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Barriers to Timely Screening Colonoscopy

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Barriers to Timely Screening Colonoscopy: The Role of Health Insurance

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Barriers to Timely Screening Colonoscopy: The Role of Health Insurance

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Barriers to Timely Screening Colonoscopy: The Role of Health Insurance

ABSTRACT

Objective:

Colorectal cancer (CRC) can be largely prevented or effectively treated in its early stages, yet disparities exist in timely screening. The aim of this study was to explore the disparities in CRC screening on the basis of health insurance status including private, Medicare, Medicaid, and State Administered General Assistance (SAGA).

Methods:

A retrospective chart review for the period January 2000 to May 2007 (95 records) was conducted at two clinic sites; a private clinic and a university hospital clinic. All individuals at these sites who met study criteria ($\geq$50 years old with screening colonoscopy) were included. Age, gender, date of first clinic visit when screening referral was made, and date of completed procedure (screening colonoscopy) were recorded. Groups were dichotomized between individuals with private health insurance and individuals with public health insurance. Individuals with any history of CRC, known pre-cancerous conditions as well as family history of CRC requiring frequent colonoscopy were excluded from the study.

Linear model analysis was performed to compare the average waiting time to receiving screening colonoscopy between the groups. T-test was performed to analyze age or gender related differences between the two groups as well as within each group.

Results:

The average waiting time (33 days) for screening colonoscopy in privately insured individuals was significantly lower than publicly insured individuals (200 days). The time difference between the first clinic visit and the procedure was statistically significant ($p < 0.0001$) between the two groups. There was no statistical difference (p=0.089) in gender between these groups (public vs. private). There were also no statistically significant gender or age related differences found within each group.

Conclusions:

Disparities exist in timely screening for CRC and one of the barriers leading to delayed CRC screening includes health insurance status of an individual. Even within the insured group, type of insurance plays major role. There is a negative correlation between public health insurance status and timely screening. Differences in access to medical care and delivery of care experienced by patients who are publicly insured through Medicaid, Medicare, and SAGA, suggests that the State of Connecticut needs to implement changes in health care policies that would provide timely screening colonoscopy. It is evident that health insurance coverage facilitates timely access to healthcare. Therefore, there is a need for increased efforts in advocacy for policy, payment and physician participation in public insurance programs.

A state-wide comprehensive program involving multiple components targeting different levels of change such as provider, patients and the community should help reduce some of the observed causes of healthcare disparities based on the insurance status.

INTRODUCTION

Colorectal cancer (CRC) will kill more than 50,000 people in the year 2007, according to the American Cancer Society (ACS 2006). CRC is the third most common type of cancer and second most common cause of cancer death in the U.S. In 2005, approximately 145,000 people were diagnosed with CRC. Although colorectal cancer is one of the leading causes of cancer-related deaths in the United States, in almost all cases, early diagnosis of polyps can lead to a complete cure (ACS 2006). This is because many colorectal cancers are thought to arise from adenomatous polyps in the colon. These mushroom-like growths are usually benign, but some may develop into cancer over time. The majority of the time, the diagnosis of localized colon cancer is through colonoscopy. Among the various screening methods used to detect the cancer, the role of colonoscopy in the prevention of CRC has been commended by both the medical community and the federal government.[1] The ACS, the American Gastroenterological Association and various health organizations have advised that routine screening for CRC should begin at age 50 for individuals of average risk and be repeated at 10 year intervals. The current screening guidelines for average adults and those with a family history of CRC can be found in Table 1.

Without screening, 40% of all CRC cancers were assumed to result in death within 5 years.[2] The Morbidity and Mortality Weekly Report in 2001[3] stated that the percentage of persons aged ≥ 50 years who received screening colonoscopy had steadily increased from 30% in 1997 to 33% in 1999 to almost 40% by 2001. However improving screening rates is still of concern, particularly in the state of Connecticut where 42% of adults aged 50 or

older have not been screened and an estimated 1,710 new cases are diagnosed and 660 people die of CRC each year.[4]

According to recent data, less than half of the US population has been screened, which has resulted in the later stage of cancer diagnosis, and significantly increased health related expenditures. A key factor believed to explain the later stage at diagnosis is the underutilization of routine screening services for CRC. Studies show that colonoscopy would decrease by > 80% the risk of cancer death, provided it is started by the age of 50, and was repeated every 5 or 10 years.[5] Therefore, in order to eliminate the likelihood of CRC diagnosis and related mortality there is an urgent need to identify and minimize the reasons for low levels of screening.

Colorectal Cancer (CRC): Etiology, Diagnosis, and Prevention:

Colorectal cancer (CRC) starts in either the large intestine (colon) or the rectum (end of the colon). Colon cancer and rectal cancer are together known as colorectal cancer. Most of these cancers begin as a polyp-a growth of tissue that starts in the lining and grows into the center of the colon or rectum. A type of polyp known as an adenoma can become cancerous. In most cases, colorectal cancers develop slowly over a period of several years. Removing the polyp early may prevent it from becoming cancerous. Over 95% of colon and rectal cancers are adenocarcinomas.

At an early stage, CRC rarely causes any signs or symptoms. Serious symptoms like bleeding from the rectum, a change in bowel habits, and weight loss usually occur later, when the cancer has become invasive.

As CRC is highly curable when found in its early stages, it is important to have screening tests that examine the entire colon because cancer can occur anywhere in the colon. When an adenomatous polyp, which is a precursor lesion, develops, it takes 10 to 15 years to transform into cancer; therefore people with an increased risk for developing colorectal cancer may want to undergo initial screening at a younger age and continue with screening frequently in an attempt to prevent the progression of this cancer.

