagnosis						
0-49	162	5.1	159	4.8	321	5
50-64	632	86.8	422	53.8	1054	69.7
65 - 74	662	233.7	449	139.3	1111	183.3
75+	644	321.8	739	246.7	1383	277.7
Race and Hispanic Ethnicity						
Hispanic	689	55.1	508	34	1197	43.6
Non-Hispanic White	1278	51.8	1147	37.7	2434	44.2
Native American	83	32.5	69	20.4	152	25.5
Black	30	41.4	26	35.4	56	38.8
Other	11	33	19	39.4	30	37.3
Tumor location						
Right	697	17.5	699	14.1	1396	15.7
Left	601	14.6	476	9.6	1077	11.8
Rectosigmoid junction	172	4.2	111	2.2	283	3.1
Rectum	501	12.1	335	6.8	836	9.1
Appendix	26	0.6	15	0.3	41	0.4

Table 2. Number of new cases and incidence rates of colorectal cancer by sex, race and Hispanic ethnicity, and stage at diagnosis, New Mexico, 2001-2004. Rates are adjusted to the US 2000 standard population and expressed per 100,000 population. New Mexico Tumor Registry Data. *Data suppressed due to small numbers.

	Men		Women		Combined	
Stage at Diagnosis	**Case count**	**Incidence rate**	**Case count**	**Incidence Rate**	**Case count**	**Incidence Rate**
All Groups						
localized	645	19.6	503	12.6	1148	15.7
regional	631	19.0	560	14.0	1191	16.3
distant	306	9.1	253	6.3	559	7.6
Hispanic						
localized	205	20.1	129	10.6	334	14.9
regional	217	21.1	171	14.0	388	17.3
distant	103	10.0	80	6.4	183	8.0
Non-Hispanic White						
localized	417	20.9	344	14.2	761	17.2
regional	370	18.4	349	14.3	719	16.2
distant	176	8.7	147	6.1	323	7.3
Native American						
localized	18	8.0	18	6.9	36	7.4
regional	31	14.6	26	9.0	57	11.2
distant	18	8.4	16	5.6	34	6.8
Black						
localized	*	6.9	*	18.7	8	6.8
regional	10	17.8	9	9.4	19	16.1
distant	7	11.9	7	8.2	14	11.2

Table 3. Number of deaths and the age-adjusted mortality rates of colorectal cancer by sex, age at death, race/ethnicity, New Mexico, 2000-2004. Rates are adjusted to the US 2000 standard population and expressed per 100,000 population. New Mexico Tumor Registry data. (5, 6)

	Males		Females		Combined	
	Death count	**Mortality Rate**	**Death count**	**Mortality Rate**	**Death count**	**Mortality Rate**
Age at death						
0-49	41	1.3	33	1	74	1.1
50-64	201	27.6	126	16.1	327	21.6
65 - 74	239	84.4	145	45	384	63.5
75+	351	178.6	380	125.1	731	146.9
Race/Ethnicity						
Hispanic Ethnicity	292	25.3	210	14.5	502	19.2
Non-Hispanic White	487	20.1	437	13.8	924	16.6
Native American	32	12.8	24	7.8	56	9.9
Black	19	28.6	10	13.5	29	20.7

