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CRAWFORD COUNTY

Community Health Needs Assessment



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Preface

The Affordable Care Act (ACA) requires that all 501(c)(3) hospitals, like the Meadville Medical Center and the Titusville Area Hospital, must conduct a community health needs assessment (CHNA) and adopt an implementation strategy to meet identified community health needs at least once every three years. The ACA specifies that the process of completing a community health needs assessment must include:

1. **Collecting** input from persons who represent the broad interests of the community served by the hospital.
2. **Publishing** the findings of the community health needs assessment so they are available to the community at large.
3. **Developing** and **implementing** a strategy to meet the needs identified in the assessment.

This report summarizes our work to collect and publish an assessment of the community needs and health inequalities related to cancer and cancer screening in Crawford County, PA. This report serves as a tool for the Meadville Medical Center and Titusville Area Hospital, along with other agencies and organizations across the county that are interested and committed to improving public health, to develop and implement strategies to address the needs and inequalities discussed here.

Executive Summary:

Findings from the 2018-19

Community Health Needs Assessment (CHNA)

Throughout 2018-19 the research team completed a community health needs assessment in Crawford County, Pennsylvania – the geographic area served by the Meadville Medical Center and Titusville Area Hospital. The research process included a review of public health surveillance data and a community-based knowledge, attitudes, and practices (KAP) survey focused on cancer screening and prevention.

The findings of this multi-year research project illustrate the public perceptions and attitudes regarding cancer prevalence and screening opportunities in Crawford County as well as the incidence and mortality rates of cancer throughout Crawford County.

Cancer Incidence & Mortality

Using data from the Pennsylvania Department of Health, Centers for Disease Control & Prevention, and National Institutes of Health, we found that across all cancer types the incidence -- the number of newly diagnosed cases of cancer -- in Crawford County is statistically significantly higher compared to state and national rates. Crawford County is among the top 15 counties in Pennsylvania with the highest cancer incidence rate. The mortality rates of breast, cervical, and oral cavity/pharynx in Crawford County are statistically significantly lower compared to similar state and national rates.

Surveillance data as well as information gathered through the community survey show that the prevalence of Crawford County residents who are current or former smokers is statistically significantly higher than state and national prevalences. According to the American Cancer Society almost half of all deaths from liver, colorectal, lung, oral cavity/throat, esophagus, larynx, stomach, pancreas, bladder, kidney, cervix, and acute myeloid leukemia can be attributed to smoking.¹ Incidence rate of many of these cancers - including lung, esophageal, colorectal, and lung -- are statistically significantly higher in Crawford County compared to state and national rates.

¹ <https://www.cancer.org/latest-news/study-smoking-causes-almost-half-of-deaths-from-12-cancer-types.html>

The need for smoking cessation programs as well as access to screening tests for cancers associated with smoking need to be made widely available throughout Crawford County. Efforts to motivate and encourage smokers to work with a primary care physician/provider to screen for cancer also needs to be a community health priority.

Knowledge & Attitudes of Cancer Screenings

Through the 2019 community survey, it was determined that 78 percent of adults 18 years of age and older in Crawford County have a primary care physician/provider (PCP). While this is the majority of adults in the county, it is important to make note of the following two findings:

1. The patient to PCP ratio in Crawford County is 1,602:1. This means that there is only one PCP for every 1,602 patients across the county. This ratio has increased by approximately 5 percent between 2017 to 2018; meaning there are fewer PCPs in the county and the ratio of patients to PCPs is getting larger.²
2. During the previous (2015-16) community health needs assessment survey, we found that 92 percent of adults aged 18 years of age and older had a PCP. In the past three years, the percent of adults reporting that they have a PCP decreased by 14 percent.

The increasing ratio of patients to PCPs combined with the decreasing number of adults reporting having a PCP has the potential for a perfect storm related to cancer screening, incidence, and mortality in Crawford County. The 2018-19 Community Health Needs Assessment found that individuals with a PCP were more likely to talk about, understand the importance of, and get the appropriate cancer screening tests. Individuals who reported not having a PCP were less likely to have or understand a cancer screening test.

While in certain instances (discussed at length in the full report), education-level and having private healthcare insurance increased an adult's understanding and willingness to be screened for cancer, across the board for all cancer types and each screening test, we found that those who had a PCP were more likely to be screened than those who did not report having a PCP regardless of education-level or type of healthcare insurance.