Screening is crucial for the prevention and early treatment of CRC. Routine colonoscopy can reduce the incidence of CRC by 76-90%.[6] One study estimated that in order to save one year of expected life of a person aged between 50-79 years, 3-6 colonoscopies were needed.[7] In addition, individuals with a personal or family history of adenomatous polyps, Familial Adenomatous Polyposis, Hereditary Nonpolyposis Colorectal cancer, or colorectal cancer require screening much earlier than average risk adults.

Several screening strategies are currently available as outlined in Table 1. A colonoscopy has an added advantage that if polyps are found during the procedure they can be immediately removed. Current research indicates that the colonoscopy is a highly sensitive, specific, and cost-effective screening procedure.

The sensitivity and specificity of colonoscopy in detecting CRC is > 95% and 90-96% respectively. Colonoscopy can be used to look at the whole colon and its sensitivity is greater than barium enema (82.9%), with an odds ratio of 3.93 for a missed cancer by barium enema compared with colonoscopy. The sensitivity of double-contrast barium enema (85.2%) is not significantly different than a single-contrast (81.8%). Cancers detected by colonoscopy are also more likely to be Dukes' class A (cancer confined to mucosa) (24.9%) than cancers detected by barium enema (9.8%).[8] Colonoscopy, when

performed by gastroenterologists, was found to be more sensitive (97.3%) for cancer than colonoscopy by non-gastroenterologists (87%), with an odds ratio of 5.36 for a missed cancer by a non-gastroenterologist compared with a gastroenterologist. Out of the several screening methods for colorectal cancer, colonoscopy is by far the most expensive, the typical cost ranging from $500 to $1,000, yet accurate in diagnosing CRC.[9]

An added advantage is that colonoscopy can be both diagnostic as well as therapeutic resulting in greater cost-effectiveness, with most estimates between $10,000 and $20,000 per life-year saved. Compared with no screening, the incremental cost-effectiveness ratio for screening colonoscopy was $6,600 per life-year gained. By comparison, the ratio for breast cancer screening has been estimated at $22,000 per life-year gained, heart transplantation at $160,000 per life-year gained, and screening for cervical cancer at $1,700,000 per life-year gained.[10] Therefore colonoscopy costs less than $20,000 per year of life saved and is within an acceptable range of cost-effectiveness by US health standards.[11] These findings were consistent with another study which found colonoscopy to be the most cost-effective means of screening for CRC when compared to other screening methods because it reduces mortality at relatively low incremental costs.[12] (See Table 2).

Current status of the insurance problem

Approximately 47 million Americans are either underinsured or uninsured and many assume they cannot afford CRC screening. According to the US Census Bureau, approximately 60% of the population receives health insurance coverage through

employer-sponsored plans whereas 9% are covered under privately purchased health insurance. The range of health services and products available are similar in both. If purchased directly, average premiums are generally somewhat lower than those for employer-sponsored coverage, but vary by age. Deductibles and other cost-sharing are also higher, on average, and the individual consumer pays the entire premium without benefit of an employer contribution. The types of private medical insurance in the U.S include traditional indemnity or fee-for-service, Health Maintenance Organizations, Managed care, and other plans. In Connecticut 61% of the individuals are covered by health insurance provided by their employer, while 4% have individual coverage (See Figure 1).

Government programs cover another 27% of the population. Medicare is the first major federal health insurance entitlement program. Currently, approximately 42.5 million Americans are covered by the Medicare program. Originally a health program only for people who were 65 years of age or older, it now also includes other beneficiaries and all state and local government employees not covered under social security. Traditionally Medicare had two components: Part A (Hospital Insurance) and Part B (Supplemental Medical Insurance). Part B covers inpatient and outpatient physician services; emergency room care; outpatient clinic and surgical care; radiation therapy and diagnostic tests (including screening colonoscopy). In cases where physicians participate in Medicare, Medicare reimburses providers 80% of the allowable (not actual) charge services; the patient provides the remaining 20%. Also under the traditional Medicare program, doctors, other providers, and suppliers receive payments according to schedules that set the maximum fees that Medicare will reimburse (see Table 3).

In Connecticut approximately 13% of the individuals have Medicare coverage.[13] Beneficiaries in the program must pay annual co-payments for covered services and supplies.[14] Medicare benefits cover a variety of colorectal cancer screening tests, including fecal occult blood tests (FOBTs), sigmoidoscopy, colonoscopy, and barium enema. Medicare pays for 62% of costs associated with inpatient CRC care and 49% of all outpatient CRC care, of which 15% is provided in hospital outpatient departments and 85% in physician's offices.[15]

Medicaid (Title XIX) is a federal healthcare program administered by individual states, which covers those below poverty level (annual income less than $ 17,000 for a family of 3) and in need of health and medical care. The program, authorized by Title XIX of the Social Security Act, is basically for low income people with specified eligibility criteria.[16] Eligible groups include low income children, families, and pregnant women; elderly and disabled people who need long-term care services; and low-income elders who need assistance with the costs of Medicare coverage. Within broad federal guidelines, states establish their own eligibility standards; determine the type, amount, duration, and scope of services; set the payment rate for services; and, administer their own programs. Thus, each state's Medicaid program is unique.[17] For CRC screening, states are authorized to cover the screening, but each one gets to decide what kind of screening it will provide and under what circumstances. In Connecticut, since October 1, 2001, Medicaid provides coverage for CRC screening, including, but not limited to an annual fecal occult blood test, flexible sigmoidoscopy or radiological imaging.

State-Administered General Assistance (SAGA) is administered by the Connecticut State Department of Social Services. SAGA provides cash to eligible individuals and families in Connecticut who do not have enough money to meet their basic needs and are deemed "unemployable." Medical insurance is provided to indigent individuals regardless of their employability status. To be eligible for SAGA Medical, an individual's income must be below the "medically needy income limit". The income limit for an individual ranges from less than $476.19 monthly to less than $574.86, depending on what region of the state he or she lives in; and the asset limit is $1000.00 per assistance unit (household). The SAGA program covers almost all services covered under the Connecticut Medicaid program with the exception of long-term care and non-emergency medical transportation. There are no categorical program requirements; eligibility is based on income and assets only.