Figure 1 Colorectal cancer incidence rates by county for all races and ethnicities combined, both sexes, all ages, New Mexico, 2001-2005. Rates are age-adjusted to the US Standard 2000 population and reported as per 100,000 population. Data and image from NCI State Cancer Profiles http://statecancerprofiles.cancer.gov
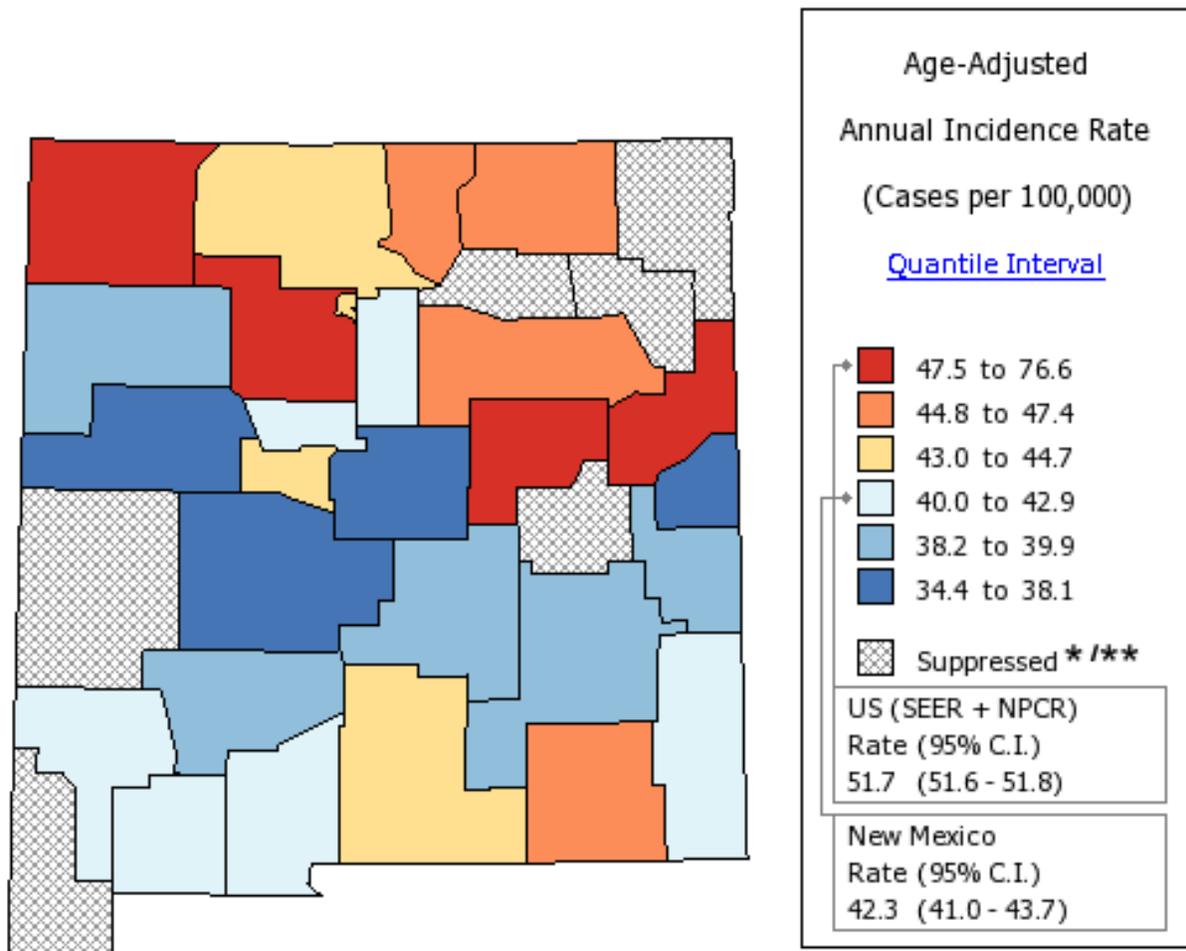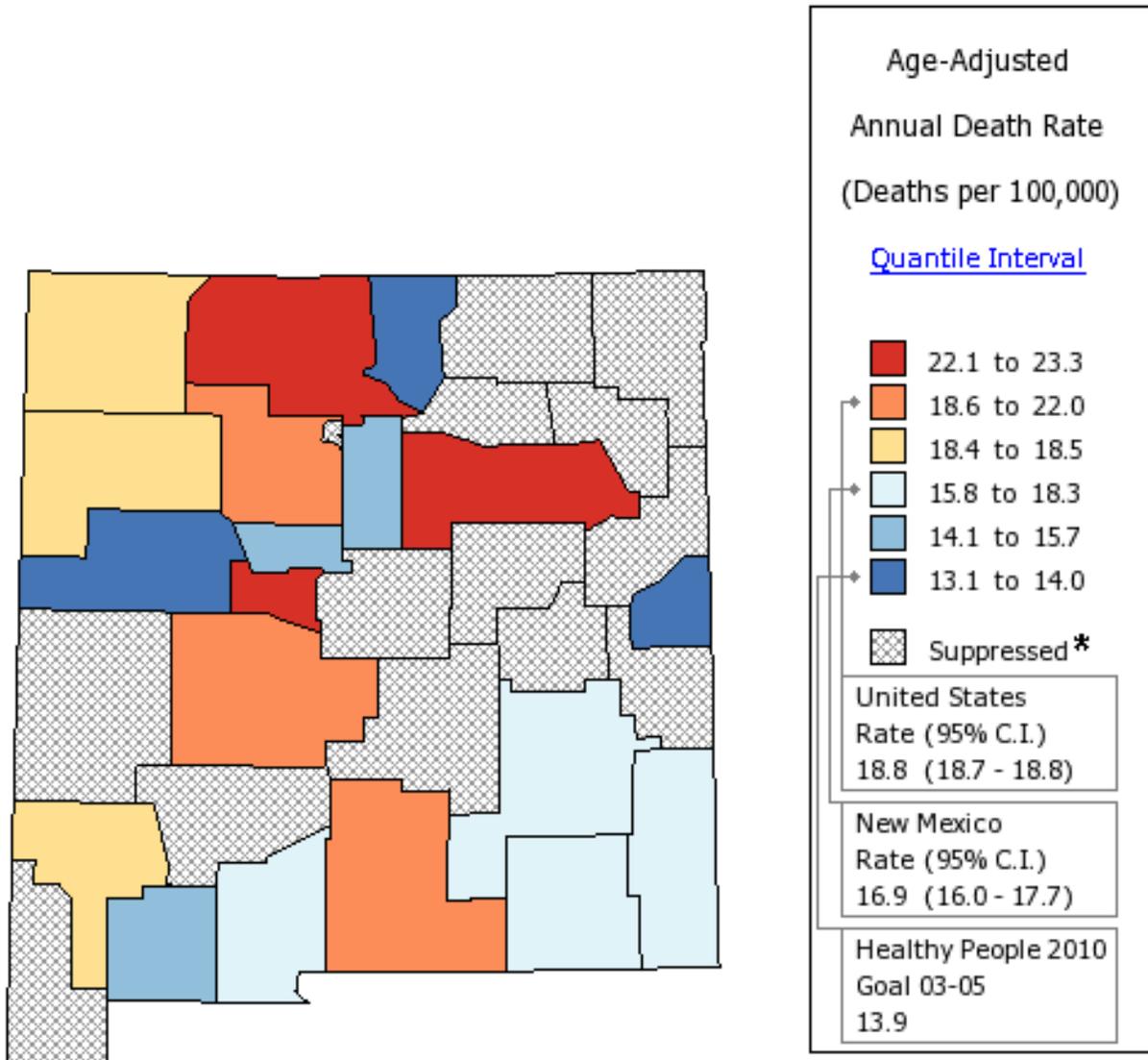
Figure 2 Colorectal cancer death rates by county for all races and ethnicities combined, both sexes, all ages, New Mexico, 2001-2005. Rates are age-adjusted to the US Standard 2000 population and reported as per 100,000 population. Data and image from NCI State Cancer Profiles http://statecancerprofiles.cancer.gov