² <https://datausa.io/profile/geo/crawford-county-pa/#health>

With a 14 percent drop in the number of adults reporting a PCP between 2015-2019, it is possible that the proportion of adults in Crawford County getting the appropriate cancer screening tests could decrease in the coming years. Every effort to increase the number of PCPs across the county and to encourage all residents to find and utilize a PCP should be made.

We also found that the majority of Crawford County adults were getting the following appropriate (based on age and sex) cancer screening tests: colonoscopy, mammogram, Pap test, clinical breast exam, and digital prostate exam. However, few adults in Crawford County have reported completing a skin exam or lung CT test. The lung CT test, which screens for lung cancer among individuals 55 years of age and older who have smoked at least 35 pack-years, is of particular concern given that more than 35 percent of adults in Crawford County are either current or former smokers.³

We found that females were more likely to be screened for cancer and understand cancer screening tests compared to males. Males were less likely to get the appropriate (based on age) screening test and understand the connections between specific screening tests and the cancers they were screening for.

Efforts to improve access to and utilization of screening tests can be targeted toward males, especially those who do not have a PCP. Additionally, education and programming is needed among the current and former smokers throughout the county. We found overall that the smokers, especially those who are current smokers, were statistically significantly less likely to have a PCP and get the recommended screening tests for their sex and age.

³ https://www.cdc.gov/cancer/lung/basic_info/screening.htm

2018-19 CHNA: Cancer Prevention & Screening

The CHNA is a project to assess the health in Crawford County, PA. This multi-year project aims to: **collect, analyze, distribute, and utilize valid and reliable data to improve community health.**

The 2018-19 CHNA in Crawford County included two phases of data collection: (1) review of public health surveillance data; and (2) a community-wide Knowledge, Attitude, and Practices (KAP)⁴ survey.

We decided to focus on cancer screening and prevention for the following reasons --

1. The 2015-16 CHNA illustrated that residents of Crawford County perceive cancer to be a community health concern.
2. The 2015-16 CHNA found that only 55 percent of adults 50 years of age or older were reporting that they were getting cancer screening tests; at the same time, we found that many adults between the ages of 18-50 were reporting they were also getting screening tests (namely mammography and PSAs) for which they are not able to get because of their age.
3. Cancer remains the second most common cause of death in Crawford County.⁵
4. Two of the leading causes of cancer -- smoking cigarettes and being obese/overweight -- are prevalent in Crawford County, with measures of prevalence being higher than state and national measures.⁶

The goal of the 2018-19 CHNA in Crawford County was to determine the prevalence of Crawford County residents who are being screened for cancer and to assess their knowledge and attitudes regarding early detection and prevention of cancer (through screening tests and the HPV vaccine).

We believe that a healthy community is one in which residents are both receiving appropriate preventative care and knowledgeable about the cancer screening tests, treatment, and other preventative measures.

⁴ https://apps.who.int/iris/bitstream/handle/10665/43790/9789241596176_eng.pdf;jsessionid=86A44A13A6691B22BFCBC0ABADAB4115?sequence=1

⁵ <https://www.health.pa.gov/topics/HealthStatistics/VitalStatistics/CountyHealthProfiles/Documents/current/Crawford.aspx>

⁶ <https://www.health.pa.gov/topics/HealthStatistics/VitalStatistics/CountyHealthProfiles/Documents/current/Crawford.asp>

Introduction

Crawford County, Pennsylvania is a rural community located 90 miles north of Pittsburgh, PA and 40 miles south of Erie, PA. The population in Crawford County has been declining for years and this trend continued between 2016 and 2019. Currently 85,063 individuals live in the County, which is a 4.2 percent reduction in the population. While the population is decreasing the percent of residents in the County who are 65 years of age or older continues to increase. In 2016, nearly 18 percent of the residents were above 65; today that number has increased above 20 percent. The county remains racially homogeneous; approximately 96 percent of residents are white/non-Hispanic.

