Final Report

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Alabama Survey of Endoscopic Capacity (SECAP)

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1.0 Introduction

This report represents the final report of the Alabama Survey of Endoscopic Capacity (Alabama SECAP)—a study which was conducted to assess the current capacity of the Alabama healthcare system to conduct colorectal cancer (CRC) screening and follow-up examinations for average-risk persons 50 to 75 years of age. The age range selected is consistent with current guidelines (USPSTF, 2008). Data for the study were obtained from a survey sent to all health care facilities known to have purchased flexible sigmoidoscopes and colonoscopes between 2006 and 2010 based on lists provided by major endoscopic equipment manufacturers. The survey obtained information regarding the number of colorectal screening and follow-up examinations currently being performed, as well as the additional number of screening and follow-up examinations that could be performed in the event of widespread screening. The study then compared the actual numbers of endoscopic procedures currently being performed and the additional number currently possible with the number of procedures needed for the eligible population, based on the demographic composition of the state population and current rates of screening. Estimates are provided for each of six sub-state regions, as well as for the state overall. The results of the study provide valuable information to determine whether or not the capacity can meet the need for colorectal cancer screening and follow-up procedures.

In this report we summarize the methods and findings from the study. The study methods—the objectives of the study, survey design and administration, and analysis methods—are described in Section 2. In Section 3 we estimate the current capacity for colorectal cancer screening and follow-up examinations. This includes a discussion of the number of colorectal cancer screening and follow-up procedures that are currently being performed, the additional number of procedures that could be performed in the event of widespread screening and the characteristics of the medical practices and providers that currently perform colorectal cancer screening and follow-up examinations. In Section 4 we estimate the size of the unscreened average-risk population 50 to 75 years of age and the tests needed to screen them. Finally, in Section 5 we compare the number of additional procedures possible with the unmet need for colorectal cancer screening and follow-up examinations in order to assess the capacity of the healthcare system to provide the necessary colorectal cancer screening and follow-up examinations.

2.0 Study Methods

2.1 Objectives of the Study

The primary goal of the study was to determine the capacity of the state health care system to provide endoscopic colorectal cancer screening and follow-up to all appropriate persons. Specifically, the objectives of the study were to:

- Describe the health care provider and facility characteristics of those providers who are performing screening and follow-up examinations;

- Estimate the number of colorectal cancer screening and follow-up examinations currently being performed by facilities that own sigmoidoscopes and colonoscopes and the additional number of screening and follow-up examinations that could be performed in the event of widespread screening;

- Determine the unmet need for colorectal cancer screening and follow-up examinations among average risk individuals 50 to 75 years of age; and

- For the state overall, as well as for sub-state regions, compare the number of procedures that could be performed with the need for colorectal cancer screening and follow-up examinations in order to assess the current capacity of the health care system to provide the necessary colorectal cancer screening and follow-up examinations.

To obtain information on the current capacity in the state for colorectal cancer screening and follow-up examinations, a survey was administered to all health care facilities known to have purchased flexible sigmoidoscopes and colonoscopes between 2006 and 2010. This included single-specialty and multi-specialty physician practices, single-specialty and multi-specialty ambulatory endoscopy/surgery centers (ASCs), hospitals, medical clinics, and managed care organizations. In addition, to estimate the unmet need for colorectal cancer screening and follow-up examinations, a forecasting model was developed and used to: (1) estimate the number of average-risk people 50 to 75 years of age who have not been screened for colorectal cancer; (2) describe the socio-demographic characteristics of the unscreened population; and (3) estimate the annual number of procedures required to satisfy the unmet need for endoscopic colorectal cancer screening and follow-up tests.

2.2 Survey Design and Administration

All facilities in the state that are known to have purchased lower gastrointestinal (GI) endoscopic equipment between 2006 and 2010 were surveyed to obtain information regarding the number of screening and follow-up procedures that are currently being performed, the additional number of procedures that could be performed in the event of widespread screening, and the characteristics of the practices and the providers performing screening and follow-up procedures (including non-physician providers). The State Survey of Endoscopic Capacity (State SECAP) was done

simultaneously with the National SECAP in 2012. All facilities in the state that were not surveyed in the national survey were contacted and asked to participate in the State SECAP.

Facilities were contacted by telephone to verify their eligibility and to obtain the name and address of the person in charge of endoscopy at the facility. The survey was sent to the person identified in the screening telephone call.

In this section we provide a detailed description of the survey design and administration. In particular, we describe (1) development of the survey instrument, (2) identification of the eligible facilities that perform endoscopy, (3) data collection procedures, and (4) region definitions and survey response rate.

2.2.1 Development of the survey instrument

Two survey instruments were used in the study: a telephone screening questionnaire and a self-administered survey. The instruments were similar to those used in the National SECAP I in 2001 and the State SECAP administered between 2003 and 2005 in 15 states. The purpose of the screening questionnaire was to confirm that the facility was eligible for inclusion in the study (lower endoscopy being performed for colorectal cancer screening in adults) and to obtain the name and address of the physician or nurse manager in charge of endoscopy at the facility. The self-administered questionnaire was then sent by Federal Express to the respondent identified during the telephone screening call. The screening call script is provided in Appendix A.

The self-administered questionnaire was modified slightly, based on the advice of experts. The revised survey instrument was pretested at three hospitals and two ASCs. Average completion time for the mail survey was 35 minutes. Minor revisions were made to the survey questionnaire to clarify confusing terminology (e.g., CTC) and add or re-order response categories (e.g., add video gastroscopes EGDs, put non-fiberoptic scope categories first). Questions were also reordered to improve skip logic.

The final SECAP II survey instrument, which was approved by OMB and the Battelle IRB, is provided in Appendix B. The survey questions in the state survey are identical to those in the national survey, thereby allowing us to combine data from facilities sampled as part of National SECAP II with the remaining facilities in the state. The cover page and inside page for the state survey differ from the national survey in terms of the name of the survey (State SECAP instead of National SECAP), and in the explanation for why the facility was selected (sampled in National SECAP; part of the universe for State SECAP).

The self-administered survey was designed to obtain information regarding:

- The numbers of flexible sigmoidoscopies and colonoscopies currently being performed and the types of providers performing the procedures (including the numbers of procedures performed by non-physician endoscopists);
- The additional numbers of flexible sigmoidoscopies and colonoscopies that could be performed with no other investment of resources;

- The primary limiting factor to performing additional flexible sigmoidoscopies and colonoscopies;
- Step(s) that would be taken if the need for screening flexible sigmoidoscopy and colonoscopy were to exceed their current capacity to perform these procedures;
- Room time for flexible sigmoidoscopies and colonoscopies;
- Waiting times for flexible sigmoidoscopy and colonoscopy appointments;
- Percentage of procedures that are for screening, surveillance and diagnostic purposes;
- Percentage of procedures that are incomplete; and
- Practice regarding use of sedation or anesthesia.

2.2.2 Identification of the eligible facilities that perform endoscopy

All medical practice sites in the state that currently perform colorectal cancer screening and follow-up in adults using flexible endoscopic equipment (sigmoidoscopes and colonoscopes) were considered to be eligible for participation in the study. The names and addresses of these medical practice sites were obtained from the three major endoscopic equipment manufacturers. Olympus America, Inc., Fujinon, Inc., and Pentax Precision Instrument Corporation provided names and addresses of facilities purchasing endoscopic equipment from 2006 to 2010. Preparation of the SECAP facility file involved standardizing the files, merging the files, and removing duplicates or ineligible cases (e.g., veterinarians, pediatric hospitals, moving and storage companies). Some state facilities were surveyed as part of the random sample drawn for the National SECAP. The remaining facilities in the state were surveyed for the State SECAP.

2.2.3 Data collection procedures

The target population for the survey included all facility settings where flexible sigmoidoscopy or colonoscopy is used to detect colorectal cancer in adults.

Telephone screening calls

Current telephone numbers for the facilities were obtained from the manufacturer's data file or by searching Internet phone directories and facility websites. Both the facility address and name were used to search for phone numbers, to ensure that medical facilities that changed names or moved were not missed. Facilities that could not be found by either facility address or name were presumed to be out of business.

A telephone screening call was made to (1) verify that the facility was eligible for inclusion in the study, and (2) to obtain the name and address of the physician or nurse manager in charge of endoscopy. Not all facilities that purchased equipment were still performing lower endoscopy at the time of the screening call.

The script of the telephone screening call is provided in Appendix A. The telephone interviewers used a computer-assisted version of this script that prompted them to ask for additional information depending upon the previously recorded answers. For example, the script varied depending upon whether the facility was a hospital, ambulatory surgery center, or physician office.

Conduct of the mail survey

Following the initial screening call, a survey packet was sent to the person identified during the call. The packet included (1) the survey questionnaire with an ID number, (2) a personal cover letter, signed by the Chief of the Comprehensive Cancer Control Branch in the Division of Cancer Prevention and Control at CDC, emphasizing the importance of the study, (3) a postage-paid return envelope addressed to Battelle, and (4) a payment of $40 as an incentive for the respondent's participation in the study. The letter provided the name and telephone number of the Battelle Task Leader to call with questions about the study. The letter also included the name and telephone number of a person to call with questions regarding Human Subjects protection. The survey packet was sent via Federal Express. The cover letter and survey questionnaire are provided in Appendix B.

Follow-up procedures

Two to three weeks after the initial mailing, a thank-you/reminder postcard was sent to each respondent to encourage survey completion. The postcard included a toll-free number to call if the respondent had any questions regarding the survey or needed to have another copy of the survey mailed. Two to three weeks after mailing the postcard reminder, a telephone call was placed to respondents who had not returned a completed questionnaire. This call served as a reminder, and allowed the opportunity to answer any questions that were delaying completion of the survey. A second telephone call was made when a completed survey was not received within two weeks following the first follow-up telephone call. A third (and final) telephone call was made when a completed survey was not received within two weeks following the second follow-up telephone call.

Tracking system

A management information system was used to monitor data collection activities. The database stored all background data known about each respondent. In addition, the database contained the dates of screening and follow-up telephone calls, the dates that questionnaires and other survey materials were mailed, and the dates that completed questionnaires were received. Mailing labels and personalized letters were generated from this system. Follow-up reminder dates were computed by the tracking system to ensure timely mailing of necessary follow-up materials and reminder phone calls. The management information system was also used to generate weekly reports summarizing the status of the data collection activity.

2.2.4 Region definitions and survey response rate

In addition to estimating the current capacity and unmet need for colorectal cancer screening and follow-up examinations at the state level, we also compared current capacity and unmet need by the sub-state regions shown in Figure 2-1. To protect confidentiality of survey respondents, we required that each region have a minimum of five facilities providing capacity data.

The number of eligible facilities, the number of surveys received, and the response rates achieved are shown in Table 2-1 for the sub-state regions and for the state overall.

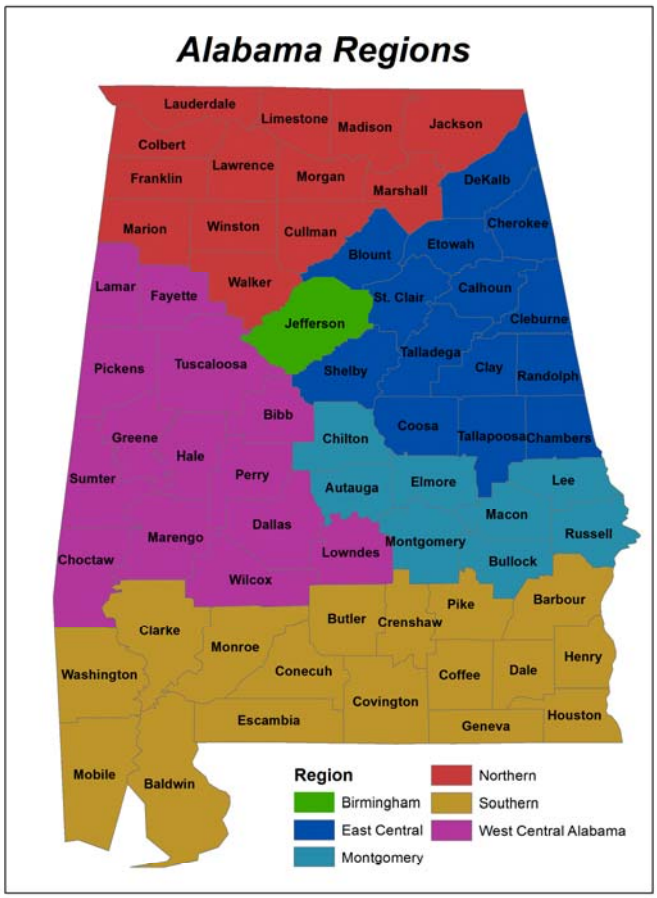

Figure 2-1: State Regions

Table 2-1

Number of Eligible Facilities, Valid Surveys and Response Rate by Region in Alabama

	Eligible Facilities	Valid Surveys	Response Rate %
Region			
1. Northern	22	15	68.2
2. East Central	15	10	66.7
3. Montgomery	9	6	66.7
4. Southern	16	13	81.2
5. Birmingham	17	13	76.5
6. West Central	8	6	75.0
Total	**87**	**63**	**72.4**

As can be seen from Table 2-1:

- The overall response rate was 72.4%. The response rate varied by region, ranging from 66.7% in the East Central and Montgomery Regions to 81.2% in the Southern Region.