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 < http://quickfacts.census.gov/qfd/states/35000.html>.

2) Cicari-Stone, L. and Boldt, D. Closing the Health Disparity Gap in New Mexico: A Roadmap for Grantmaking; May 2006. Con Alma Health Foundation, Inc. 21 June 2009.< http://www.conalma.org/docs>

3) New Mexico Department of Health. New Mexico Cancer Facts and Figures, 2007. Albuquerque, NM. 2007

4) New Mexico Tumor Registry. 1 Jan. 2006. Custom SEER*Stat Database: Incidence NM State 1973-2004 NAACCR 1946 Bytes Test, released 25 Jan 2006 to N. Stone.

5) Surveillance Research Program, National Cancer Institute SEER*Stat software (www.seer.cancer.gov/seerstat) version 6.5.1.

6) New Mexico Tumor Registry. 1 Jan 2006. Custom SEER*Stat Database: NM Mortality by county 1973-2004, released 25 Jan 2006 to N. Stone.

7) Statecancerprofiles.cancer.gov. 16 August 2007. State Cancer Profiles. 15 June 2009. <http://statecancerprofiles.cancer.gov/map/map.noimage.php>

Appendix B

Variation in Charges Quoted by Different Practices for Colorectal Cancer Screening for an Average Risk Man, Age Fifty, New Mexico, 2009

•**Private Gastroenterology Practice "A"**

−$950 Facility fee

−$650 Doctor's fee

−Total: **$1600** Screening colonoscopy

−Additional charges may apply

•**Private Gastroenterology Practice "B"**

−$250 Colonoscopy

−$100 Office visit charge for new patients

−Total: **$350** Screening colonoscopy

−Additional charges may apply

•**Private Surgery Group**

−$135 Initial charge

−$825 Hospital & physician fee

−Total: **$960** Screening colonoscopy

−Additional charge may apply if polyps are removed

•**Indigent Fund**

−All charges for procedures in hospital are covered

−Office visits are not covered

−Those without healthcare insurance may apply

−Issues: deposits, pathology

Appendix C

Summary of Colorectal Cancer Screening Coverage for State of New Mexico Employees

<u>State of New Mexico employees - Blue Cross Blue Shield</u>
- No copay (deductible is waived)
- Preventive Adult Services
    - Colonoscopies
    - "Other wellness services"
    - Other services related to colon screening are not mentioned in this plan

<u>State of New Mexico employees - Lovelace</u>
- No copay
- Covered Services
- Additional services as recommended by the U.S. Preventive Services Task Force
    - "Periodic" stool examination for the presence of blood for Members age 40 or older
    - "Periodic" left-sided colon examination of 35 to 60 centimeters for Members age 45 or older
    - Other services related to colon screening are not mentioned in this plan

<u>State of New Mexico employees - Presbyterian</u>
- Plan does not specifically mention if there is a copay requirement
- Covered Services
- Additional services as recommended by the U.S. Preventive Services Task Force
    - "Periodic" stool examination for the presence of blood for Members age 40 or older
    - "Periodic" left-sided colon examination of 35 to 60 centimeters for Members age 45 or older
    - Other services related to colon screening are not mentioned in this plan

<u>State of New Mexico employees - United Healthcare</u>
- Lab, X rays and Outpatient section
- This plan mentions that there is no copay requirement for screening services
- This plan does not specifically mention any screening services

Appendix D

Diagram of Colorectal Cancer Staging
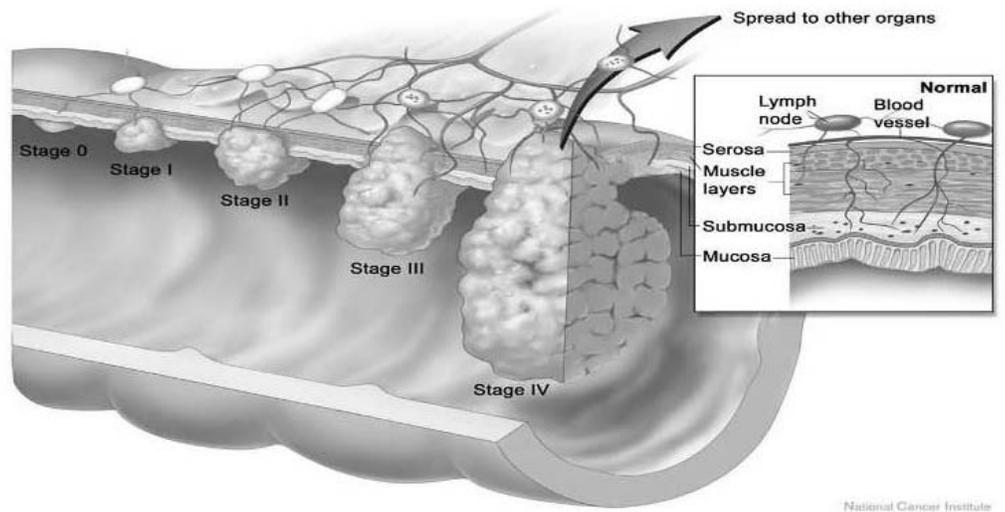
Appendix E