Approximately 14.6 percent of the population in Crawford County lives below the poverty line; this estimate is 2.5 percent lower than it was three years ago (in 2016). Twenty percent of adults 25 years of age or older have completed a Bachelor's degree or higher, which is an increase from 2016 when the percent of adults with a college degree was below 20 percent. The percent of adults with at least a high school diploma (88 percent) has remained the same over the past three years. Eight percent of all adults living in Crawford County lack health insurance.⁷

The city of Meadville, the county seat, is home to 12,721 residents. The city, like the County, is seeing a reduction of residents. Between 2010-2019 the population of city residents dropped by 5 percent. Meadville is home to the Meadville Medical Center, the Crawford city, county, and state government offices, as well as Allegheny College, Acutec Precision Aerospace, and Smuckers. The city of Meadville is more racially diverse than the county -- with 89 percent of residents white and nearly 6 percent black. Additionally, the rate of individuals living below the poverty line in the city is 24.9 percent (more than 10 percent higher than the county as a whole). The Meadville Medical Center (MMC) is located in Meadville, PA. The MMC is a 235-bed non-profit community health system. In addition to the main hospital, MMC also runs the Yolanda G. Barco Oncology Institute and Vernon Place, which is home to Radiology and the Women's Diagnostic Center, among others.^{8,9}

The town of Titusville is home to 5,237 residents. Between 2010-2018 the population has decreased by 6 percent. The Titusville Area Hospital (TAH) is a 25 bed critical access hospital. In October of 2015 the TAH was acquired by the MMC to create a single healthcare system throughout Crawford County.^{10,11}

⁷ <https://www.census.gov/quickfacts/fact/table/crawfordcountypennsylvania/PST045218>

⁸ <https://www.census.gov/quickfacts/meadvillecitypennsylvania>

⁹ www.mmchs.org

¹⁰ <https://www.census.gov/quickfacts/titusvillecitypennsylvania>

¹¹ <https://www.titusvillehospital.org/>

METHODS: 2018-19 Crawford County Community Health Needs Assessment

The 2018-19 CHNA involved a multi-step data collection process. We began our work by reviewing the most recent public health surveillance data related to cancer, paying particular attention to cancer incidence and mortality rates. We compared the rates of various types of cancer in Crawford County to the rates in Pennsylvania and the United States. Additionally, we used surveillance data to compare the prevalence of important risk factors for cancer -- smoking, obesity, and vaccine uptake -- in Crawford County to Pennsylvania and United States prevalence.

In addition to gathering publicly available data, we completed a community-wide cross-sectional study in order to determine the prevalence of Crawford County residents who are being screened for cancer and to assess their knowledge regarding early detection and prevention of cancer (through screening tests and the HPV vaccine).

Study Design

In order to assess the knowledge, attitudes, and practices of Crawford County residents related to cancer screening tests, vaccinations, and risky behaviors, we conducted a community-wide cross-sectional study. The survey instrument used was developed as part of an undergraduate thesis project and adhered to the best practices of community survey development and administration. The survey instrument was written at a seventh grade reading level (to accommodate all reading levels of eligible participants), was approximately 500 words long, and was pilot tested among various groups to ensure reliability and validity of questions asked. The questions were formed using the Health Belief Model (HBM) and the Knowledge, Attitudes, and Practices (KAP) survey model.

Theoretical Framework for Survey Question Development --

We used Aday & Cornelius (2006) to create a set of best practices for the development of the survey questions. All of the questions were written in full phrases or complete sentences with all parts of the question on the same page. Knowledge questions were placed at the beginning of the survey, as this introduced the respondents to the topics and prevented any survey questions from influencing their responses.

Study Population

The study was conducted throughout Crawford County, PA. All adults 18 years of age and older were eligible to participate (~67,150 individuals). The survey was administered both electronically and via pen and paper. We decided to administer the survey in-person/via pen and paper (in addition to via the Internet) because only 72.9 percent of households in Crawford County have a broadband Internet subscription. In order to gather data from those who do not have access to the Internet, we collected surveys throughout Crawford County. Students in an undergraduate Epidemiology class collaborated with local agencies and organizations to identify community events and locations across the county where surveys could be administered. While the majority of survey respondents used the online survey (52.3 percent), 47.7 percent of the respondents completed the paper survey administered by the student researchers.

Surveys were collected online and on paper from April-June 2018. All participants were volunteers, and each had the opportunity to: (1) select whether or not they would complete the survey designed for males or females; and (2) skip or stop answering questions at any point during the survey.

We received approval from the Allegheny College Institutional Review Board to complete the survey.

Study Variables

Study participants were asked to self-identify as either male or female, as we administered two separate surveys. The male survey asked questions regarding prostate, colon, skin, and lung cancer screening as well as HPV and the HPV vaccine. The female survey asked questions regarding breast, cervical, colon, skin, and lung cancer screening as well as HPV and the HPV vaccine.