Medicare reimbursement to the physician for screening colonoscopy may average $380, but the total cost of colonoscopy is much higher if reimbursement to health care professionals and hospitals are considered.[18] In 1992, Medicare instituted a physician fee schedule and transitioned from charge-based to a resource-based reimbursement system. The Medicare physician reimbursement for a given procedure equals the sum of three geographically adjusted relative value units (work, practice expense, and malpractice) multiplied by a conversion factor. Each component of this system is reviewed and updated individually.[19]

Before 1998, Medicare did not reimburse physicians for routine screening for colon cancer. Reimbursement rules were liberalized to include routine screening colonoscopy

in 2001. However, gastroenterologists have their own reimbursement problems. Medicare reimbursement dropped almost 30% between 1998 and 2002,[20] according to Paul J. Berggreen, one of four gastroenterologists with the Gastrointestinal Associates in Phoenix, Arizona. Medicare reimbursement for inpatient diagnostic colonoscopy is now only $282 (See Table 3).

The centers for Medicare and Medicaid Services estimates that only 14% of the Medicare population has had any form of CRC screening, while the American Cancer Society claims that only 26% of eligible average risk patients have opted to be screened. By contrast, 70% of eligible women get mammograms and 80% have pap smears. These high rates of screening in breast and cervical cancer patients have been attributed to being insured, as a lack of health insurance coverage remains the strongest predictor of cancer screening underutilization.[21] Lacking supplemental (private) health insurance in addition to Medicare coverage was related to lower rates of screening in women as they were more likely to be screened than their counterparts without additional health insurance.[22,23,24]

In the past, researchers have shown that although screening rates for CRC have increased, differences in gender, ethnicity, level of education, income level and insurance type among the screened population and those not screened still exist. However, few studies have focused specifically on men and women aged 50 or over who are covered by SAGA as opposed to Medicare and Medicaid. The gap in public health efforts must be addressed to meet the needs of approximately 30,000 clients that receive SAGA medical assistance in Connecticut.

Current data from the Medicare physician/supplier billing claims file for New York, Florida, and Illinois for the years 2002 and 2003 suggests that the type of health insurance and whether or not one has insurance strongly affects the rates of screening, as the uninsured and publicly insured have low screening rates as opposed to those with private insurance. Other disparities within Medicare beneficiaries such as sex, racial/ethnic, and socioeconomic characteristics and interactions between socioeconomic and demographic variables have also been extensively analyzed.[25]

Hart[26] described the "inverse care law" as those who are most in need of medical care receive the least amount of it, because the type of care one receives may be determined largely by the ability to pay for that care.

The interrelationship between disease, access to health care, race, and social class has been well established. One area of care studied is oral health care. It has been documented that impoverished and racial minority populations receive substandard oral health care compared with their more affluent White counterparts.[27] According to the American Dental Education Association, health care services in the US are inappropriately treated as market place commodities, i.e., those who are unable to pay have less access to quality resources. Thus there seems to be economic and racial barriers to patients in oral healthcare. Due to this, disadvantaged minority patients bear the brunt of poor oral health, receive lower-quality health care, and are less likely to receive routine preventive care. [28] [29]

More than 46 million people (approximately 16% of the US population) are uninsured or under insured.[30] Individuals who are uninsured, underinsured, or insured by government

programs may face significant barriers to obtaining health care. This effect of health insurance status on clinical decision making has been extensively analyzed in past studies.

Meyers et al found that those who do not have health insurance received fewer health services and had poorer health status than those who had health insurance.[31] Such a disparity was a result of changes that physicians made in clinical management of patients in response to patient's health insurance status. The study also found that almost 1 in 3 US physicians reported not offering useful preventive and health maintenance services, such as age-appropriate screening to patients because of health insurance coverage restrictions.

Some general physicians in the community do not accept new patients unless they have private health insurance or are able to pay the full cost at the time of the visit. For example, a recent national survey of office-based physicians found that although 96% were accepting new patients, 40.3% did not accept "no charge" or charity patients, 25.5% did not accept Medicaid patients, and 13.9% did not accept patients covered by Medicare.[32] Patients who are unable to afford outpatient care in private practice settings often seek care in emergency departments, which are required by law only to examine patients to determine whether a medical emergency exists.[33] Consequently, many patients initially seen in emergency departments are referred to outpatient providers for follow-up care, but uninsured or Medicaid-insured patients may not receive this care because of insurance status discrimination.

These findings may reflect heightened sensitivity to cost issues among physicians who work with underserved patients in disadvantaged communities. Almost all physicians reported that they do consider health insurance status at times, and although insurance was considered to a greater degree when the patient was uninsured, changes in clinical management were also made for privately insured patients.[34] Therefore, the differences in patients' insurance type and status are likely a cause of cancer screening disparities.

Other factors affecting CRC screening rates include knowledge, socio-economic barriers, and failure to recommend timely screening by physicians. A study [35] that aimed to determine the key variables that impact cost-effectiveness of colon screening programs found that patient adherence was an important determinant of effectiveness of all screening programs including CRC screening. It was also recommended that future studies should be focused on methods of patient education that improve patient compliance with screening recommendations. Knowledge regarding colon cancer screening is very poor, as nearly half of the US population does not know of any screening method, which is a major failure in healthcare education in USA.[36]

In 2004, using the 2001 California Health Interview Survey (CHIS), a study found that only 10% of unscreened adults reported receiving physician recommendation for CRC screening, implicating low physician's adherence to current guidelines.[37]

Health insurance coverage and having a usual source of care were the two most important predictors of CRC screening. Latinos aged < 65 years were less likely to be tested than whites (relative risk [RR], 0.84; 95% confidence interval [95% CI], 0.77-0.92). Men were more likely to be tested than women, an effect that was greater among individuals age 50-64 years (RR, 1.28; 95% CI, 1.23-1.32) than among individuals age ≥ 65 years (RR, 1.19;