Estimates of US National Expenditures for Medical Treatment for the 15 Most Common Cancers*

Cancer	Percent of all new cancers (1998	Expenditures (billions; in 2004 dollars)	Percent of all cancer treatment expenditures	Average Medicare payments** per individual in first year following diagnosis (2004 dollars)
Lung	12.7%	$9.6	13.3%	$24,700
Breast	15.9%	$8.1	11.2%	$11,000
Colorectal	**10.7%**	**$8.4**	**11.7%**	**$24,200**
Prostate	16.8%	$8.0	11.1%	$11,000
Lymphoma	4.6%	$4.6	6.3%	$21,500
Head/Neck	2.8%	$3.2	4.4%	$18,000
Bladder	4.4%	$2.9	4.0%	$12,300
Leukemia	2.4%	$2.6	3.7%	$18,000
Ovary	1.9%	$2.2	3.1%	$36,800
Kidney	2.6%	$1.9	2.7%	$25,300
Endometrial	2.9%	$1.8	2.5%	$16,200
Cervix	0.8%	$1.7	2.4%	$20,100
Pancreas	2.3%	$1.5	2.1%	$26,600
Melanoma	4.0%	$1.5	2.0%	$4,800
Esophagus	1.0%	$0.8	1.1%	$30,500
All Other	14.0%	$13.4	18.5%	$20,400
Total	**100%**	**$72.1**	**100%**	

* Based on Cancer Prevalence in 1998 and Cancer-Specific Costs for 1997-1999, projected to 2004 using the medical care component of the Consumer Price Index

**Medicare payments include copayments and deductibles paid by patient.

Source: Based on methods described in: Brown ML, Riley GF, Schussler N, Etzioni RD. Estimating health care costs related to cancer treatment from SEER-Medicare data. *Medical Care* 2002 Aug;40(8 Suppl):IV-104-17. Phase-specific prevalence and cost estimates are for SEER-Medicare cases diagnosed between 1996-1999, with costs expressed in 2001 dollars using CMS cost adjusters. Estimates are updated to 2004 using the medical care services component of the Consumer Price Index: U.S. Department of Labor, Bureau of Labor Statistics: *CPI Detailed Report and Producer Price Indexes*. Washington. U.S. Government Printing Office. Monthly reports for January 1999-March 2004.