The survey began with a series of demographic questions. First, we asked about the respondents zip code -- this was used to ensure each individual lived in Crawford County and was the information used to determine if they lived in the geographic area served by the Meadville Medical Center or Titusville Area Hospital. Other demographic information collected was each participants level of education and type of health insurance.

We also collected a series of data points related to access to health care, including whether or not each participant had a primary care physician/provider (PCP), where each participant goes for medical care, and where they go for health information.

We asked participants to answer a series of questions related to their knowledge and understanding of specific types of cancers and how screening tests are used to detect the cancer. For females we asked knowledge questions about cervical cancer and screening, colorectal cancer and screening, and

HPV and the HPV vaccine. For male, we asked knowledge questions about colorectal cancer and HPV and the HPV vaccine.

The main outcome variables for the survey were a series of questions related to cancer screening tests (as well as the HPV vaccine). We asked all female respondents if they had ever talked to their PCP about any of the following cancer screening tests: colonoscopy, fecal occult blood test, sigmoidoscopy, lung CT scan, skin exam, Pap test, and mammography. Additionally, we asked each of the females if they had had a colonoscopy, fecal occult blood test, sigmoidoscopy, lung CT scan, skin exam, Pap test, mammography, and clinical breast exam. We asked all male respondents if they had ever talked to their PCP about any of the following cancer screening tests: colonoscopy, fecal occult blood test, sigmoidoscopy, lung CT scan, skin exam, digital prostate exam, and PSA test. Additionally, we asked each of male if they had had a colonoscopy, fecal occult blood test, sigmoidoscopy, lung CT scan, skin exam, digital prostate exam, and PSA test.

Two open-ended questions were included on the survey. We asked participants what fears, questions, or barriers they had regarding being screened for cancer. We also asked participants if they agreed with the CDC recommendation that all male and females aged 13 years and older should receive the HPV vaccine.

Statistical Analyses

We first conducted univariate analyses of each of the demographic variables so that we could make comparisons between the sample population and population of Crawford County. To compare the proportion of each variable between the sample and county populations, we used chi-square tests to determine if the sample was representative of the county population.

We also conducted univariate analyses to determine the proportion of participants who had talked to their PCP about cancer screening tests, had specific cancer screening tests, their knowledge of specific cancer screening tests, and their knowledge of HPV and the HPV vaccine.

Following the univariate analyses we conducted bivariate analyses to determine if there were differences in the proportion of participants who had talked to their PCP about cancer screening tests among participants education level, type of insurance, whether or not they had a PCP, and which hospital's geographic level the participant lived in. The same bivariate analyses were run to compare participants who had specific types of screening tests and their knowledge by education, type of insurance, whether they had a PCP, and geographic region.

For both the univariate and bivariate analyses, we restricted the sample as follows --

- Males and females aged 50 years and older to assess the questions related to colonoscopies, fecal occult blood tests, and sigmoidoscopy.
- Females aged 40 years and older to assess questions related to mammography.
- Males aged 50 year and older to assess questions related to digital prostate and PSA exams.
- All females to assess questions related to Pap exams and clinical breast exams.
- All males and females to assess questions related to skin exams.
- All males and females aged 50 years and older who were current or former smokers to assess questions related to lung CT exams.

Based on a population estimate of 67,150 adults aged 18 years of age and older living in Crawford County (51.1 percent female and 48.9 percent male), we estimated that at least 250 males and 300 females were needed to participate in the survey in order to achieve 80 percent power in the study. This is assuming an alpha-level of 0.05.

RESULTS -- from public health surveillance data

The National Institutes of Health (NIH) and Centers for Disease Control and Prevention (CDC)¹² report both the incidence and mortality rates of various cancers by county. We used this data (Tables 1 & 2) to determine how Crawford County cancer rates compare to state and national rates.

We found that across all cancer types the incidence -- the number of newly diagnosed cases of cancer -- in Crawford County is statistically significantly higher compared to state and national rates. Crawford County among the top 15 counties in Pennsylvania with the highest cancer incidence rates.

This data (Table 1) also shows that the incidence rates of the following cancers are statistically significantly higher than both state and national incidence rates per 100,000 individuals:

- Cervical
- Colon -- among males and females
- Esophageal -- among males
- Lung -- among males
- Oral cavity/pharynx -- among males
- Prostate -- among males.