95% CI, 1.15-1.23). Women were more likely than men to say that their physician did not inform them that the CRC tests were needed; women were also more likely to report CRC tests as painful or embarrassing.[38]

Lack of physician recommendation is perhaps the most frequently noted barrier to CRC screening.[39] This indicates a need for physicians to not only recommend CRC screening to their patients but also provide detailed guidance and a usual source of care to help address gaps in the receipt of CRC screening tests. This issue has not been addressed by the Medicare program[40] where a study illustrated that CRC screening was under-utilized by Medicare consumers in two states, and lack of physician recommendation was an important contributing factor. Thirty-one percent of Medicare consumers had never been tested for CRC, and 18% had been tested but were not current with Medicare-covered intervals. Overall, 28% reported not receiving a physician recommendation for screening. Predictors of receiving a physician recommendation included sociodemographic (younger age, white race, more education), health status (increased CRC risk, comorbidity), and healthcare access (had a routine/preventive care visit in the past 12 months) factors. Lack of knowledge/awareness and the physician not ordering the test were commonly cited reasons for not having CRC tests. Thus providing a benefit under the Medicare program does not ensure its widespread use by consumers or their physicians.

A 2007 study found that despite the documented benefits of CRC screening, patient participation rates remain low.[41] Physician recommendation has been identified as a significant predictor of screening completion. Although most physicians recognized and supported the importance of recommending CRC screening to eligible patients, findings from the study suggest that physicians overestimated the extent of discussions about

screening. The study also identified that areas with low supply of health care professionals correlated with low CRC screening rates. An inadequate supply of health providers has also been linked with poor health outcomes in general.[42]

Health care disparities within Race/Ethnicity

Studies in oral heath care suggest that racial minorities receive poor quality care.[43] Apart from the racial disparities that exist in oral health care, racial and ethnic disparities are also evident in cardiovascular healthcare,[44] with great focus on African American populations. Low level of screening in this population has been recognized and extensively analyzed.[45] Racial disparities also exist in screening rates for other preventive health care; one example of this is lower rate of screening mammography for Asian females. According to the 2001 CHIS, whites, African Americans, and Latinas have already met the national objective of having a mammogram in the past two years (78.1%, 78.5% and 69.9% respectively) but Asians (67.2%) and Native Hawaiians/other Pacific Islanders (63.4%) lag behind. Socio-cultural factors more relevant to recent immigrant groups in the US, like low level of education, inability to speak English, low level of acculturation, and racial/ethnic or cultural discordance with providers, were also associated with low mammography utilization.[46] Friedman and Borum[47] found that educational interventions that are focused upon racial disparities in CRC were important as they could act as a continued effort to enhance resident physicians' colorectal cancer screening practices for African Americans. A medical record review of internal medicine resident physicians' adherence to colorectal cancer screening recommendations was conducted for six months prior to and six months following an educational intervention

that focused upon issues related to racial disparities in colorectal cancer. There was a statistically significant difference in the rate at which endoscopic assessments (p<0.0001) were performed, which illustrated that continued effort to enhance resident physicians' colorectal cancer screening practices in African Americans is important.

Health care disparities by Sex

Several studies have found that women are less likely to be screened for colorectal cancer (CRC) than men. Only 53% of men and women aged 50 years and older have had FOBT in the past 12 months or lower endoscopy in the past 5 years.[48] The majority (83%) of endoscopic screening procedures were colonoscopies.[49] While the source of this screening differential is unknown, recent studies suggest differences in barriers to screening might explain health care disparities. Female and male participants reported similar preferences for CRC screening mode, but there were notable differences in the barriers and facilitators to screening.[50]

Gender related differences in receiving a CRC screening have been investigated in several studies and a key finding was that women view the preparation for endoscopic procedures, such as sedation and bowel preparation, as a major barrier to screening while men do not.[51] Also women and men express different fears and information preferences regarding endoscopic procedures, such as asking for a female physician. Women also perceive CRC as a male dominant disease thus feeling less vulnerable to CRC. Gender-specific barriers may explain women's lower rate of screening for CRC. Colorectal cancer screening promotion interventions, decision aids and specific clinical practice marketing materials may benefit by being tailored by gender.

One study compared women and men's understanding of screening flexible sigmoidoscopy (FS) to identify predictors of endoscopic CRC screening.[52] The majority of the study's respondents were white, and their average age was 62 years. Women reported significantly more embarrassment and fear about having FS than men. Women were more willing to consider having a FS if a female endoscopist performed the procedure. Of the 334 participants who were eligible to have endoscopic CRC screening, 53 (16%) had the procedure within a year. The odds of having the endoscopic procedures increased with the length of time the patients were under the care of their primary care providers and how strongly patients believed that one should have an FS even without symptoms. The study's findings suggest some unique gender-specific attitudes and beliefs that act as potential barriers for CRC screening and further support the important role of primary care providers in facilitating timely completion of screening colonoscopy.

General Disparities with race and insurance status

Socioeconomic status (SES) plays a significant role in terms of access to health care. In a study of Hispanic Americans attending a city clinic, authors identified the following barriers to adequate medical care: language problems, cultural differences, poverty, lack of health insurance coverage (public or private), transportation difficulties, and long waiting times. [53] SES has also been associated with receipt of colorectal investigations in Ontario.[54] Only one-fifth of people in the screening-eligible age group received any colorectal investigation. The study demonstrated a significant association between receipt of any colorectal investigation and income ($p < 0.001$); people in the highest-income

quintile had higher odds of receiving any colorectal investigation and of receiving colonoscopy.