Characteristics of the respondents and the facilities they represented are shown in Table 2-2. Nearly three-quarters of the respondents are nurse administrators or managers, and approximately three-quarters of the facilities are hospitals.

Table 2-2

Respondent Characteristics

	Number	Percent
Respondent Professional Position		
Physician endoscopist	4	6.4
Nurse endoscopist	0	0.0
Nurse administrator/manager	47	74.6
Endoscopy nurse	6	9.5
Other	6	9.5
Facility Type		
Hospital	48	76.2
Ambulatory or endoscopy surgery center	14	22.2
Physician practice	1	1.6
Total surveys	**63**	**100.0**

2.3 Analysis Methods

The survey data were analyzed using standard univariate and bivariate descriptive statistics (e.g., means, frequencies, cross-tabulations).

In the sections below we describe the procedure used to classify facilities for the analysis, the procedure used to impute missing data on the key variables, and the procedure to weight the data to adjust for non-response.

2.3.1 Classification of facilities by urban/rural location and practice specialty

For the analysis, we classified facilities as urban or rural. We used a dichotomous urban/rural classification based on a ZIP code version of the rural-urban commuting area (RUCA) coding scheme. To yield a rural-urban dichotomy, RUCA codes 1 (urban core census tract) to 3 (census tract weakly tied to urban core) were considered to be urban and codes 4 (large town census tract) to 10 (isolated small rural census tract) were considered to be rural.

We also classified facilities as one of four practice types based on the specialty of the physicians that perform the flexible sigmoidoscopy and colonoscopy procedures at the facility. These practice specialties include: (1) gastroenterology practices, (2) primary care practices, (3) surgical practices, and (4) mixed practices.

- If 75% or more of the procedures are performed by gastroenterologists, the facility was classified as a **gastroenterology practice**.

- If 75% or more of the procedures are performed by family practitioners, general practitioners and/or internists, the facility was classified as a **primary care practice**.

- If 75% or more of the procedures are performed by colorectal and/or general surgeons, the facility was classified as a **surgical practice**.

- If there is no dominant physician specialty or if the dominant physician specialty for flexible sigmoidoscopy is different than that for colonoscopy, the facility was classified as a **mixed practice**.

Residents, fellows, and non-physician endoscopists were not considered in determining the practice specialty. If a facility only performs one of the procedures, we classified it based on that one procedure. If the survey was missing information for one of the procedures, the information for the other procedure was used to classify the practice site. It should be noted that this definition of practice type is based on the dominant physician specialty performing lower GI endoscopic procedures at the facility, rather than the dominant physician specialty for all medical procedures.

Table 2-3 shows the breakdown of practice specialty by urban or rural location. In Alabama, 65% of the facilities are located in urban areas. In urban areas, 78% of the 41 facilities have

gastroenterologists who perform 75% or more of the endoscopies. In rural areas, only 27% of the 22 facilities are of this type.

Table 2-3

Surveys by Practice Specialty and Urban/Rural Location		
Practice Specialty	**Urban**	**Rural**
Gastroenterology	32	6
Primary care	1	3
Surgery	1	8
Mixed	7	5
Total surveys	**41**	**22**

2.3.2 Imputation of missing data

For the estimation of endoscopic capacity, two questions are critical to the analysis. These critical items included: (1) the number of procedures currently being performed and (2) the additional number of procedures that could be performed. If the respondent indicated that the procedure was performed at the facility, but the number of procedures currently performed each week and the additional number of procedures that could potentially be performed each week were both missing, then the case was treated as a refusal.

Due to the low volume of flexible sigmoidoscopies performed at many facilities, facilities that perform fewer than two flexible sigmoidoscopies per week were skipped past most of the flexible sigmoidoscopy questions. Thus, the number of facilities included in the analyses for flexible sigmoidoscopy is the subset of facilities currently performing two or more flexible sigmoidoscopies per week. Facilities that perform fewer than two flexible sigmoidoscopies per week and perform no colonoscopies were considered ineligible.

Below we describe the surveys that were missing key capacity data and how the missing data were handled. Of the 63 Alabama surveys, surveys that required imputing data included the following:

- 1 survey that was missing the number of additional colonoscopies possible;
- 1 survey that was missing the number of additional flexible sigmoidoscopies possible.

We used two variables to stratify facilities before imputing missing values: (1) whether the facility was located in a rural or urban area; and (2) practice specialty (gastroenterology, primary care, surgery, or mixed specialties) performing the procedures at that facility. In the National SECAP I, these two variables were found to be closely associated with the number of procedures performed. Thus, all facilities were stratified into 8 cells based on an urban/rural and practice specialty classification. If a survey indicated that the facility performs flexible sigmoidoscopy or colonoscopy, but the total number of procedures performed was missing, we imputed an estimate of current volume. The imputation method, a variation of the hot deck method, is described below:

1. For the first survey with missing information for current volume, a volume estimate was randomly selected from among all surveys with reported values from the same cell.

2. The process was repeated for each subsequent survey with missing information (excluding any surveys that were previously selected to generate imputed values).

A slightly different procedure was used to impute the additional number of flexible sigmoidoscopies or colonoscopies that could be performed. All facilities were stratified into 16 cells based on an urban/rural classification, practice specialty (gastroenterology, primary care, surgical, or mixed as defined in section 2.3.1) and the number of procedures currently being performed (e.g., less than the mean number of procedures for the cell, equal to or greater than the mean number of procedures for the cell). These three variables together are highly associated with potential volume. The imputation method, a variation of the hot deck method, is described below:

1. For the first survey with missing information for the number of additional procedures possible, we randomly selected a ratio of potential to current volume from among all surveys with valid estimates for both potential and current volume from the same cell.

2. This ratio was then multiplied by the current volume to provide an imputed value of the number of additional procedures possible.

3. The process was repeated for each subsequent survey with missing information (excluding any surveys that were previously selected to generate imputed values).

2.3.3 Calculation of survey weights

The survey data were weighted to adjust for non-response. The survey weight was calculated as the ratio of the number of eligible facilities in each of the sub-state regions to the number of completed surveys in that area. Because the survey data were weighted to produce state estimates, the data were analyzed using Stata 12.1—a software package which adjusts for the sample weights (StataCorp, 2012).

Utilizing these weights Table 2-4 shows the breakdown of facilities that perform flexible sigmoidoscopy only, colonoscopy only, or both procedures for screening adults. Only facilities performing at least two flexible sigmoidoscopies per week are included in the universe and our analyses.

Table 2-4

Estimated Number and Percent of Facilities in Alabama Performing Endoscopic Colorectal Cancer Screening

	Number	Percent
Flexible sigmoidoscopy only	0	0.0
Colonoscopy only	43	49.4
Both	44	50.6

As shown in Table 2-4, colonoscopy is the primary method of colorectal cancer screening in Alabama.

- Approximately half of the facilities perform two or more flexible sigmoidoscopies per week.
- All 87 facilities perform colonoscopy; 44 of these also perform two or more flexible sigmoidoscopies per week.

3.0 Current Capacity for Colorectal Cancer Screening and Follow-up

In this section we present survey data from healthcare facilities regarding the types of physicians currently performing lower GI endoscopic procedures, the number of procedures that are currently being performed, and the additional number of procedures that could be performed with no other investment of resources. In addition, we present survey data on the limiting factors to performing more procedures, the measures that facilities would take to meet an increased need for colorectal screening and follow-up procedures, room time allocated and waiting time for an appointment, incomplete procedures, and the use and monitoring of sedatives or anesthesia.

3.1 Characteristics of Providers Performing Endoscopy

The survey asked each facility to report the total number of flexible sigmoidoscopies and colonoscopies performed by all providers at that facility in a typical week, as well as the percentage of flexible sigmoidoscopies and colonoscopies performed by various types of providers. The responses to these questions (weighted for facility non-response) were used to calculate the percentages of all flexible sigmoidoscopies and colonoscopies performed in the state by provider specialty. The percentages of procedures that are performed by gastroenterologists, primary care providers (e.g., general or family practitioner, internist), and surgeons (e.g., general surgeons, colorectal surgeons) are summarized in Table 3-1. The percentages of procedures that are performed by fellows (with a supervising physician in attendance), non-physician providers (nurse practitioners, physician assistants, registered nurses, or licensed practical nurses), and other providers are also shown in the table. The corresponding data from the National SECAP in 2012 are also shown for comparison.

Table 3-1

Percentage of All Flexible Sigmoidoscopies and Colonoscopies Performed by Physician Specialty for Alabama and the Nation in 2012

	Flexible Sigmoidoscopy		Colonoscopy	
	State	**Nation**	**State**	**Nation**
Gastroenterologist	83.1	63.1%	74.2	82.0%
Primary Care Provider	3.2	6.7%	7.8	2.4%
Surgeon	13.8	21.0%	15.8	11.5%
General surgeon	9.5	3.9%	13.3	7.2%
Colorectal surgeon	4.2	17.1%	2.5	4.3%
Fellow with supervising physician in attendance	0.0	0.0%	2.2	2.4%
Non-Physician Endoscopist*	0.0	7.6%	0.0	0.1%
Other	0.0	1.7%	0.0	1.7%
Number of facilities	**44**	**1,831**	**87**	**5,858**

* Non-physician endoscopists include nurse practitioners, physician assistants, registered nurses, and licensed practical nurses.

As can be seen in Table 3-1, gastroenterologists perform most of the lower endoscopic procedures in Alabama and the nation.

- Gastroenterologists perform 83% of the flexible sigmoidoscopies and 74% of the colonoscopies in Alabama.
- General surgeons perform 10% of the flexible sigmoidoscopies and 13% of the colonoscopies in Alabama.
- Primary care physicians perform 3% of flexible sigmoidoscopies and 8% of colonoscopies in Alabama.
- Non-physician endoscopists do not perform lower endoscopy in Alabama.

3.2 Number and Type of Procedures Performed

The survey collected information to estimate the current and potential capacity of facilities to perform procedures. The following data are summarized in Table 3-2 for the state and the nation: percent of facilities that perform the procedure; mean number of flexible sigmoidoscopies and colonoscopies performed per week; percent of facilities that can perform more procedures (with no other investment of resources); and mean number of additional procedures that could be performed per week (with no other investment of resources).

Table 3-2

Procedures Currently Being Performed in Alabama and the Nation in 2012 (standard errors in parentheses)

	Flexible Sigmoidoscopy*		Colonoscopy	
	State	**Nation**	**State**	**Nation**
Percent of facilities that perform the procedure	50.5	30.6%	100.0	97.8%
Mean number of procedures performed per week per facility**	6.4 (0.5)	5.7 (0.4)	58.2 (5.1)	51.1 (2.5)
Percent of facilities that can perform more procedures**	79.5	20.3%	79.3	81.2%
Mean number of additional procedures possible per week per facility***	29.9 (3.1)	24.1 (1.2)	31.2 (1.8)	44.2 (5.7)

*Limited to those facilities that perform 2 or more flexible sigmoidoscopies per week.

**Among those facilities that perform the procedure

***Among those facilities that can perform additional procedures

As can be seen in Table 3-2, the majority of facilities in Alabama report the capacity to perform additional procedures with no other investment of resources.

- Facilities in Alabama that perform two or more flexible sigmoidoscopies per week on average perform 6.4 flexible sigmoidoscopies per week; facilities in Alabama that perform colonoscopies perform an average of 58.2 colonoscopies per week.

- For those facilities in Alabama that can do additional flexible sigmoidoscopies, the number of additional procedures are over four times the number of flexible

sigmoidoscopies that are currently being performed. An additional 44.2 colononoscopies per week could be performed per facility, on average.

3.3 Limiting Factors and Measures to Address Increased Need

In addition to asking facilities to estimate the additional number of procedures that they could perform per week with no other investment of resources, the survey asked about the factors that limit their ability to perform more procedures and the step(s) facilities would take if the need for screening flexible sigmoidoscopy and colonoscopy were to exceed their current capacity to perform these procedures. Respondents were instructed to answer 'yes' or 'no' to a number of response choices. These response choices, along with the percentage of respondents who answered 'yes', are shown in Tables 3-3 for primary limiting factor and 3-4 for the step(s) facilities would take to meet increased need.