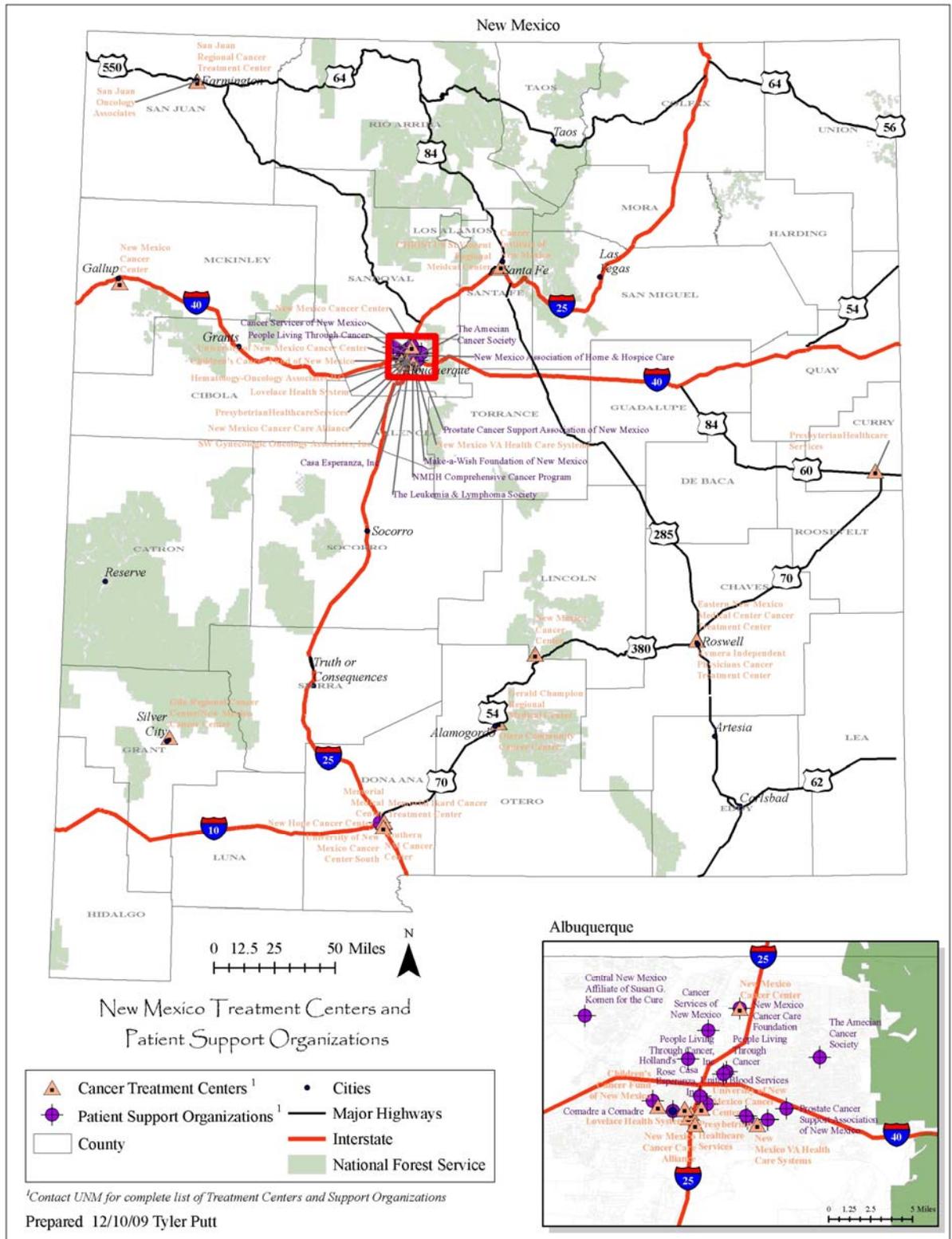Accessed from http://progressreport.cancer.gov

Appendix F

Locations of colorectal cancer screening and treatment resources in New Mexico:

- **Map of General Surgeons and Gastroenterologists Practicing in New Mexico, Fall 2009**
- **Map of Cancer Treatment Centers in New Mexico, Fall 2009**
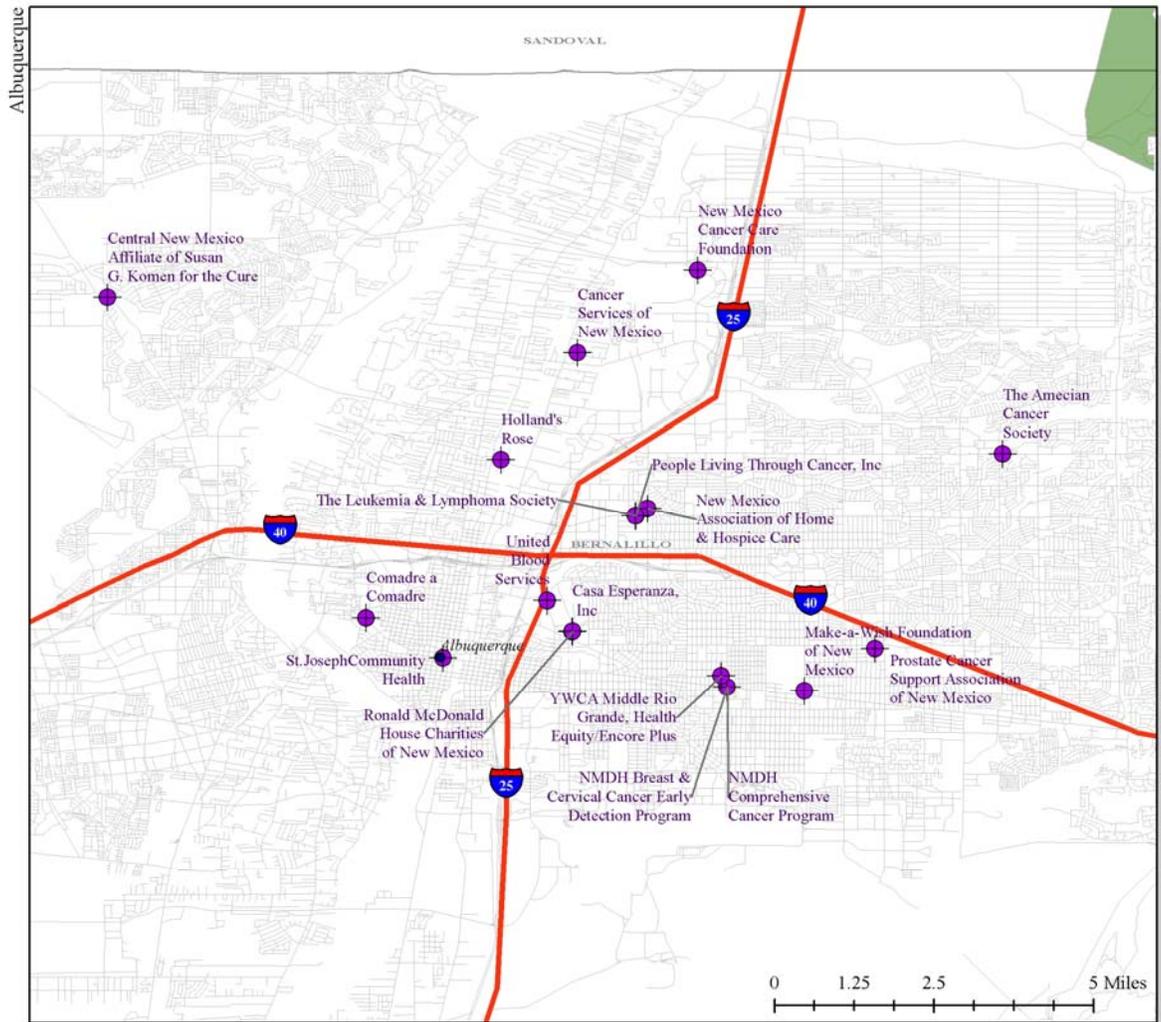- **Map of Cancer Patient Resource Centers in New Mexico, Fall 2009**