One study explored whether racial differences in stage at diagnosis could be explained by SES differences.[55] SES was an independent predictor of stage at diagnosis for CRC and other cancers with cases from the highest SES block-group more likely to present with local stage disease than those from the lowest SES group. Race independently predicted stage only for breast and prostate cancers where African-Americans presented with more advanced stage than Caucasians. Based on census block-group aggregate data, SES was found to be an important predictor of stage at diagnosis, most likely accounting for much of the disparity in stage between African-Americans and Caucasians for CRC.

Existence of Health Care Disparities in Colorectal Cancer Screening

Low levels of CRC screening among those aged 50 or over have been attributed to obstacles such as low income and health insurance type.[56] Health insurance enables access to care by protecting individuals and families against the high and often unexpected costs of medical care, as well as by connecting them to networks and systems of health care providers. Although the cost of colonoscopy is high, the importance of CRC screening to detect cancer has been accepted by insurances, and routine screening is now covered by both private insurance and public insurance.

The American health insurance system comprises both private and public sectors, but its foundation is employer-based coverage for working families and Medicare for the elderly and disabled. Medicare covers virtually all elderly Americans.[57] Medicare started fully

covering the cost for colonoscopies for its beneficiaries after the 1998 Medicare Policy change to include routine screening colonoscopy to increase the odds of screening among those with incomes less than $25,000,[58] thereby attempting to eliminate co-pay as a barrier for people over 65 years of age. Medicare's reimbursement policy change also covered screening colonoscopies in individuals with an increased colon cancer risk, and this policy was extended in 2001 to cover all average risk individuals in a population. These changes were aimed at lessening/reducing the existing disparities of screening among those aged 65 or over. However, other studies show that racial and ethnic disparities still exist despite these attempts to correct the gap on those over 65 years of age.[59] Although the Medicare policy alleviated the screening disparity between non-Hispanic whites and blacks, the gap between Hispanics and non-Hispanic whites actually widened. The Hispanics elderly also had the lowest screening rates in the years 2000 and 2003. The low screening rates associated with specific races and ethnicities have been attributed to their lack of health insurance and variations in coverage, therefore disparities in CRC screening that persisted among Medicare beneficiaries still exist are attributed to race and ethnicity.

Studies have shown that despite Medicare coverage less than 50% of those aged 65 or over have ever been screened for CRC.[60] CRC screening was under-utilized by Medicare consumers in two states, and lack of physician recommendation was an important contributing factor. Providing a benefit under the Medicare program does not ensure its widespread use by consumers or their physicians. State assisted insurance packages like SAGA's reimbursement is minimal and therefore is not widely accepted by private physicians.

Medicare's typical beneficiaries with CRC were expected to be among the oldest and sickest of CRC patients due to the delays in getting screened.[61] The lack of medical insurance coverage for screening tests may be one such reason many patients do not undergo procedures, as there was a significant increase in the number of and proportion of colonoscopies performed after the Medicare reimbursement policy was implemented.[62]

Despite the recognized effectiveness of screening colonoscopy to decrease mortality, it has been widely documented that CRC screening rates are low especially among the socially disadvantaged patients, such as those that have low income levels, minority groups and in those with low educational levels.[63] These factors further affect their access to and type of health insurance coverage as those on low income levels would be covered by health plans designed specifically for them, such as SAGA coverage. [64]

Relationship between Medical insurance and CRC screening

Disparities within the insured population have been extensively studied, with a special focus on reasons for not being screened such as lack of physician recommendation, or lack of available information about the need for CRC screening.[65] [66] One study found that 77% of insured individuals were screened for CRC as opposed to only 33% of those uninsured. Based on NHIS 2006, 53.6% of uninsured individuals aged 18 to 64 years had no usual source of health care compared with 9.9% of privately insured and 10.8% of individuals with Medicaid insurance.[67]

Medicaid-insured patients were more likely to report that they did not get care due to cost, delayed care due to cost, or did not get prescription drugs due to cost compared with

privately insured patients. A few studies have also reported CRC screening rates for Medicaid-insured patients that were lower than those for privately insured patients, but higher than for uninsured patients.[68] The effect of patient insurance status on health care services has been analyzed.[69] Lack of health insurance was generally identified as an obstacle to the use of health care services. The use of health care services increased for insured compared with uninsured individuals. Gaps in insurance coverage or insurance disruption have also been associated to decreased access to medical care and utilization, inability to obtain prescription medications and unmet medical needs.[70]

Since certain groups are at an increased risk of not receiving CRC screening, interventions by policy makers to reduce these disparities should be an integral part of overall efforts to improve CRC prevention and control. Previous studies have documented various groups that are less likely to be screened for CRC and that insurance coverage does not ensure screening. Performing colonoscopies has been documented to be financially rewarding for medical centers;[71] however, changes in centers for Medicare and Medicaid services reimbursement threaten the ability to retain any financial benefit. This issue has not yet been analyzed for state-wide insurance in any study and thus this gap in the literature needs to be addressed. Specific barriers to CRC screening were: lack of screening policy, poor motivation by primary care providers to encourage CRC screening completion by their patients, and inadequate insurance coverage.

In 2004, a 20-year follow-up data collected in the National Polyp Study concluded that the first colonoscopy performed on a person has the greatest impact for preventing death from colorectal cancer.[72] Therefore, the importance of a timely colonoscopy cannot be

ignored.   This study focused on CRC colonoscopy screening and health care disparities

based on health insurance status because of the lack of published data.

METHODS

Aim of Study

The aim of this study was to explore the disparities in CRC screening on the basis of health insurance status including private, Medicare, Medicaid, and State Administered General Assistance (SAGA).

Study Design

A retrospective chart review was conducted at two sites. The two clinics were purposefully selected: the University hospital clinic only had patients insured through public programs (Medicare, Medicaid and SAGA); while the private clinic only had patients with private health insurance. The primary care physicians at the participating sites provided the lists of patients enrolled in their respective clinics. The study was approved by the University of Connecticut Institutional Review Board.