Table 3-3

Primary Limiting Factor to Performing More Flexible Sigmoidoscopies and Colonoscopies in Alabama and the Nation

	Flexible Sigmoidoscopy*		Colonoscopy	
	State 2012	**Nation 2012**	**State 2012**	**Nation 2012**
Time – few open appointments	7.3%	6.1%	14.1%	6.5%
Cancellations, "no shows"	7.8%	3.6%	3.7%	5.7%
Physicians available to perform procedures	33.1%	20.6%	31.4%	34.0%
Nursing staff to assist with procedures	7.7%	10.0%	14.1%	8.9%
Ancillary staff to help with room turnover	3.4%	2.7%	1.6%	0.6%
Staff or physicians to monitor the sedation or anesthesia	--	--	1.5%	2.1%
Procedure rooms	6.8%	6.5%	6.4%	6.9%
Prep and/or recovery rooms	13.8%	9.8%	10.0%	8.2%
Endoscopes or monitors	3.5%	3.8%	0.0%	3.6%
Reimbursement	13.8%	8.0%	6.6%	4.0%
Other	3.5%	29.0%	10.4%	19.5%

*Limited to those facilities that perform 2 or more flexible sigmoidoscopies per week

As shown in Table 3-3 the availability of physicians is a key factor that limits facilities in Alabama and in the Nation from performing more procedures.

Table 3-4

Measures to Address Increased Need for Flexible Sigmoidoscopy and Colonoscopy in Alabama and the Nation

	State 2012	Nation 2012
Flexible Sigmoidoscopy*		
Increase proportion of work day allocated to procedures	42.2%	32.8%
Modify block scheduling	45.5%	32.7%
Use patient navigators or reminder calls to decrease "no shows" or cancellations	32.3%	23.4%
Increase physician staff	35.1%	26.2%
Increase/hire non-physician endoscopists to do procedures	7.0%	7.5%
Increase nursing staff to assist with procedures	49.3%	39.1%
Increase ancillary staff to help with room turnover	35.5%	35.1%
Establish a larger screening unit/more procedure rooms	30.3%	20.3%
Establish additional prep and/or recovery areas	26.9%	25.6%
Purchase or lease more equipment	31.1%	25.2%
Other	3.7%	3.8%
Not applicable, not planning to perform more procedures	20.3%	39.8%
Colonoscopy		
Increase proportion of work day allocated to procedures	61.8%	59.3%
Modify block scheduling	60.5%	56.9%
Use patient navigators or reminder calls to decrease "no shows" or cancellations	37.8%	37.3%
Increase physician staff	52.0%	55.3%
Increase/hire non-physician endoscopists to do procedures	3.3%	5.4%
Increase nursing staff to assist with procedures	72.3%	68.1%
Increase ancillary staff to help with room turnover	54.2%	51.6%
Increase staff or physicians to help monitor the sedation/anesthesia	45.5%	41.2%
Establish a larger screening unit/more procedure rooms	37.2%	36.5%
Establish additional prep and/or recovery areas	35.5%	39.9%
Purchase or lease more equipment	52.9%	52.0%
Other	0.0%	4.5%
Not applicable, not planning to perform more procedures	6.5%	8.6%

*Limited to those facilities that perform 2 or more flexible sigmoidoscopies per week

Facilities in Alabama that perform flexible sigmoidoscopy and or colonoscopy chose a number of steps they would take to increase the time, staff and space available to perform more procedures (see Table 3-4). Increasing nursing staff to assist with procedures was chosen by 49% of facilities for flexible sigmoidoscopy and 72% of facilities for colonoscopy.

Approximately one-fifth of facilities report that they would not take additional steps for performing more flexible sigmoidoscopies.

3.4 Scheduling Procedures

The survey collected information about the room time typically scheduled for each procedure, the typical waiting time for a screening, surveillance, or diagnostic endoscopy appointment, and the percentage of procedures for screening, surveillance, and diagnostic purposes.[1] The waiting time for an appointment reflects the current capacity to conduct colorectal cancer screening in a timely manner. The waiting time results comparing the state and the nation are shown in Table 3-5. The average room time for procedures and the percentage of procedures for screening, surveillance, or diagnostic purposes are reported in the bullets under the table.

Table 3-5

Typical Waiting Time for Various Endoscopy Procedures in Alabama and the Nation

	State 2012	Nation 2012
Screening Flexible Sigmoidoscopy*		
1 – 2 weeks	70.8%	72.1%
3 – 4 weeks	25.2%	18.6%
1 – 2 months	4.0%	5.6%
More than 2 months	0.0%	3.7%
Screening Colonoscopy*		
1 – 2 weeks	80.0%	68.5%
3 – 4 weeks	12.0%	20.7%
1 – 2 months	8.0%	7.0%
More than 2 months	0.0%	3.7%
Diagnostic Colonoscopy*		
1 – 2 weeks	90.5%	83.3%
3 – 4 weeks	6.2%	12.5%
1 – 2 months	3.3%	3.6%
More than 2 months	0.0%	0.6%

*Among those facilities that perform the procedure

As can be seen from Table 3-5, waiting time for screening endoscopy is relatively short at Alabama facilities.

- For flexible sigmoidoscopy the wait time is 2 weeks or less at 71% of Alabama facilities. For screening colonoscopy, the waiting time is 2 weeks or less at 80% of facilities.

[1] Surveillance refers to procedures performed for patients previously diagnosed with colorectal polyps or cancers. Diagnostic procedures are those performed for individuals with gastrointestinal symptoms or to follow-up a positive screening test, such as fecal occult blood test, flexible sigmoidoscopy, double contrast barium enema, or computed tomographic colonography.

- Waiting time for diagnostic colonoscopy is less than for screening colonoscopy: 2 weeks or less at 90% of Alabama facilities.
- The average room-time for Alabama facilities to perform lower endoscopy is 23 minutes for flexible sigmoidoscopy and 35 minutes for colonoscopy (not shown in the table).
- The percentage of flexible sigmoidoscopies performed for screening is 19.9% (not shown in the table).
- The percentages of colonoscopies performed for screening, surveillance, and diagnosis are 40.7%, 25.3%, and 34.0%, respectively (not shown in the table).

3.5 Incomplete Procedures

Incomplete procedures utilize a facility's resources without successfully screening patients. Respondents at facilities where the procedures are performed were asked the percentage of incomplete flexible sigmoidoscopies and colonoscopies performed at that site and the most common reason for an incomplete procedure. The answers to these questions are summarized in Table 3-6.

Table 3-6

Incomplete Procedures, in Alabama and the Nation

	Flexible Sigmoidoscopy		Colonoscopy	
	State 2012	**Nation 2012**	**State 2012**	**Nation 2012**
Percent incomplete*	2.0%	1.7%	5.8%	4.9%
Most common reason*:				
Poor bowel preparation	47.2%	33.1%	82.0%	71.7%
Patient discomfort or pain	3.4%	8.3%	18.0%	2.4%
Technical difficulties (e.g., spasms, adhesions, tortuosity)	3.9%	2.1%	0.0%	23.0%
Other	0.0%	1.4%	0.0%	1.4%
Not applicable; no incompletes	45.5%	55.1%	0.0%	1.5%

*Among those facilities that perform the procedure

Relatively few procedures in Alabama or the nation are incomplete.

- Approximately 2% of flexible sigmoidoscopies and 6% of colonoscopies are incomplete.
- Poor bowel preparation is the most common reason for an incomplete procedure.

3.6 Practice Regarding Use of Sedation or Anesthesia

The survey asked about the sedation or anesthesia typically used at the facility for flexible sigmoidoscopies and colonoscopies and who typically monitors opiods/benzodiazepenes and propofol. Use of sedation or anesthesia can impact facility capacity by requiring additional trained staff or physicians and by affecting the length of time needed for patients to be ready for the procedure or ready to go home, as well as the time needed to perform the procedure. The percentages of facilities in Alabama and the nation that typically use sedation or anesthesia for lower endoscopy are shown in Table 3-7.

Table 3-7

Sedation and Anesthesia Typically Used for Endoscopies in Alabama and the Nation

	Flexible Sigmoidoscopy		Colonoscopy	
	State 2012	**Nation 2012**	**State 2012**	**Nation 2012**
Opiads/Benzodiazepines	46.4%	30.1%	42.5%	36.9%
Propofol	26.7%	23.5%	33.7%	41.7%
No sedation or anesthesia is typically used	19.8%	34.0%	3.3%	0.2%
Other agents	0.0%	0.3%	0.0%	0.8%
No typical pattern	7.1%	12.1%	20.6%	20.5%

*Among those facilities that perform the procedure

Both types of sedation/anesthesia are used in Alabama.

- Opiads/Benzodiazepines are used for flexible sigmoidoscopy at 46% of facilities in Alabama and for colonoscopy at 42% of Alabama facilities. Propofol is used at 27% of facilities for flexible sigmoidoscopy and at 34% of facilities for colonoscopy.
- No sedation or anesthesia is typically used by 20% of facilities for flexible sigmoidoscopy, whereas sedation or anesthesia is typically used for colonoscopy at 97% of facilities.

The survey asked respondents to select all the type of physicians or staff who typically monitor the sedation and anesthesia. Table 3-8 presents the results for facilities in Alabama and the nation. Note that the percentages do not add to 100%, because respondents could select more than one response.

Table 3-8

Monitoring of Sedation or Anesthesia for Endoscopies in Alabama and the Nation*

	Opiods/Benzodiazepines		Propofol	
	State 2012	**Nation 2012**	**State 2012**	**Nation 2012**
RN	67.1%	61.4%	4.9%	5.3%
Certified Registered Nurse Anesthesiologist (CRNA)	14.6%	15.5%	82.0%	58.8%
Endoscopist	15.9%	21.5%	3.1%	3.5%
Anesthesiologist	6.5%	10.9%	23.0%	46.7%
Other	1.4%	0.5%	3.1%	1.0%
Not applicable; anesthesia or sedation not typically used	0.0%	0.0%	3.0%	0.0%

*Among those facilities that perform the procedure

The results in Table 3-8 show that Alabama facilities and facilities nationwide use CRNAs and anesthesiologists to monitor propofol, whereas RNs are most commonly used to monitor opiods/benzodiazepines.

4.0 Unmet Need for Screening and Follow-up Procedures

In this section we describe the forecasting model that was used to estimate the unmet need for colorectal cancer screening and follow-up examinations. The model (1) estimates the number of average-risk people 50 to 75 years of age who have not been screened for colorectal cancer according to current guidelines; (2) describes the socio-demographic characteristics of the unscreened population; and (3) estimates the annual number of procedures required to satisfy the unmet need for endoscopic colorectal cancer screening and follow-up tests. We begin by describing the methods and data sources used in developing the forecasting model. We conclude with a summary of the number of colorectal cancer screening and follow-up procedures that are required to satisfy the current unmet need.

4.1 Development of the Forecasting Model

A forecasting model—based on the demographic characteristics of the state population -- was developed and used to estimate the current unmet need for colorectal cancer screening and follow-up procedures (i.e., the number of people who currently have not been screened for colorectal cancer according to current guidelines). An overview of the forecasting model is provided in Figure 4-1.