Map of General Surgeons and Gastroenterologists Practicing in New Mexico, Fall 2009
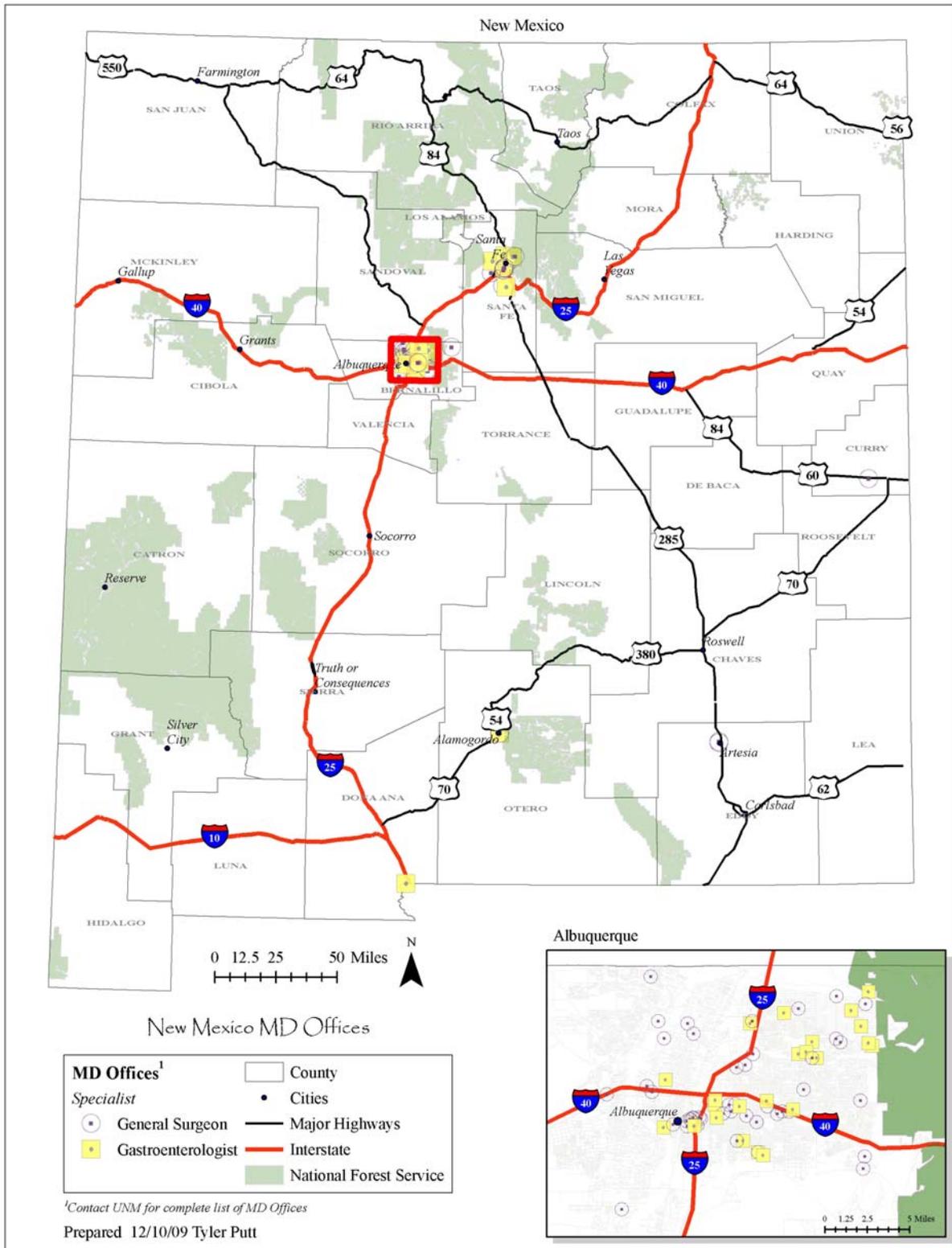
Map of Cancer Treatment Centers in New Mexico, Fall 2009

New Mexico Treatment Centers and Patient Support Organizations

Cancer Treatment Centers [1]
Patient Support Organizations [1]
County
Cities
Major Highways
Interstate
National Forest Service

[1]Contact UNM for complete list of Treatment Centers and Support Organizations

Prepared 12/10/09 Tyler Putt

Map of Cancer Patient Resource Centers in New Mexico, Fall 2009

New Mexico Patient Support Organizations

Legend:
- Patient Support Organizations[1]
- County
- Cities
- Major Highways
- Interstate
- National Forest Service
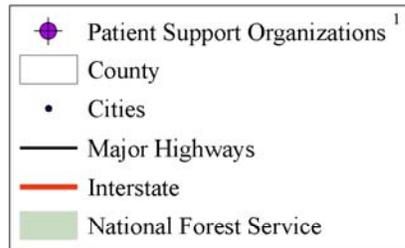
[1]Contact UNM for complete list of Patient Support Organizations
Prepared 12/10/09 Tyler Putt
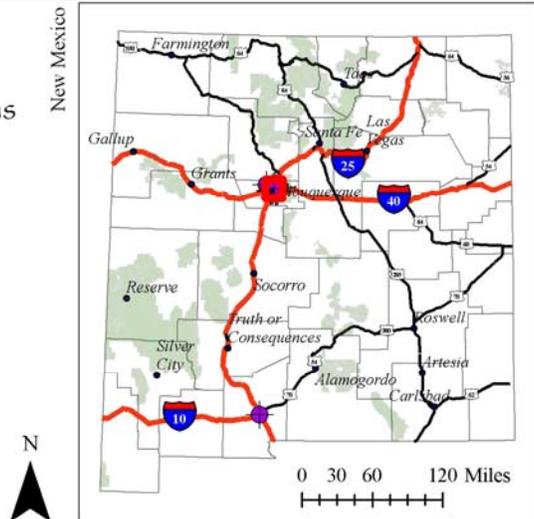
Appendix G

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