Study Participants

Inclusion Criteria:

All asymptomatic adults, male and female, aged 50 to 75 years who completed a screening colonoscopy from January 2000 to May 2007 were included in this study.

Ages 50-75 were chosen as the age range for this study. Fifty is the age at which the screening colonoscopy is recommended and 75 was chosen as the upper age limit in order to eliminate other medical conditions related to early or frequent screening colonoscopy.

Exclusion Criteria:

Individuals with a personal history of CRC, inflammatory bowel disease as well as family history of CRC were excluded as they require frequent surveillance colonoscopy and did not meet the criteria of screening colonoscopy.

Description of Study Sites

The university hospital clinic is an outpatient facility in an inner city community health center that provides preventive care and health maintenance services to people from the surrounding neighborhoods. This site serves as a primary clinic center, serving a population of more than 250,000 clients. It is primarily run by in-training physicians who are supervised by board-certified attending physicians. The patient population is diverse in race/ethnicity, level of income, and education. All adult individuals having private or public health insurance (Medicare, Medicaid, and SAGA), as well as uninsured patients are served at this site. Highly specialized procedures like colonoscopy are scheduled through a centralized electronic scheduling system, and the appointment to the specialty GI clinic is made once the treating physician recommends it. The procedure is performed by the gastroenterologists at the fully equipped on-site endoscopy suite.

The private medical clinic is a multi-specialty group practice affiliated with a community hospital. This clinic is run by board-certified internists and provides continuity care and health maintenance services to individuals with private health insurance as well as Medicare beneficiaries. Patients are referred to the group's gastroenterology specialists

for colonoscopy at affiliated off-site locations. Only the privately insured from this practice were included in the study.

Data Collection

The ICD-9 Code for screening colonoscopy (45.23) was used to extract medical charts for the study. There were 200 medical charts with completed screening colonoscopy at the private clinic between January 2000 and May 2007, of these 45 charts were randomly selected (using the Microsoft Excel random number generator program). Similarly, from the University hospital clinic records, 150 medical charts met the selection criteria, and 50 charts were randomly selected.

Outcome variable and measures:

The dependent variable was time between primary care physician's referral and receipt of screening colonoscopy. Type of health insurance was the independent variable in this study.

Data Analysis

Data regarding insurance status was dichotomized for having private versus public health insurance. Medicare, Medicaid and SAGA covered individuals were grouped together as publicly insured. Age, gender, insurance status, and the time between the first clinic visit with screening referral and receipt of colonoscopy were recorded. Linear model analysis was performed using SAS 9.1 to compare the average waiting time in receiving screening colonoscopy among the two insurance groups. T-tests were performed to examine gender and age-related differences between the two insurance groups as well as within each group.

RESULTS

Table 4 shows the baseline characteristics of the two study groups (age and gender) by type of health insurance. There was no significant age or gender difference between insurance groups. However, there was a significant difference for the time between date of first clinic referral and the date of screening colonoscopy. The time between the first clinic visit and the procedure was statistically significant ($p < 0.0001$) between the two groups. The average waiting time for screening colonoscopy in privately insured individuals (33 days) was significantly lower than that for publicly insured individuals (200 days) [see Figure 2]. There was no statistical difference ($p=0.089$) in time for screening colonoscopy between men and women (data not shown). Age or gender related differences within each group were also not statistically significant except that there were fewer men than women.

Figure 3 shows a graph of the trend in receiving screening colonoscopy over the last 7 years for these two groups. In 2004, the average waiting time in the publicly insured group was found to be the shortest (140 days). However, in 2000, the publicly insured group waited the longest period of time (300 days) to receive screening colonoscopy. Waiting time in the privately insured group remained shorter than publicly insured individuals throughout the seven years.

DISCUSSION

The results of this study are consistent with previous studies,[73] and confirm the fact that disparities exist in our healthcare delivery system based on health insurance status. The study illustrates that health insurance status greatly affects timely access to preventive health care for publicly insured individuals. This is also consistent with the association between health insurance coverage and access to primary and preventive care, because health insurance type is associated with length of waiting time for screening. Publicly insured individuals had to wait longer for screening colonoscopy to be performed than privately insured individuals. Insurance coverage through Medicaid was frequently not accepted by physicians, individuals had problems gaining access to services, and finding providers available for colonoscopies was a challenge.[74] In the US, individuals pay approximately 13% of all health care costs out of pocket. Rising costs due to economic inflation create an especially severe financial burden for individuals who must pay health care costs out of pocket. One study found that patients felt unwelcome at the gastroenterology specialty medical practices and had to travel long distances to find physicians who accepted their health insurance coverage in order to receive CRC screening.[75] Long waiting times to receive screening once a physician accepting public insurance was found may be due to prioritized scheduling which results in privately insured individuals receiving screening first. In other studies, non-adherence to screening or non-scheduling of screening has been attributed to health system barriers. This study was limited to those who were screened and completed their screening. Future studies should include patients who did not complete screening to identify the barriers.

Previous research has confirmed that unmet healthcare needs were also attributed to the high costs of medical care. These findings were also consistent with barriers to healthcare access experienced by low-income families with Medicaid insurance.[76] Therefore, lack of access often resulted in loss of follow-up and frequently affected timely screening. The present study found an average 200 day waiting time to receive screening colonoscopy for publicly insured patients. This delay for the publicly insured group may just be the tip of the iceberg, as discussed above, and may underestimate the actual delay faced by an average risk individual in the general population. This situation has created a vicious cycle in the US health care system, where reluctance by physicians to screen patients with public health insurance has limited timely access to screening colonoscopy, which may inevitably result in later stage diagnosis of CRC and increase the overall cost for medical treatment. Consequently, the percentage of unscreened adults aged 50 or over in Connecticut (42%) is likely to rise. If future policies target the issue of increased timely CRC screening of patients with public health insurance, this should result in improved rates of screened patients in Connecticut, and decreased waiting times for CRC screening may result in early detection of CRC.