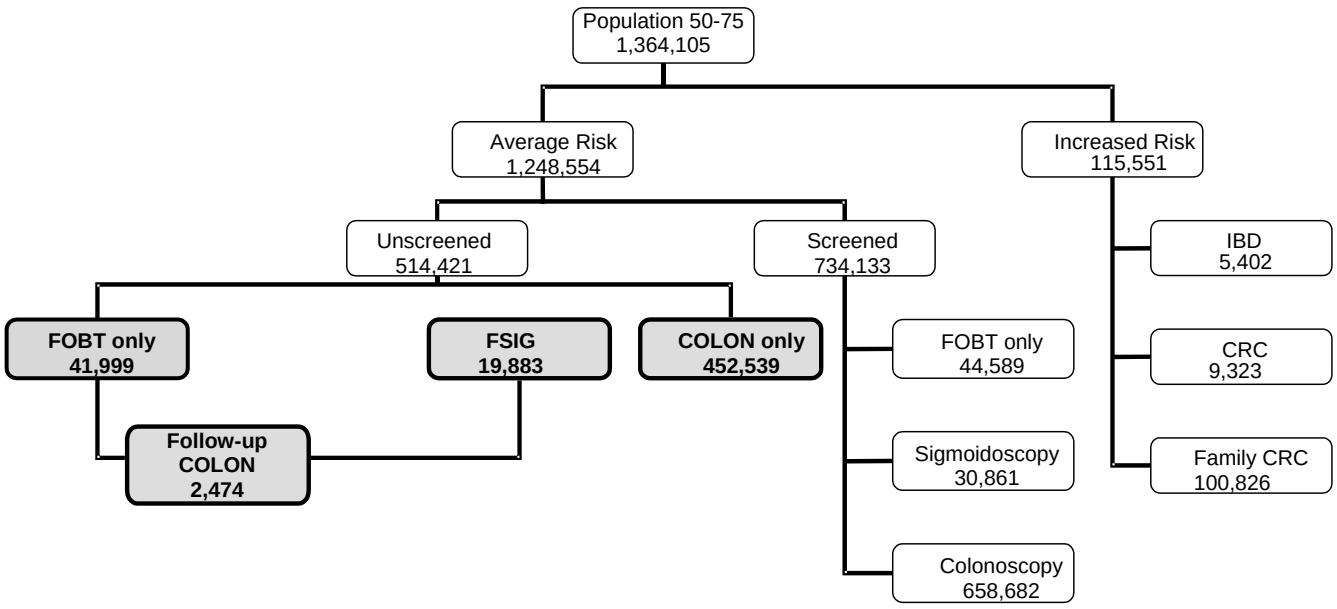

Figure 4-1: Estimated number of people needing CRC screening and follow-up

The model begins with the number of people 50 to 75 years of age. The population at increased risk—those with inflammatory bowel disease (IBD), a history of colorectal cancer, or a family history of colorectal cancer—was estimated and subtracted from the total number of people 50 to 75 years of age to determine the size of the average-risk population. Data from the Behavioral Risk Factor Surveillance Survey (BRFSS) in the state were analyzed to estimate colorectal cancer screening rates among average-risk people 50 to 75 years of age. These screening rates were then applied to the average-risk population to estimate the number of individuals who have been screened according to current guidelines and the number who have not been screened for colorectal cancer. (The estimates in the grey boxes are for the base case described below in section 4.1.3) The data used and the assumptions made in developing the forecasting model are described below.

4.1.1 Population estimates

We used the U.S. Census Bureau estimates for the number of people by county, age, gender and race/ethnicity (Annual County Resident Population Estimates by Age, Sex, Race, and Hispanic Origin: April 1, 2010 to July 1, 2011).[2] Since estimates were by standard five year age ranges (e.g.; 50-54, 55-59, etc.) and we needed to include estimates for ages 50 to 75, we estimated the number of people age 75 as one-fifth of people in each county ages 75 to 79. The estimates by age were combined so that we had totals for those ages 50 to 64 and 65 to 75.

The population distribution by insurance status and income level by gender and race/ethnicity was estimated for all people in the state ages 50 to 64 using data from the Small Area Health Insurance Estimates (SAHIE) for 2010. The SAHIE was also used to estimate the population distribution by income level and health insurance status stratified by gender and county for ages 50 to 64 but for all race/ethnicity groups combined. The Current Population Surveys for March 2008, 2009, 2010 and 2011 were used to estimate the population distribution by income level and health insurance status stratified by gender and race/ethnicity for all people in the state ages 65 to 75. We used the county level distributions for income level and health insurance status for those 50 to 64 for all race groups as initial estimates for each race groups and both age levels, and then used iterative proportional fitting to combine the initial estimates by county with state level estimates to estimate the distributions for those ages 50 to 64 and 65 to 75 by race/ethnicity for each county such that the totals across all counties yields results consistent with the statewide totals.

To determine the size of the population at average risk for colorectal cancer, we first estimated the number of individuals at increased risk for colorectal cancer. These include people with inflammatory bowel disease, a history of colorectal cancer, or a family history of colorectal cancer. We did not attempt to measure the size of the population currently receiving post-polypectomy surveillance colonoscopies. Sources of information regarding the numbers of individuals at increased risk for colorectal cancer are described below.

[2] File: 7/1/2011 County Characteristics Resident Population Estimates
Source: U.S. Census Bureau, Population Division
Release Date: May 2012

- **Inflammatory bowel disease**. An estimate of the number of individuals with IBD was obtained from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) website.[3] We assumed that the prevalence of IBD does not vary by state, age (among those 20 years of age and older), race/ethnicity or gender. We used the national prevalence rate to estimate the number of individuals ages 50 to 75 in the state who have IBD. Approximately 5,402 persons 50 to 75 years of age were thus estimated to be at increased risk due to IBD.
- **History of colorectal cancer**. The state health department provided incidence counts for colorectal cancer stratified by age, race, gender and region. To estimate the prevalence of CRC from these incidence estimates, we applied the ratios estimated from national data to the state incidence counts.[4] Based on this, we estimated approximately 9,323 persons 50 to 75 years of age have a history of colorectal cancer.

- **Family history of colorectal cancer.** An estimate of the number of individuals with a family history of colorectal cancer stratified by age, and race/ethnicity was obtained by analyzing data from the 2000 National Health Interview Survey (NHIS). Persons with a personal history of colorectal cancer were excluded from analysis. A person was considered to have a family history of colorectal cancer if he or she had a parent, sibling or child who had been diagnosed with colorectal cancer at any age. These estimates were divided by the national population count to estimate a prevalence rate for family history of colorectal cancer. Applying these national prevalence rates to the state population, we estimated that approximately 100,826 persons 50 to 75 years of age have a family history of colorectal cancer.

The population at increased risk—those with IBD, a history of colorectal cancer, or a family history of colorectal cancer—was subtracted from the total number of people 50 to 75 years of age to determine the size of the average-risk population.

4.1.2 Estimating the unmet need for colorectal cancer screening

Information on the characteristics of individuals and whether they have been screened for colorectal cancer based on current screening guidelines, as reported in the state BRFSS for 2008 and 2010, were used to estimate the effect of each characteristic on the likelihood of being screened. Multivariate, multinomial logistic regression was used to estimate the relationship between various socio-demographic characteristics (e.g., age, sex, race, income level, health insurance status, region of the state) and the probability that an individual has been screened with FOBT in the past year, flexible sigmoidoscopy (with or without FOBT) in the past five years, colonoscopy in the past ten years, or none of the above.

[3] NIDDK, http://digestive.niddk.nih.gov/statistics/statistics.htm

[4] We used Surveillance, Epidemiology and End Results program (SEER, 2011) crude incidence rates stratified by age, race, and gender and Census population data to estimate incidence counts nationwide. SEER also provided 18-year limited duration prevalence rates by age, gender race and ethnicity. The prevalence and incidence were applied to population estimates to obtain counts and these were combined to estimate a ratio by age, race, and gender.

To account for the sampling weights in our analysis, we used Stata 12.1 (StataCorp, 2012) for the logistic regression. The coefficients and standard errors for the logistic regression analysis are shown in Appendix C.

The logistic regression coefficients were used to estimate the proportion of average-risk individuals who have been screened according to current guidelines:

- FOBT within the past year only,
- Flexible sigmoidoscopy (with or without FOBT) in the past 5 years, and
- Colonoscopy within the past 10 years only

These proportions were used to generate population counts of the number of average-risk people in the state ages 50 to 75 that have been screened according to current colorectal cancer screening guidelines. By subtracting the number of individuals that have been screened from the total number of average-risk individuals, we produced an estimate of the size of the state population currently in need of colorectal cancer screening and follow-up procedures.

4.1.3 Need for screening procedures in various screening scenarios

Next, we estimated the total number and type of procedures required to screen the average-risk population in need of colorectal cancer screening. We estimated the number of procedures required for a base case and for four alternative screening scenarios. These are described below:

- **Base case – current patterns**. In the base case, the use of screening tests is based on the current pattern of screening test use. The coefficients of the logistic regression analysis were applied to the characteristics of the unscreened average-risk population to predict the numbers of various screening tests (e.g., FOBT, sigmoidoscopy, colonoscopy) that will be required.
- **Option 1 – 100% gFOBT**. Instead of using demographic characteristics to estimate the type of screening, this option assumes that all eligible unscreened individuals are screened with a guaiac FOBT.
- **Option 2 – 100% iFOBT**. This option assumes that all eligible unscreened individuals are screened with an immunochemical FOBT (also known as FIT). This assumption does not use the demographic characteristics to determine the type of screening tests.
- **Option 3 – 100% colonoscopy**. This option assumes that all eligible unscreened individuals are screened with a colonoscopy. This assumption does not use the demographic characteristics to determine the type of screening tests.

In addition, we estimated the number of procedures required for the base case and three options for a hypothetical program that targets low income people (e.g., those less than 200% of the poverty level) between 50 and 65 years of age, with no health insurance. The same method used to determine unmet need for the general population was used for this target population.

Need for follow-up procedures in each screening scenario

In the base case and all options, we assumed that all positive FOBT and flexible sigmoidoscopy screening tests are followed by a diagnostic colonoscopy. To estimate the number of persons who are likely to require diagnostic follow-up from initial screening tests proposed in each of these hypothetical programs, we applied positivity rates obtained in trials published in peer-reviewed literature (UK Flexible Sigmoidoscopy Screening Trial Investigators, 2002; Wilschut et. al., 2011). The positivity rates in the model for guaiac FOBT, immunochemical FOBT and sigmoidoscopy are 3.7%, 5.3% and 5.3%, respectively.

4.2 Forecasting Model Results

Figure 4-1 shows the breakdown of the state population, 50 to 75 years of age, into average risk screened and unscreened groups.

- Of the 1.2 million average-risk persons in Alabama 50 to 75 years of age, 734,133 people (58.8%) have been screened with FOBT and/or endoscopy—approximately 658,682 with colonoscopy, 44,589 with FOBT only, and 30,861 with sigmoidoscopy (with or without FOBT) at the intervals specified by current screening guidelines. The remaining 514,421 people represent the size of the average-risk population currently unscreened for colorectal cancer.

4.2.1 Characteristics of the unscreened population

The socio-demographic characteristics of the unscreened and screened average-risk persons are presented in Table 4-1.

- Slightly more than half (52%) of the average-risk individuals in need of colorectal cancer screening are women. Of the 514,421 people in need of screening, approximately 403,342 (78%) are 50 to 65 years old and 111,079 are 65 to 75 years of age. With respect to income, 314,045 of the individuals who have not been screened have incomes greater than 200% of the poverty level, while 200,376 (39%) have incomes less than 200% of the poverty level. In terms of health insurance status, 426,022 unscreened people have health insurance, whereas approximately 88,399 (17%) people do not have health insurance coverage. Of the 514,421 people, approximately 57,510 (11%) are aged 50-64, have incomes less than 200% of the poverty level and have no health insurance.

Table 4-1

Socio-demographic Characteristics of the Average Risk Population in Alabama*

	Unscreened Population	Screened Population	Total
Total	514,421	734,133	1,248,554
Gender			
Male	245,407	345,129	590,536
Female	269,014	389,004	658,018
Race/Ethnicity			
White	370,281	549,881	920,162
Other	144,140	184,251	328,391
Age			
50-65 years	403,342	480,244	883,586
65-75 years	111,079	253,888	364,967
Family Income			
>200% of Poverty Level	314,045	543,738	857,783
≤200% of Poverty Level	200,376	190,395	390,771
Health Insurance			
Yes	426,022	700,524	1,126,546
No	88,399	33,609	122,008
Region			
1. Northern	119,144	177,227	296,371
2. East Central	102,788	134,454	237,242
3. Montgomery	61,657	87,039	148,696
4. Southern	117,494	176,924	294,418
5. Birmingham	64,821	101,432	166,253
6. West Central	48,517	57,056	105,573
Age 50-64, <200% of Federal Poverty Level, No Health Insurance			
	57,510	17,587	75,097

* People ages 50 to 75 excluding those with family history of CRC, personal history of CRC or inflammatory bowel disease.

4.2.2 Total number of screening and follow-up procedures required

The total numbers of colorectal cancer screening and follow-up procedures required to satisfy the unmet need—for the base case and the three screening options—are shown in Table 4-2. The shaded boxes of Figure 4-1 also show the total number of procedures for the base case.

- Based on current screening patterns (the base case), approximately 41,999 FOBTs, 19,883 flexible sigmoidoscopies, and 452,539 screening colonoscopies are required.

- In addition, based on reported positivity rates for the various screening tests, approximately 2,474 diagnostic colonoscopies are required for the base case estimate.

Table 4-2

Number of Screening and Follow-up Tests to Immediately Satisfy Unmet Need for Alabama

	FOBT	Flexible Sigmoid-oscopy	Screening Colonoscopy	Follow-up Colonoscopy Newly Screened	Total Colonoscopy
Average-Risk Population, 50-75 Years Old					
Base Case Current patterns	41,999	19,883	452,539	2,474	455,013
Option 1 100% gFOBT	514,421	0	0	19,034	19,034
Option 2 100% iFOBT	514,421	0	0	27,264	27,264
Option 3 100% colonoscopy	0	0	514,421	0	514,421
Average-Risk Population, 50-64 Years Old, <200% of Poverty Level, No Insurance					
Base Case Current patterns	11,420	894	45,196	479	45,675
Option 1 100% gFOBT	57,510	0	0	2,128	2,128
Option 2 100% iFOBT	57,510	0	0	3,048	3,048
Option 3 100% colonoscopy	0	0	57,510	0	57,510

gFOBT = guaiac Fecal Occult Blood Test
iFOBT = immunochemical Fecal Occult Blood Test

Estimates of the number of screening and follow-up procedures that are required to satisfy the unmet need varies depending upon the screening tests used.

- If the unscreened population is screened with gFOBT only (Option 1), a total of 19,034 colonoscopies are required to follow-up positive FOBTs.

- Option 2—in which people are screened with iFOBT first—will require approximately 27,264 follow-up colonoscopies.

- Option 3—in which everyone is screened with colonoscopy--requires approximately 514,421 colonoscopies.

The lower half of Table 4-2 focuses on the unscreened population less than 65 years of age, with no health insurance and with an annual income less than 200% of the poverty level.

- There are 75,097 low income people ages 50-64 with no health insurance; 57,510 of these people have not been screened.

- For all options, the total number of endoscopic procedures needed to screen low income people without health insurance coverage, is approximately 11% of the number of procedures needed to screen the eligible population at large.

5.0 Comparison of Current Capacity and Unmet Need

In Section 3 we presented data from the State Survey of Endoscopic Capacity regarding the current capacity of the health care facilities to provide colorectal cancer screening and follow-up procedures. This included the average number of screening and follow-up procedures that are currently being performed per week, as well as the additional number of procedures that could be performed per week with no other investment of resources. In Section 4 we estimated the need for colorectal cancer screening and follow-up examinations among average-risk individuals 50 to 75 years of age who have not been screened for colorectal cancer based upon current guidelines. In this section we compare the capacity of the state health care system to perform screening and follow-up endoscopic procedures with the estimate of unmet need to determine whether or not the current capacity is adequate to meet an increased need for colorectal cancer screening and follow-up tests.

5.1 Capacity for Screening and Follow-up Procedures

The survey collected information regarding whether or not a facility performs flexible sigmoidoscopy and colonoscopy. Responses to these questions were used to estimate the total number of practices that currently perform endoscopies in the state. Table 5-1 shows the total number of practices that perform colonoscopy by region. Relatively few facilities perform two or more flexible sigmoidoscopies per week, and thus we report only state totals for flexible sigmoidoscopy.

Table 5-1
Estimated Number of Facilities that Perform Colonoscopies in Alabama, by Region

	Number
1. Northern	22
2. East Central	15
3. Montgomery	9
4. Southern	16
5. Birmingham	17
6. West Central	8
Total	**87**

Of the 87 facilities that perform endoscopy, 44 facilities (50.5%) perform flexible sigmoidoscopy and 87 (100%) perform colonoscopy.

For those facilities that perform flexible sigmoidoscopy and/or colonoscopy, the survey obtained information regarding the number of procedures performed per week, the additional number of procedures that could be performed per week with no other investment of resources, and the average number of weeks of operation per year[5]. The responses to these questions were used to estimate the current number of flexible sigmoidoscopy and colonoscopy procedures performed each year, as well as the additional number of procedures (unused capacity) that could be

[5] If a facility was closed for ten holidays per year, then we asked that the respondent enter 50 as the answer.

performed each year. The annual current number and unused capacity for each facility was calculated by multiplying reported weekly current and unused capacity estimates by the average weeks per year. The total number of facilities in each region that perform the procedure was multiplied by the mean annual procedural number per facility in the region to estimate capacity by region.. The results of this analysis, by region, are summarized in Table 5-2 for colonoscopy. Results for the state overall are bulleted for flexible sigmoidoscopy, as well as colonoscopy.

Table 5-2

Current Number of Colonoscopies and Unused Capacity, by Region

Region	Current Number	Unused Capacity
1. Northern	45,130	34,200
2. East Central	29,880	22,900
3. Montgomery	56,160	11,000
4. Southern	33,580	14,100
5. Birmingham	81,970	18,500
6. West Central	9,530	9,100
Total	**256,260**	**109,860**

The current number of procedures and the additional number of procedures possible (shown in Table 5-2 for colonoscopy) indicate that Alabama facilities are underutilized.

- Approximately 14,250 flexible sigmoidoscopies (not shown in the table) and 256,260 colonoscopies are currently being performed in Alabama each year.

- The unused capacity is the number of procedures available to screen the currently unscreened population. There is capacity to perform approximately 52,150 more flexible sigmoidoscopies (not shown in the table) and 109,860 more colonoscopies.

5.2 Comparison of Capacity and Unmet Need

As was described in Section 4, we developed a forecasting model—based on the demographic characteristics of the population in the state—and used the model to estimate the current unmet need for colorectal cancer screening and follow-up procedures. In this section we compare the current capacity of the state health care system to perform screening and follow-up endoscopic procedures with the estimate of unmet need to determine whether or not the current capacity is adequate to meet an increased need for colorectal cancer screening and follow-up tests.

Estimates of the number of screening and follow-up procedures that are required to satisfy the unmet need varies depending upon the screening tests used. Therefore, we estimated the number of procedures required for a base case and for the following three alternative screening scenarios:

- **Base case—**the use of screening tests is based on the current pattern of screening test use. Unscreened individuals are screened using the same test as screened individuals with similar demographic characteristics.
- **Option 1—**all unscreened individuals are screened with a guaiac FOBT.
- **Option 2—**all eligible unscreened individuals are screened with an immunochemical FOBT.
- **Option 3—**all eligible unscreened individuals are screened with a colonoscopy

The upper section of Table 5-3 compares the unused capacity of colonoscopy procedures with the number of colorectal cancer screening and follow-up procedures required by the currently unscreened population should they opt to be screened within a year. The lower section of Table 5-3 presents the same comparisons for individuals 50-64 years old, without health insurance and with income less than 200% of the poverty level. Comparisons are made for the base case, as well as for the three different screening options.

Table 5-3

Comparison of Unmet Need and Unused Capacity - Base Case and Options*

	Flexible Sigmoidoscopy*		Colonoscopy	
	Unmet Need	**Need as Percent of Unused Capacity****	**Unmet Need**	**Need as Percent of Unused Capacity****
Alabama Average-Risk Population, 50-75 Years Old				
Base Case Current patterns	19,883	38%	455,013	414%
Option 1 100% g FOBT	0	Not Applicable	19,034	17%
Option 2 100% iFOBT	0	Not Applicable	27,264	25%
Option 3 100% colonoscopy	0	Not Applicable	514,421	468%
Alabama Average-Risk Population, 50-64 Years Old, <200% Of Poverty Level, No Insurance				
Base Case Current patterns	894	2%	45,675	42%
Option 1 100% guaiac FOBT	0	Not Applicable	2,128	2%
Option 2 100% iFOBT	0	Not Applicable	3,048	3%
Option 3 100% colonoscopy	0	Not Applicable	57,510	52%

gFOBT = guaiac Fecal Occult Blood Test
iFOBT = immunochemical Fecal Occult Blood Test
* Limited to facilities that perform 2 or more flexible sigmoidoscopies per week
**Includes all necessary screening and diagnostic follow-up to positive FOBT and flexible sigmoidoscopy screening procedures, but does not include surveillance colonoscopies. Values over 100% imply a shortage of procedures to screen the average-risk unscreened population.

The results vary considerably depending upon the screening options used. The comparison is the percentage of unused capacity required to screen those in need. A value of 100% means there is a perfect match between need and capacity, whereas values greater than 100% mean there is greater need than capacity.

- The base case, reflecting current patterns of screening, results in a shortage of colonoscopies. There are over four times the number of average-risk persons, 50 to 75 years old, who would need colonoscopies than could be accommodated.

- The unused capacity is more than adequate to meet the increased need for Options 1 and 2, in which everyone is screened with FOBT only, and colonoscopies are performed as follow-up to positive FOBT. The different types of FOBT require different numbers of follow-up colonoscopies. Approximately 17% of the unused colonoscopy capacity would be utilized in follow-up screening to positive guaiac FOBT tests; 25% of the unused colonoscopy capacity would be required for follow-up screening to the immunochemical FOBT.

- Option 3, in which everyone receives a screening colonoscopy, results in the greatest deficit with nearly five times more colonoscopies needed than could be performed in a year.

- The Base Case and all three options are achievable within one year for the special population of low income individuals without health insurance.

Table 5-4

Comparison of Unmet Need and Unused Capacity for Colonoscopy, by Region – Base Case*

	Unmet Need	Need as a Percentage of Unused Capacity**
Region		
1. Northern	108,526	317%
2. East Central	90,731	396%
3. Montgomery	55,203	502%
4. Southern	101,237	718%
5. Birmingham	58,592	317%
6. West Central	40,724	447%
Total	**455,013**	**414%**

*Includes all necessary screening and diagnostic follow-up to positive FOBT and flexible sigmoidoscopy screening procedures, but does not include surveillance colonoscopies.

**Values over 100% imply a shortage of procedures to screen the average-risk unscreened population. In other words, 718% means the unmet need is over 7 times as much as the unused capacity.

Capacity varies by region (see Table 5-4 for the base case only). In the base case the unscreened population is assumed to choose the same screening tests as the screened population with similar demographic characteristics.

- Unused colonoscopy capacity is inadequate in all regions for all needed screening to occur in one year. Need exceeds capacity most dramatically in the Southern region. In the Southern region, 101,237 average-risk persons, 50 to 75 years old, need to be screened by colonoscopy according to the base case. However, unused capacity in this region would only screen an additional 14,100 persons in a year (see Table 5-2) – resulting in a mismatch of 718%.

- The regions in which need and unused colonoscopy capacity most closely match for the base case – Northern and Birmingham – still show need as 317% of annual unused capacity. It would take over three years to screen the individuals in need in these regions.

5.3 Study Limitations

Approximately 14,250 flexible sigmoidoscopies and 256,260 colonoscopies are estimated to have been performed in Alabama in 2012. Based on the responses to the survey, 52,150 additional flexible sigmoidoscopies and 109,860 additional colonoscopies could be performed each year.

However, it is important to recognize there are a few limitations to these estimates. First, the survey questions about the current number of procedures asked for the number of procedures performed in a typical week. It is possible that respondents report the number of procedures done during typical busy weeks, and not an average that takes into account slower weeks due to staff vacation or low patient demand during holiday weeks.

Second, although the survey questions on unused capacity asked about the number of procedures possible "with no other investment of resources", we cannot be certain that respondents answered accordingly. It is unclear how respondents factored in the primary limiting factor -- physician availability – in estimating the number of additional procedures possible.

The forecasting model also has some limitations. The model was designed to estimate the unmet need of the average risk population, since this represents the largest proportion of the population in need of colorectal cancer screening and the one we can most clearly define. However, our estimate of unmet need among the average risk population was based on a static, rather than a dynamic forecasting model. As a result, the model does not account for the aging of the population, the number of people moving in and out of the state over time or crossing state boundaries to be screened, and repeat procedures or post-polypectomy surveillance.

Lastly, because this model is based on current census, cancer prevalence and screening test prevalence data, results will quickly become outdated, and these estimates will need to be re-calculated periodically to maintain an accurate assessment of the size of the unscreened population.

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Appendix A. Screening Telephone Call Script

Form Approved
OMB No. 0920-539
Exp. 07/31/2013

Screening Telephone Call to Identify the Appropriate Survey Respondent

For each facility to be surveyed, a screening telephone call will be made to (1) confirm that the facility is eligible for inclusion in the study and (2) obtain the name and address of the individual who is most knowledgeable about the use of the endoscopic equipment. The questions to be asked during the screening call will vary by practice setting. The screening survey will be administered as a computer-assisted telephone interview. As a result, data entry will be performed as part of the interview process and the skip-logic will be electronic.

The following burden statement will be available to be read to the person responding to the call if they ask for this information.

Questions 1-4 will be asked of the individual who answers the phone at the practice site.

1. Hello, my name is (INTERVIEWER NAME). I am calling from the Battelle Centers for Public Health Research and Evaluation in Seattle, Washington. I am calling on behalf of the Centers for Disease Control and Prevention (*and the State Name Department of Public Health)*. They are conducting a survey of facilities that perform endoscopy for the detection of colorectal cancer. Am I calling (CONFIRM NAME AND ADDRESS)?