Published cost estimates for the medical care of patients with CRC range from $25,000 to $45,000.[77] Therefore, early diagnosis is essential to reduce overall cost due to cancer related morbidity and mortality.

The relationship between insurance status and the diagnosis of four types of cancer including CRC in adults has been examined. It was found that when cancer was first diagnosed in its later stages, it often reflected poor access to primary care and routine health screening. The researchers also found that the uninsured and those with Medicaid

coverage had greater odds of a late-stage diagnosis than the privately insured group.[78] Public insurance greatly affects screening rates for many conditions as described earlier in the paper. Another cancer example is screening mammography in Latinas. It was estimated that only 13.2% of eligible women received a mammogram between 2002 to 2003; public health insurance status was widely recognized as a major barrier. [79 80]

Previous studies have also found gender differences in screening such that women are less likely to be screened for CRC than men. This suggests gender-specific barriers to screening for women, which may include viewing the preparation for endoscopic procedures as a major barrier to screening.[81] In contrast to previous studies, the present study did not find any statistical significance between men and women in terms of their health insurance status. This may reflect the over representation of females at both clinic sites due to overall low number of total study subjects.

It has been well established that racial disparities exist for CRC screening as well as other preventive healthcare.[82] Socio-cultural factors, such as low education levels, low income levels and low levels of acculturation, are associated with those most likely to have public health insurance. For example, African American women were less likely to be screened for CRC than Caucasian females due to their likelihood of reporting a lack of insurance coverage or public health insurance coverage.[83] Another study analyzing CRC screening utilization in Medicare beneficiaries concluded that CRC screening was strongly associated with receipt of previous screening (35.7% vs. 21.2%; p < .001), and screening was also more frequent in younger and white patients.[84] Since the majority of those publicly insured individuals are likely to belong to racial and ethnic minority groups, such as African Americans and Hispanics; it can be hypothesized that targeting

publicly insured individuals for improvement of screening would result in an improvement in timely screening of racial and ethnic minorities.

Given that health insurance status is associated with socio-demographic characteristics, such as race/ethnicity, immigration status/country of birth, and level of education; it is possible that differences in screening rates reflect differences in knowledge about cancer prevention, cultural beliefs or other barriers to health care.

The results of this study emphasize the importance of making sure that policy makers understand the barriers faced by low-income families with public health insurance, especially when trying to access necessary preventive care such as CRC screening.

Limitations and Recommendations.

There were several limitations to this study. The crude measure of time difference between physician order and receipt of screening colonoscopy did not account for administrative and patient-related issues such as clinic scheduling, transportation, missed appointments and attitudes of clinic staff.

Race/ethnicity of the study groups was not recorded as this study focused primarily on health insurance status as a barrier in receiving timely CRC screening. From previous studies, authors have found publicly insured (Medicare or Medicaid) individuals representing racial minorities. Previous research showed that patients with dual coverage (Medicare-Medicaid) were 15 to 52 percent less likely to undergo CRC screening procedures- a gap that persisted in age, race, and sex-stratified analyses. [85] However, joint enrollment (Medicare-Medicaid) status was not recorded in the present study.

Another limitation is that the total number of screening colonoscopies ordered in each clinic site each year was not recorded. Future studies may benefit by including both total

procedures ordered as well as procedures completed. This would provide a denominator for screening ordered and completed. This study lacks generalizability due to the small sample size, limited clinic sites, and confounding of clinic site and insurance status.

The US is in the midst of a health care workforce crisis that is expected to worsen in the next decade.[86] Future studies should focus on qualitative data about healthcare providers' attitudes about barriers to performing procedures as these may also have a great impact on timely screening. For example, limiting factors may include increased patient load, limited para-medical staff, limited endoscopic instruments or minimal reimbursement.

An upper age limit of 75 years of age was chosen in this study. While current guidelines do not specify an upper age limit for CRC screening, recent studies have questioned the life expectancy benefit obtained from performing screening colonoscopy in very elderly persons.[87] [88] The benefits of screening an elderly person must be weighed against the risk of the procedure as well as competing comorbid conditions. Another limitation is that un-insured individuals were not included in this study as data collection was limited to those who had either public or private health insurance from the two clinic sites. Uninsured individuals are likely to receive their medical care in emergency departments due to lack of primary health insurance coverage. Therefore future studies may also benefit from including uninsured individuals to document the issues they face in receiving screening colonoscopy and comparing the results with privately and publicly insured groups.

Despite these limitations, this study suggests that there is a longer time required for screening for CRC associated with public health insurance when compared with privately insured patients. Health insurance is an essential foundation for all individuals, but it does

not solve all problems. Policy reforms need to address all three issues: insurance, access and cost.

The ideal health care system would ensure access to health care without financial barriers, where cost sharing with co-payment schedules is based on income. Therefore, low-income individuals would pay no or nominal amounts, which would help restrain costs. Initiatives that provide financial incentives to physicians for voluntary achievement of evidence-based performance standards should improve preventive screening, quality of care, and continuous care coordination.

According to the US 2000 census data, Connecticut's population age 50 and over is a little over 1 million (almost 30% of the total population) and is rapidly growing. In this study, the mean age for both screening colonoscopy groups (public and privately insured) was 60 years. Developing a national health care workforce policy for the education and training of an adequate supply of health professionals in the US, this country could help the nation's health care needs to be met, as timely screening is affected by the availability of health care professionals who are able to perform CRC screening.

This policy would greatly help to meet the demands of our rapidly growing population of those who are 50 years of age or above and require CRC screening.

Evidence in previous research suggests that a physician reminder system works effectively for physician adherence to screening recommendation.[89] By making CRC screening reminders part of the preventive health care checklist at the front of every patient chart, more timely referrals can be made.