   IF YES, CONTINUE WITH QUESTION 2

   IF NO, RECORD NAME AND ADDRESS BELOW BEFORE CONTINUING WITH QUESTION 2

   _____

   _____

   _____

2. Does this practice perform flexible sigmoidoscopy or colonoscopy to detect colorectal cancer in adults?

   - θ yes
   - θ no
   - θ don't know

   ***If NO to question 2**, conclude the interview by saying:* "I'm sorry, but our study is focusing on practice sites that perform colorectal cancer screening in adults. Thank you very much for your time."

   ***If DON'T KNOW,** ask to speak to someone who might know:* "Is there someone else there who might know? May I speak with him/her?"

3. Are the flexible sigmoidoscopies or colonoscopies performed at this site or somewhere else?

   - θ yes, performed at this site
   - θ no, performed elsewhere
   - θ don't know

   ***If NO to question 3**, conclude the interview by saying:* "I'm sorry, but our study is focusing on practice sites that perform colorectal cancer screening in adults. Thank you very much for your time."

   ***If DON'T KNOW,** ask to speak to someone who might know:* "Is there someone else there who might know? May I speak with him/her?"

4. Can you please tell me which of the following best describes this practice site?

   - θ Private Practice
   - θ Ambulatory endoscopy or surgery center
   - θ Hospital

IF THE PRACTICE SITE IS A HOSPITAL, THE INTERVIEWER WILL CONTINUE WITH PART A

IF THE PRACTICE SITE IS AN ANBULATORY ENDOSCOPY/SURGERY CENTER OR A PRIVATE PRACTICE, THE INTERVIEWER WILL CONTINUE WITH PART B

PART A—TO BE ASKED IF THE PRACTICE SITE IS A HOSPITAL

Please connect me with the Gastroenterology Department. *If the respondent indicates that the hospital does not have a Gastroenterology Department, ask to be connected to the department where sigmoidoscopy and/or colonoscopy are performed.*

QUESTIONS FOR THE HOSPITAL GASTROENTEROLOGY DEPARTMENT

When the interviewer reaches the Hospital Gastroenterology Department, read the following:

Hello, my name is (INTERVIEWER NAME) and I am calling from the Battelle Centers for Public Health Research and Evaluation in Seattle, Washington. I am calling on behalf of the Centers for Disease Control and Prevention *(and the State Name Department of Public Health)*. They are conducting a survey of facilities that perform endoscopy for the detection of colorectal cancer. May I please speak with the charge nurse in the endoscopy suite? *If the charge nurse is not available, obtain a name and telephone number of the charge nurse to call at a later time.*

When the interviewer reaches the charge nurse, read the following:

5. Hello, my name is (INTERVIEWER NAME) and I am calling from the Battelle Centers for Public Health Research and Evaluation in Seattle, Washington. I am calling on behalf of the Centers for Disease Control and Prevention *(and the State Name Department of Public Health)*. They are conducting a survey of facilities that perform endoscopy for the detection of colorectal cancer. Does this hospital perform flexible sigmoidoscopy or colonoscopy to detect colorectal cancer in adults?

   θ yes
   θ no

   ***If NO to question 5**, conclude the interview by saying:* "I'm sorry, but our study is focusing on hospitals that perform colorectal cancer screening in adults. Thank you very much for your time."

6. I am trying to identify all the sites within this hospital where sigmoidoscopy and/or colonoscopy are performed to detect colorectal cancer in adults. As the charge nurse in the endoscopy suite, I thought you might best be able to help us identify these sites. Can you please tell me whether or not flexible sigmoidoscopy or colonoscopy are performed in the following divisions or departments in your hospital? I am only interested in departments that perform these procedures in adults. *(Read and record all that apply)*

   θ Gastroenterology department
   θ General surgery department
   θ Colorectal surgery department
   θ Family practice department
   θ General internal medicine department

- θ Operating room
- θ Satellite clinics (list all satellite clinics)
- θ Other (specify)_____

_____

_____

_____

_____

7. We would like to send a survey to the person who knows the most about the numbers of flexible sigmoidoscopies and colonoscopies that are being performed in this department and who is performing these procedures. Most likely this is the physician who is in charge of endoscopy at this facility. Can you please tell me the name of that person? *If there is no physician in charge of endoscopy at the facility, ask if there is a nurse or an administrator who could provide this information. Confirm the spelling of the name, title, and specialty of the person (to determine if the cover letter and envelope should be addressed to Dr., Mr. or Ms.).*

Name: _____

Title: _____

Specialty: _____

8. What is the Federal Express address and telephone number for Dr./Mr./Ms. (PERSON IDENTIFIED IN QUESTION 7)? *Be sure that the address includes the name of the practice site (e.g., name of the physician practice, hospital department, clinic, surgical center).*

Practice Site: _____

Address: _____

_____

City, State, Zip Code: _____

Telephone Number: _____

9. Is the mailing address for Dr./Mr./Ms. (PERSON IDENTIFIED IN QUESTION 7) the same as his/her Federal Express address? If not, what is his/her mailing address?

Address: _____

_____

City, State, Zip Code: _____

Conclude the interview with the Gastroenterology Department charge nurse by saying: "That is all the information I need at the moment. Thank you very much for your time and assistance. You have been very helpful. Good-bye."

QUESTIONS FOR OTHER HOSPITAL SITES THAT PERFORM ENDOSCOPY

When the interviewer reaches a hospital department other than the Gastroenterology Department, read the following:

Hello, my name is (INTERVIEWER NAME) and I am calling from the Battelle Centers for Public Health Research and Evaluation in Seattle, Washington. I am calling on behalf of the Centers for Disease Control and Prevention *(and the State Name Department of Public Health)*. They are conducting a survey of facilities that perform endoscopy for the detection of colorectal cancer. May I please speak with the charge nurse in the department/division/clinic? *If the charge nurse is not available, obtain a name and telephone number of the charge nurse to call at a later time.*

When the interviewer reaches the charge nurse, read the following:

10. Hello, my name is (INTERVIEWER NAME) and I am calling from the Battelle Centers for Public Health Research and Evaluation in Seattle, Washington. I am calling on behalf of the Centers for Disease Control and Prevention *(and the State Name Department of Public Health)*. They are conducting a survey of facilities that perform endoscopy for the detection of colorectal cancer. Does [NAME OF THE HOSPITAL DEPARTMENT/DIVISION/ CLINIC] perform flexible sigmoidoscopy or colonoscopy to detect colorectal cancer in adults?

    θ yes
    θ no

    ***If NO to question 10**, conclude the interview by saying:* "I'm sorry, but our study is focusing on hospital departments that perform colorectal cancer screening in adults. Thank you very much for your time."

11. We would like to send a survey to the person who knows the most about the numbers of flexible sigmoidoscopies and colonoscopies that are being performed and who are performing these procedures. Most likely this is the physician who is in charge of endoscopy at this facility. Can you please tell me the name of that person? *If there is no physician in charge of endoscopy at the facility, ask if there is a nurse or an administrator who could provide this information. Confirm the spelling of the name, title, and specialty of the person (to determine if the cover letter and envelope should be addressed to Dr., Mr. or Ms.).*

    Name: _____

    Title: _____

    Specialty: _____

12. What is the Federal Express address and telephone number for Dr./Mr./Ms. (PERSON IDENTIFIED IN QUESTION 11)? *Be sure that the address includes the name of the practice site (e.g., name of the hospital department, outpatient clinic, surgical center).*

    Practice Site: _____

    Address: _____

    _____

    City, State, Zip Code: _____

    Telephone Number: _____

13. Is the mailing address for Dr./Mr./Ms. (PERSON IDENTIFIED IN QUESTION 11) the same as his/her Federal Express address? If not, what is his/her mailing address?

    Address: _____

    _____

    City, State, Zip Code: _____

Conclude the interview with the charge nurse by saying: "That is all the information I need at the moment. Thank you very much for your time and assistance. You have been very helpful. Good-bye."

PART B—TO BE ASKED IF THE PRACTICE SITE IS AN AMBULATORY ENDOSCOPY/SURGERY CENTER OR A PRIVATE PRACTICE

14. We would like to send a survey to the person who knows the most about the numbers of flexible sigmoidoscopies and colonoscopies that are being performed and who is performing these procedures. Most likely this is the physician who is in charge of endoscopy at this facility. Can you please tell me the name of that person? *If there is no physician in charge of endoscopy at the facility, ask if there is a nurse or an administrator who could provide this information. Confirm the spelling of the name, title, and specialty of the person (to determine if the cover letter and envelope should be addressed to Dr., Mr. or Ms.).*

    Name: _____

    Title: _____

    Specialty: _____

15. What is the Federal Express address and telephone number for Dr./Mr./Ms. (PERSON IDENTIFIED IN QUESTION 14)? *Be sure that the address includes the name of the practice site (e.g., name of the physician practice, clinic, surgical center).*

    Practice Site: _____

    Address: _____

    _____

    City, State, Zip Code: _____

    Telephone Number: _____

16. Is the mailing address for Dr./Mr./Ms. (PERSON IDENTIFIED IN QUESTION 14) the same as his/her Federal Express address? If not, what is his/her mailing address?

    Address: _____

    _____

    City, State, Zip Code: _____

Conclude the interview by saying: "That is all the information I need at the moment. Thank you very much for your time and assistance. You have been very helpful. Good-bye."

Appendix B. Mail Survey and Cover Letter/Informed Consent

Alabama SECAP II Cover Letter on CDC Letterhead

<<Merge respondent facility and address>>

Dear <<Merge respondent title and name>>:

We are requesting your participation in the Survey of Endoscopic Capacity (SECAP), a survey that is being conducted for the Centers for Disease Control and Prevention and the Alabama Department of Health. The objectives of this research study are: (1) to estimate the numbers of endoscopic procedures currently being performed; (2) to estimate the maximum number of procedures that could be performed if demand for screening were to substantially increase; and (3) to describe the medical facilities in which these procedures are being performed. Data will be obtained by surveying medical practices that own flexible endoscopic equipment. Study results will be used to identify deficits in the current medical infrastructure for endoscopic colorectal cancer screening and will provide critical baseline information for use in planning and sustaining initiatives to increase screening for colorectal cancer.

Colorectal cancer is the second leading cause of cancer-related deaths in the U.S. Although major professional organizations now recommend regular screening for colorectal cancer for average risk persons aged 50 and older, screening rates are still unacceptably low. Information regarding the capacity of the health care system to provide widespread screening and follow-up examinations was obtained in a similar survey several years ago but is now outdated.

All facilities in the state of Alabama that are known to own flexible sigmoidoscopes and colonoscopes, based upon lists provided by major endoscopic equipment manufacturers, are being asked to complete the survey. You were identified by your practice as the person most knowledgeable about the use of the endoscopic equipment at your facility. We are asking you to complete the enclosed questionnaire, requiring approximately 30-40 minutes of your time. If flexible sigmoidoscopy or colonoscopy is not done by any physician or non-physician endoscopist at the practice site identified above, or if the procedures are not done for the purposes of screening for colorectal cancer, please indicate this on the survey cover and return it in the postage paid envelope.

It is important that you report only those procedures that are performed at <<merge sampled facility name and street address>>. You can return the survey in the enclosed postage-paid return envelope. The CDC realizes that your time is extremely valuable and we have enclosed a $40 reimbursement in appreciation of your time and effort given to the study.

Your participation in the study is completely voluntary. Data collection will be managed by Battelle, Centers for Public Health Research and Evaluation, a national survey and research organization with extensive experience in collection of health data. Data will be aggregated; no individual facility information will be presented in any report. Your responses will be kept private to the extent allowed by law. To protect your privacy, we will keep the records under a code number rather than by name. Records will be stored in locked files to which only study staff will have access.

Information linking you to the data you supply will be destroyed after data collection has been completed. Your name or any other personal identifiers will not appear when we present in oral or written presentation of study results.

If you have any questions regarding the study, please call Diane Manninen, Ph.D., Task Leader, Battelle, at 1-800-426-6762. If you have any questions regarding your rights as a study subject, please contact the Chair of the Battelle Institutional Review Board, at 1-877-810-9530, ext. 500.

Thank you in advance for your time and participation in this important research endeavor.

Sincerely,

Laura Seeff MD, Branch Chief
Comprehensive Cancer Control Branch
Division of Cancer Prevention and Control
National Center for Chronic Disease Prevention and Health Promotion

Form Approved
OMB No. 0920-0539
Exp. 07/31/2013

CDC Survey of Alabama Endoscopic Capacity (SECAP)

The Centers for Disease Control and Prevention (CDC) and the Alabama Department of Public Health are conducting a research study involving a survey to determine the current capacity of the state health care system to conduct colorectal cancer screening and follow-up examinations of all appropriate persons using endoscopy for primary screening or for diagnostic follow-up examinations. The results of the survey will be used to identify deficits in the current colorectal cancer endoscopic medical infrastructure, as well as to provide critical baseline information for use in planning initiatives aimed at increasing colorectal cancer screening.

All information that you provide will be kept private to the extent allowed by law, and CDC does not plan to disclose identifiable data to anyone but the researchers conducting the study. Responses will be reported only in summary form along with information from the other facilities that participate in the survey. No personal identifiers will be included in either oral or written presentation of the study results.

Participation in the study is voluntary. You are subject to no penalty if you choose not to provide all or any part of the requested information.

If you have any questions regarding the study, please call Diane Manninen, Ph.D., Task Leader, Battelle at 1-800-426-6762. If you have any questions regarding your rights as a study subject, please contact the Chairperson of the Battelle Institutional Review Board, at 1-877-810-9530, ext. 500.

Thank you for your participation in this important study.

Section 1. Introduction

In this survey, the term "practice site" is used to refer to the specific site identified in the cover letter. In a hospital setting, practice site refers to a specific department, division, clinic or endoscopy suite. In a non-hospital setting, practice site refers to a physician practice or ambulatory endoscopy or ambulatory surgery center. Responses should reflect the total number of endoscopic procedures performed by all endoscopists at the specific practice site as identified in the cover letter.

If you are unable to respond to a specific question, please feel free to consult with others at this practice site who may be more familiar with certain types of information.

1. Are any colonoscopies or flexible sigmoidoscopies performed at this site?
   (Circle one response.)

   Colonoscopies, only.....1

   Flexible sigmoidoscopies, only.....2

   Both colonoscopies and flexible sigmoidoscopies 3

   Neither are done.....4 ∗ ***STOP, PLEASE RETURN SURVEY NOW. THANK YOU FOR YOUR HELP.***

2. Approximately how many weeks per year does this practice site have normal operations? (For example, if the practice site is closed for ten holidays per year, then the answer would be 50 weeks.)

weeks per year	

3. How many of the following types of equipment are used by this practice site for either colonoscopies or flexible sigmoidoscopies? ***(Please provide a NUMBER, not a percentage.)***

   a. Non-fiberoptic video colonoscopes ..... | | | |

   b. Non-fiberoptic video flexible sigmoidoscopes ..... | | | |

   c. Video gastroscopes (EGDs) ..... | | | |

   d. Fiberoptic colonoscopes ..... | | | |

   e. Fiberoptic flexible sigmoidoscopes ..... | | | |

   f. Other endoscopes used for lower endoscopy (specify type_____) ..... | | | |

   g. Video monitors (for use with the scopes above) ..... | | | |

4. How many procedure rooms are available at this practice site for lower endoscopies?

Number of procedure rooms		

5. How many physicians who are members of this practice or who have practice privileges at this practice site perform flexible sigmoidoscopies and/or colonoscopies at this facility? ***(Please provide a NUMBER, not a percentage.)***

   a. Family/General Practice ..... | | | |

   b. Internal Medicine ..... | | | |

   c. Gastroenterology ..... | | | |

   d. General Surgery ..... | | | |

   e. Colorectal Surgery ..... | | | |

   f. Other Physicians ..... | | | |

6. Do interns, residents or fellows receive flexible sigmoidoscopy or colonoscopy training at this practice site?

Yes 1
No 2

7. How many colonoscopies and flexible sigmoidoscopies were performed at this practice site in 2010?

	2010 ↓
a. Colonoscopies	
b. Flexible Sigmoidoscopies	

8. What kind of sedation or anesthesia is typically used for flexible sigmoidoscopies and colonoscopies at this practice site? ***(Circle one response for each column.)***

	a. Flexible Sigmoidoscopies ↓	b. Colonoscopies ↓
Opioids/Benzodiazepines…….....	1	1
Propofol.....	2	2
No sedation or anesthesia is typically used.....	3	3
Other agents, please specify _____.....	4	4
No typical pattern.....	5	5
Procedure is not performed here	6	6

9. Who typically monitors the sedation or anesthesia? ***(Circle all that apply.)***

	a. Opioids/ Benzodiazepines ↓	b. Propofol ↓
RN	1	1
CRNA	2	2
Endoscopist	3	3
Anesthesiologist	4	4
Other, please specify _____.....	5	5
Not applicable; anesthesia or sedation not typically used	6	6

Section 2. Colonoscopy

In this section we ask about colonoscopies performed at this practice site for colorectal cancer screening, surveillance, and diagnostic procedures, as defined below:

- ***Screening*** *refers to the routine, periodic use of a testing procedure intended to detect cancer or pre-cancerous lesions at an earlier stage than is possible through clinical detection or incidental discovery.*
- ***Surveillance*** *refers to procedures performed for patients previously diagnosed with colorectal polyps or cancers.*
- ***Diagnostic*** *procedures are those performed for individuals with gastrointestinal symptoms (e.g., abdominal pain or tenderness, change in bowel habits, bleeding, anemia, an abdominal or rectal mass, evidence of bowel obstruction, or weight loss) or to follow-up a positive screening test (e.g., fecal occult blood test, flexible sigmoidoscopy, double contrast barium enema, computed tomographic colonography (CTC)).*

If you are unable to provide exact responses, please provide your best estimate for procedures performed by this entire practice site. If you are unable to answer certain questions, please feel free to consult with others at this practice site who may be more familiar with this type of information.

10. Do any physician or non-physician endoscopists perform colonoscopy at this practice site?

Yes 1
No.....2 ∗ ***SKIP TO QUESTION 27***

11. Of the total number of colonoscopies performed during a typical week, what percentage is performed by the following types of practitioners? ***(Please provide your best estimate.)***

a. Family/General practitioner ..... ☐☐☐ **%**
b. Internist ..... ☐☐☐ **%**
c. Gastroenterologist ..... ☐☐☐ **%**
d. General surgeon ..... ☐☐☐ **%**
e. Colorectal surgeon ..... ☐☐☐ **%**
f. Non-physician endoscopist ..... ☐☐☐ **%**
g. Fellows supervised by an attending physician ..... ☐☐☐ **%**
h. Other (Specify): _____ ..... ☐☐☐ **%**

TOTAL 100%

12. During a typical week, how many colonoscopies are performed by all physician and non-physician endoscopists at this practice site? ***(Please provide your best estimate, including screening, surveillance and diagnostic procedures.)***

Total number of colonoscopies per week			

13. Approximately what **percentages** of all colonoscopies performed at this site are performed for: ***(Please refer to the definitions on the previous page and provide your best estimate.)***

a. Primary colorectal cancer screening ..... | | | | **%**

b. Surveillance..... | | | | **%**

c. Diagnostic procedures (including follow-up of a positive screening test) ..... | | | | **%**

14. Could more colonoscopies be performed at this practice site **with no other investment of resources**?

Yes 1
No.....2 ∗ ***SKIP TO QUESTION 16***

15. If the demand for colorectal cancer screening and follow-up were to increase substantially, how many additional colonoscopies could be performed at this practice site per week with **no other investment of resources?** ***(Please provide your best estimate.)***

Additional number of colonoscopies per week			

16. What are the limiting factors to performing more colonoscopies at this practice site? ***(For each item a-k, circle 1 for yes or 2 for no.)***

	YES ↓	NO ↓
a. Insufficient time – few open appointments available for colonoscopies	1	2
b. Insufficient utilization due to cancellations or "no shows"	1	2
c. Insufficient number of physicians available to perform procedures	1	2
d. Insufficient nursing staff to assist with procedures	1	2
e. Insufficient ancillary staff to help with room turnover	1	2
f. Insufficient staff or physicians to monitor the sedation or anesthesia	1	2
g. Insufficient procedure rooms	1	2
h. Insufficient prep and/or recovery areas	1	2
i. Insufficient endoscopes or monitors	1	2
j. Insufficient reimbursement	1	2
k. Other (please specify _____)	1	2

17. Which is the primary limiting factor? ***(Circle one response.)***

Insufficient time – few open appointments available for colonoscopies	1
Insufficient utilization due to cancellations or "no shows"	2
Insufficient number of physicians available to perform procedures	3
Insufficient nursing staff to assist with procedures	4
Insufficient ancillary staff to help with room turnover	5
Insufficient staff or physicians to monitor the sedation or anesthesia	6
Insufficient procedure rooms	7
Insufficient prep and/or recovery areas	8
Insufficient endoscopes or monitors	9
Insufficient reimbursement	10
Other (please specify _____)	11

18. If the demand for colonoscopies were to exceed this practice site's current capacity to perform colonoscopies, what steps would this practice site take to meet that increased demand? ***(For each item a-m, circle 1 for yes or 2 for no.)***

	YES ↓	NO ↓
a. Not applicable, not planning to perform more colonoscopies	1	2
b. Increase hours or proportion of the work day allocated to procedures	1	2
c. Modify block scheduling	1	2
d. Use patient navigators or reminder calls to decrease cancellations and "no shows"	1	2
e. Increase physician staff	1	2
f. Increase/hire non-physician endoscopists to perform procedures	1	2
g. Increase nursing staff to assist with procedures	1	2
h. Increase ancillary staff to help with room turnover	1	2
i. Increase staff or physicians to monitor the sedation or anesthesia	1	2
j. Establish a larger screening unit/more procedure rooms	1	2
k. Establish additional prep and/or recovery areas	1	2
l. Purchase or lease more equipment	1	2
m. Other (Specify_____)	1	2

19. What is the average room-time scheduled for a <u>colonoscopy</u>?

minutes	

20. What is the typical waiting time for a <u>screening</u> colonoscopy appointment at this practice site? ***(Circle one response.)***

1-2 weeks	1
3-4 weeks	2
1-2 months	3
3-4 months	4
5-6 months	5
More than six months	6

21. What is the typical waiting time for a diagnostic colonoscopy appointment at this practice site? ***(Circle one response.)***

1-2 weeks 1
3-4 weeks 2
1-2 months 3
3-4 months 4
5-6 months 5
More than six months..... 6

22. Does your endoscopy unit routinely monitor the following? ***(For each item a-h, circle 1 for yes or 2 for no.)***

	YES ↓	NO ↓
a. Cecal intubation rate	1	2
b. Colonoscope withdrawal time	1	2
c. Polyp detection rate	1.	2
d. Adenoma detection rate	1	2
e. Percentage of inadequate bowel preparations	1	2
f. Recommended recall interval for rescreening, diagnostic follow-up, or surveillance	1	2
g. Other (Specify_____)	1	2
h. None of the above	1	2

23. In this practice site, approximately what **percentage** of colonoscopies is incomplete?

			%

24. What is the most common reason at this practice site for an incomplete colonoscopy? ***(Circle one response.)***

Poor bowel preparation 1
Patient discomfort or pain 2
Technical difficulties (e.g., spasms, adhesions, tortuosity) 3
Other (Specify_____)..... 4

25. If a colonoscopy is incomplete because of poor bowel preparation or patient discomfort or pain, what would be the next step?
(Circle all that apply.)

	a. Poor bowel preparation	b. Patient discomfort or pain	c. Technical difficulties
Repeat the colonoscopy at a later date	1	1	1
Order a double contrast barium enema	2	2	2
Order a computed tomographic colonography (CTC)	3	3	3
Not applicable	4	4	4
Other (Specify_____)	5	5	5

26. How many colonoscopies per week are performed to follow-up a positive computed tomographic colonography (CTC)? ***(Circle one response.)***

< 1 colonoscopy per week 1
1 – 5 colonoscopies per week 2
> 5 colonoscopies per week.....3

Section 3. Flexible Sigmoidoscopy

In this section we ask about screening flexible sigmoidoscopies performed at this practice site. If you are unable to provide exact responses, please provide your best estimate. If you are unable to answer certain questions, please feel free to consult with others at this practice site who may be more familiar with this type of information.

27. Do any physician or non-physician endoscopists perform flexible sigmoidoscopy at this practice site?

Yes 1
No.....2 ∗ ***SKIP TO QUESTION 42***

28. During a typical <u>week</u>, how many <u>flexible sigmoidoscopies</u> are performed by all physician and non-physician endoscopists at this practice site?
(Please provide your best estimate.)