In order for future studies to better address existing health insurance-related disparities in the healthcare system based on health insurance, the study design should include multiple

clinic sites for a more comprehensive collection of data. Including survey questionnaires for physicians as well as patients in the study group would also help identify barriers to recommending, obtaining and performing screening procedures. Lastly, by designing a study including uninsured individuals as a third study group, better comparisons could be made across the three different insurance groups.

CONCLUSION

Health insurance coverage plays a fundamental role in improving health care service access, delivery and health outcomes. Preventive care such as regular doctor visits and health screenings are crucial to maintenance of good health and prevention of serious health problems; they are also important indicators of overall access to healthcare. Disparities in timely receipt of care identified in this study require immediate attention at local, state, and federal level. It is evident that health insurance coverage facilitates timely access to healthcare.   In order to monitor facilitators and barriers to health care delivery, measures such as increasing patient-provider communication, physician awareness and provision of comprehensive insurance coverage, need to be taken at the policy and program levels so that the sources of health care inequity can be addressed. Universal coverage through as a national health plan would help decrease access gaps and improve the rates for recommended preventive healthcare services.

Further research is needed to determine the basis for the observed disparities in timely access to colorectal cancer screening and to develop interventions to reduce and eliminate these differences.   Culturally appropriate and population tailored interventions should include print and media material promoting knowledge of CRC screening. In addition, research is needed to understand patient-related factors and barriers to timely receipt of CRC screening, with a special focus on the publicly insured. A program involving multiple components targeting different levels of change such as providers, patients, and the community should help reduce some of the causes of disparities. Effective provider interventions incorporating one-on-one feedback and education may also prove

successful. However, more research is needed to systematically investigate the causes and potential solutions to access to and utilization of CRC and other screening procedures.

Table 1: Screening Recommendations for Colorectal Cancer (CRC) [90]

Risk Category	Screening Method	Age to begin screening
Average risk	1. Fecal occult blood testing annually. 2. Flexible sigmoidoscopy every five years. 3. Fecal occult blood testing annually and flexible sigmoidoscopy every five years. 4. Double-contrast barium enema every five to 10 years. 5. Colonoscopy every 10 years.	50 years
Family history of CRC	1. Colonoscopy every 10 years. 2. Double-contrast barium enema every 5 years.	40 years of age or 10 years before cancer was diagnosed in the youngest affected family member, whichever is earlier.

Table 2: Comparison between Colorectal Cancer (CRC) Screening methods: Sensitivity, Specificity and Cost

CRC Screening Test	Sensitivity (%)	Specificity (%)	Cost (US $)	Total costs per life-years saved (US $)[91]
FOBT [92]	30-50	90-99	10-25 [93]	81, 678
Barium Enema [94]	62-90	67-85	200-250 [95]	17,553 [96]
Sigmoidoscopy [97]	95	94	150-200 [98]	74, 032
Colonoscopy [99]	>95	90-96	500-1,000 [100]	28, 143

Table 3: National average CMS Reimbursement for Diagnostic Colonoscopy: Inpatient vs. Outpatient[101]

	Inpatient (Hospital)	Outpatient (Office)
Diagnostic Colonoscopy (CPT Code: 45385)	$282	$502

CMS = Centers for Medicare and Medicaid Services
CPT = All Current Procedural Terminology. Copyright 2006 American Medical Association

Table 4: Demographic Characteristics

Type of Insurance	Subjects (n = 95)	Age (mean $\pm$ SD)	Sex (M/F)
Private	45	60 $\pm$ 7	12/33
Public	50	59 $\pm$ 6	17/33

Figure 1: CT Population Distribution by Insurance Status[102]

Legend:
- Employer
- Medicare
- Medicaid
- Other Public
- Uninsured
- Individual

4%
10%
1%
11%
13%
61%
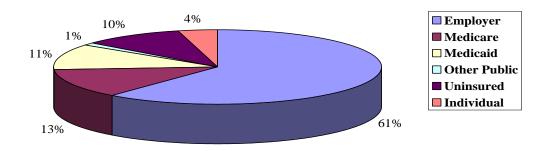
Figure 2: Average waiting time (days) & Health Insurance Status
df=54.7, t-value=4.53, p<.0001
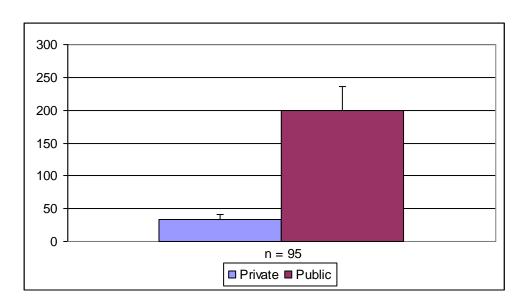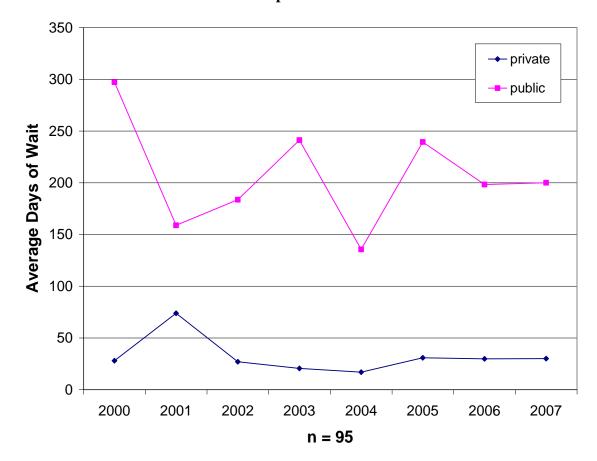

n = 95

Private   Public

Figure 3: Average waiting time in days to receive Screening Colonoscopy in 7 years period.

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