Total number of sigmoidoscopies per week			

IF LESS THAN 2 SIGMOIDOSCOPIES PER WEEK, ∗ ***SKIP TO QUESTION 42***

29. Of the total number of flexible sigmoidoscopies performed during a typical week in this practice, what percentages are performed by the following types of practitioners? ***(Please provide your best estimate.)***

a. Family/General practitioner ..... ☐☐☐ **%**
b. Internist ..... ☐☐☐ **%**
c. Gastroenterologist ..... ☐☐☐ **%**
d. General surgeon ..... ☐☐☐ **%**
e. Colorectal surgeon ..... ☐☐☐ **%**
f. Non-physician endoscopist ..... ☐☐☐ **%**
g. Other (Specify): _____ ..... ☐☐☐ **%**

30. Approximately what **percentage** of all flexible sigmoidoscopies performed at this practice site is performed for colorectal cancer screening?
(Please provide your best estimate. If none, please record "0".)

☐☐☐ **%**

31. Could more flexible sigmoidoscopies be performed at this practice site **with no other investment of resources**?

Yes 1
No.....2 ∗ ***SKIP TO QUESTION 33***

32. If the demand for colorectal cancer screening and follow-up were to increase substantially, how many additional flexible sigmoidoscopies could be performed at this practice site per week **with no other investment of resources?**
(Please provide your best estimate.)

Additional number of sigmoidoscopies per week		

33. What are the limiting factors to performing more flexible sigmoidoscopies at this practice site? ***(For each item a-j, circle 1 for yes or 2 for no.)***

	YES ↓	NO ↓
a. Insufficient time – few open appointments available for flexible sigmoidoscopies	1	2
b. Insufficient utilization due to cancellations or "no shows"	1	2
c. Insufficient number of physicians available to perform procedures	1	2
d. Insufficient nursing staff to assist with procedures	1	2
e. Insufficient ancillary staff to help with room turnover	1	2
f. Insufficient procedure rooms	1	2
g. Insufficient prep and/or recovery areas	1	2
h. Insufficient endoscopes or monitors	1	2
i. Insufficient reimbursement	1	2
j. Other (Specify_____)	1	2

34. Which is the primary limiting factor? ***(Circle one response.)***

Insufficient time – few open appointments available for flexible sigmoidoscopies	1
Insufficient utilization due to cancellations or "no shows"	2
Insufficient number of physicians available to perform procedures	3
Insufficient nursing staff to assist with procedures	4
Insufficient ancillary staff to help with room turnover	5
Insufficient procedure rooms	6
Insufficient prep and/or recovery areas	7
Insufficient endoscopes or monitors	8
Insufficient reimbursement	9
Other (Specify_____)	10

35. If the demand for flexible sigmoidoscopies were to exceed this practice site's current capacity to perform flexible sigmoidoscopies, what steps would this practice site take to meet that increased demand? ***(For each item a-l, circle 1 for yes or 2 for no.)***

	YES ↓	NO ↓
a. Not applicable, not planning to perform more flexible sigmoidoscopies	1	2
b. Increase hours or proportion of the work day allocated to procedures	1	2
c. Modify block scheduling	1	2
d. Use patient navigators or reminder calls to decrease cancellations and "no shows"	1	2
e. Increase physician staff	1	2
f. Increase/hire non-physician endoscopists to perform procedures	1	2
g. Increase nursing staff to assist with procedures	1	2
h Increase ancillary staff to help with room turnover	1	2
i. Establish a larger screening unit/more procedure rooms	1	2
j. Establish additional prep and/or recovery areas	1	2
k. Purchase or lease more equipment	1	2
l Other (Specify_____)	1	2

36. What is the average room-time scheduled for a <u>flexible sigmoidoscopy</u>?

minutes	

37. What is the typical waiting time for a <u>screening</u> flexible sigmoidoscopy appointment at this practice site? ***(Circle one response.)***

1-2 weeks 1

3-4 weeks 2

1-2 months 3

3-4 months 4

5-6 months 5

More than six months..... 6

38. If a polyp is found during a screening flexible sigmoidoscopy, what is the typical waiting time for a colonoscopy? ***(Circle one response.)***

1-2 weeks 1
3-4 weeks 2
1-2 months 3
3-4 months 4
5-6 months 5
More than six months..... 6

39. In this practice site, approximately what **percentage** of flexible sigmoidoscopies are incomplete?

			%

40. What is the most common reason for an incomplete flexible sigmoidoscopy? ***(Circle one response.)***

Poor bowel preparation..... 1
Patient discomfort or pain..... 2
Technical difficulties (e.g., spasms, adhesions, tortuosity) 3
Not applicable 4
Other (Specify_____)..... 5

41. If a flexible sigmoidoscopy is incomplete because of poor bowel preparation or patient discomfort or pain, what would be the next step?
(Circle all that apply for each column.)

	Reason for Incomplete Procedure		
	a. Poor bowel preparation	b. Patient discomfort or pain	c. Technical problems
Re-prep and repeat the procedure the same day	1	1	1
Repeat the flexible sigmoidoscopy at a later date	2	2	2
Perform a colonoscopy at a later date	3	3	3
Refer the patient to another practice for colonoscopy	4	4	4
Order a double contrast barium enema	5	5	5
Order a computed tomographic colonography (CTC)	6	6	6
Other (Specify_____)	7	7	7

Section 4. Non-physician Endoscopists

This section focuses on the use of non-physician endoscopists to perform sigmoidoscopy or colonoscopy in this practice site. Non-physician endoscopists include nurse practitioners, physician assistants, registered nurses, and licensed practical/vocational nurses.

42. Does this practice site employ non-physician endoscopists (e.g., nurse practitioners, physician assistants, registered nurses, and licensed practical/vocational nurses) to perform sigmoidoscopy or colonoscopy?

Yes 1
No.....2 ∗ ***SKIP TO QUESTION 46***

43. How many of the following non-physician endoscopists perform sigmoidoscopy or colonoscopy in this practice site?

a. Licensed Practical/Vocational Nurse ..... | | | |

b. Registered Nurse ..... | | | |

c. Nurse Practitioner ..... | | | |

d. Physician Assistant ..... | | | |

44. When a non-physician endoscopist performs a flexible sigmoidoscopy at this practice site, what level of supervision is provided? ***(Circle one response.)***

A physician is present in the procedure room for the entire exam 1

A physician is present in the procedure room when the flexible sigmoidoscope is withdrawn only 2

The non-physician endoscopist is authorized to perform the exam in entirety, unsupervised by a physician, but . . .

a physician is "immediately available" in clinic 3
a physician is "immediately available" in hospital 4
a physician is "immediately available" by beeper/phone 5

The non-physician endoscopist is authorized to perform the exam in entirety, unsupervised by a physician 6

Non-physician endoscopists do not perform flexible sigmoidoscopy 7

Other (Specify): _____ 8

45. When a non-physician endoscopist performs a colonoscopy at this practice site, what level of supervision is provided? ***(Circle one response.)***

A physician is present in the procedure room for the entire exam 1

A physician is present in the procedure room when the colonoscope is withdrawn only 2

The non-physician endoscopist is authorized to perform the exam in entirety, unsupervised by a physician, but . . .

a physician is "immediately available" in clinic.....3
a physician is "immediately available" in hospital.....4
a physician is "immediately available" by beeper/phone 5

The non-physician endoscopist is authorized to perform the exam in entirety, unsupervised by a physician 6

Non-physician endoscopists do not perform colonoscopy 7

Other (Specify): _____ 8

Section 5. Practice Site and Respondent Characteristics

46. Please indicate whether or not this facility is one of the following types of medical facilities. ***(For each item a-e, circle 1 for yes or 2 for no.)***

	YES ↓	NO ↓
a. Health maintenance organization employing most of the physicians who practice here	1	2
b. Military hospital	1	2
c. Veterans Administration Medical Center	1	2
d. Indian Health Service or tribal facility	1	2
e. Indian Health Service contracted facility	1	2

47. For outpatient colonoscopies and/or flexible sigmoidoscopies performed at this practice site, if the patient is covered by Medicare, what reimbursement rate would be used for professional services? ***(Circle one response.)***

Medicare Physician Facility 1

Medicare Physician Non-facility Rate for office-based endoscopy 2

Not applicable, no Medicare patients or Medicare not billed per patient encounter.....3

Don't know 4

48. For outpatient colonoscopies and/or flexible sigmoidoscopies performed at this practice site, if the patient is covered by Medicare, what reimbursement would be used for the facility? ***(Circle one response.)***

Medicare rate for ASC 1
Medicare rate for hospital outpatient department 2
Not applicable for physician practice and office-based endoscopy 3
Not applicable, no Medicare patients or Medicare not billed per patient encounter 4
Don't know 5

49. Did you refer to electronic medical records to provide estimates of current or past procedural volume? ***(Circle one response.)***

Yes 1
No 2

50. Which of the following categories best describes this practice site? ***(Circle one response.)***

Physician practice .....1 * ***CONTINUE TO QUESTION 51***
Ambulatory endoscopy/surgery center .....2 * ***SKIP TO QUESTION 53***
Hospital .....3 * ***SKIP TO QUESTION 54***

For Physician Practices

51. How many physicians (e.g., surgeons, medical doctors, and doctors of osteopathy) are at this practice site?

Number of physicians		

52. During a typical week, approximately how many patients are seen at this practice site for any reason, including for procedures? ***(Circle one response.)***

75 or fewer 1
76-150 2
151-300 3
301-500 4
501 or more 5

PLEASE SKIP TO QUESTION 58

For Ambulatory Endoscopy or Surgery Centers

53. What type of ambulatory surgery center is this practice site? ***(Circle one response.)***

Single Specialty…….. 1
Multispecialty…….. 2
Other, (specify _____) 3

PLEASE SKIP TO QUESTION 58

For Hospitals

54. Which of the following describes this location? ***(Circle one response.)***

Gastroenterology department 1
General surgery department 2
Colorectal surgery department 3
Family practice department 4
General internal medicine department 5
Operating room 6
Satellite clinic 7
GI/Endoscopy Lab 8
Outpatient surgery 9
Other (specify)_____ 10

55. Does this department or lab serve outpatients only? ***(Circle one response.)***

Yes 1
No 2

56. Is this hospital a voluntary non-profit, government, or proprietary for profit facility? ***(Circle one response.)***

Voluntary non-profit. 1
Government 2
Proprietary for profit 3

57. How many patient beds does this hospital contain?

Number of beds		

For All Sites

58. What is your position at this facility? ***(Circle one response.)***

Physician endoscopist 1
Nurse endoscopist 2
Nurse administrator/manager 3
Endoscopy nurse 4
Other (Specify): _____ 5

COMMENTS

_____

_____

_____

_____

_____

_____

_____

_____

THANK YOU FOR YOUR TIME AND EFFORT IN PARTICIPATING IN THIS SURVEY. PLEASE MAIL THE COMPLETED SURVEY IN THE POSTAGE PAID ENVELOPE TO:

Attn: CDC SECAP STUDY OFFICE
1100 Dexter Avenue North, Suite 400
Seattle, WA 98109

Appendix C. Multinomial Logistic Regression Coefficients

Table C1

Multinomial Logistic Regression Results for Alabama*

	FOBT		Flexible Sigmoidoscopy		Colonoscopy	
	Coefficient	**Standard Error**	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
Male	0.237846	0.171722	0.495386	0.222313	-0.08207	0.070362
Nonwhite	0.313179	0.179355	0.068136	0.290243	0.035493	0.08274
Health Insurance	0.471444	0.289059	2.241881	0.633018	1.250304	0.132057
<200% of Poverty Level	0.046664	0.185306	-0.43581	0.279303	-0.55562	0.08241
Missing income data	-0.00309	0.233424	-0.03797	0.275661	-0.16643	0.091423
Ages 50 to 64	-0.11682	0.176671	-0.55284	0.221533	-0.61314	0.070315
2008 data***	0.071154	0.165264	-0.04399	0.227079	0.183343	0.068603
Region 1 Northern	-0.01493	0.436192	-0.22378	0.405555	-0.11619	0.134847
Region 2 East Central	0.345393	0.425242	-0.41525	0.416433	-0.26005	0.13412
Region 3 Montgomery	0.162446	0.423835	-0.28843	0.419297	-0.13854	0.137498
Region 4 Southern	0.600953	0.461158	-0.04205	0.48105	-0.09232	0.156162
Region 5 Birmingham						
Region 6 West Central	0.672851	0.408012	-0.74821	0.399054	-0.33993	0.128017
Missing region data	-0.15939	0.851139	-18.412	0.422129	-0.16062	0.340575
Intercept	-3.31752	0.5709	-4.42263	0.731317	-0.09927	0.187677

*No colorectal cancer screening is the omitted category.

**White is the omitted racial category.

***2010 is the omitted data year.

****Region 5 Birmingham is the omitted region.