Of particular note, the rates of cervical cancer incidence were among the highest in the state. Similarly, esophageal cancer incidence among males in Crawford County were among the highest incidence rates in the state. HPV is a known risk factor for each of these cancers, and incidence of both cervical and esophageal cancers could be reduced through the HPV vaccine.¹³ Esophageal cancer is also associated with smoking cigarettes.¹⁴ Incidence rates of esophageal cancer could further be reduced through smoking cessation.¹⁵

¹² <https://statecancerprofiles.cancer.gov/incidencerates/index.php?stateFIPS=42&cancer=001&race=00&sex=0&age=001&type=incd&sortVariableName=rate&sortOrder=default#results>

¹³ Castellsagué (2008). Natural history and epidemiology of HPV infection and cervical cancer. *Gynecologic Oncology*, 110(3), Supplement 2: S4-7.

¹⁴ Domper Arnal, M. J., et al (2015). Esophageal cancer: Risk factors, screening and endoscopic treatment in Western and Eastern countries. *World journal of gastroenterology*, 21(26), 7933–7943. doi:10.3748/wjg.v21.i26.7933

¹⁵ Torre L.A., et al. (2015). Global cancer statistics, 2012. *CA Cancer J Clin*, 2015: 87–108.

Cancer mortality rates in Crawford County (Table 2) for all types of cancer are statistically significantly higher than mortality rates across Pennsylvania and the United States. Specifically, the mortality rates of the following cancers are statistically significantly higher than both state and national mortality rates per 100,000 individuals:

- Colon -- among males and females
- Esophageal -- among males
- Lung -- among males and females
- Prostate -- among males

When looking at the incidence and mortality rate data together, several key observations are made. First, while the incidence rate of colon cancer among females in Crawford County was lower than the state and national incidence rates, the mortality rates were statistically significantly higher. This means that while Crawford County is seeing fewer new cases of colon cancer among females, females with colon cancer in Crawford County are dying more frequently from colon cancer compared to females with colon cancer in Pennsylvania and the United States. In short, a female with colon cancer in Crawford County is more likely to die from colon cancer compared to a female with colon cancer across the state and country.

The mortality rates of breast, cervical, and oral cavity/pharynx in Crawford County are statistically significantly lower compared to similar state and national rates. While the incidence rate of cervical cancer among females in Crawford County is extremely high compared to state and national incidence rates, the mortality rate is statistically significantly lower. This means that while Crawford County is seeing more new cases of cervical cancer, females with cervical cancer in Crawford County are dying less frequently compared to females with cervical cancer in Pennsylvania and the United States. In short, a female with cervical cancer in Crawford County is less likely to die from cervical cancer compared to a female with cervical cancer across the state and country.

Table 1: Incidence of cancer comparing the rate (per 100,000 individuals) in Crawford County, Pennsylvania, and the United States (2017)

Type of Cancer	Rate in Crawford County	Rate in Pennsylvania	Rate in United States
All cancer	494.4	481.7	441.2
Breast cancers (in females)	130.9	131.0	124.7
Cervical	11.1	7.4	7.5
Colon cancer (males & females)	50.3	42.6	39.2
Colon cancer (males)	56.0	49.5	45.1
Colon cancer (females)	45.0	37.0	34.3
Esophageal (males & females)	6.6	5.2	4.6
Esophageal (males)	12.9	9.1	7.9
Lung (males & females)	69.9	64.7	60.2
Lung (males)	87.7	76.5	70.8
Lung (females)	55.6	56.3	52.2
Oral cavity/pharynx (males & females)	12.0	11.9	11.6
Oral cavity/pharynx (males)	19.4	17.7	17.6
Oral cavity/pharynx (females)	5.6	6.8	6.4
Prostate (males)	117.2	111.1	109.0

Table 2: Mortality of cancer comparing the rate (per 100,000 individuals) in Crawford County, Pennsylvania, and the United States (2017)

Type of Cancer	Mortality Rate in Crawford County	MortalityRate in Pennsylvania	Mortality Rate in United States
All cancer	183.5	171.6	163.5
Breast cancers (in females)	18.5	21.9	20.9
Cervical	<3 cases	2.2	2.3
Colon cancer (males & females)	17.2	15.5	14.5
Colon cancer (males)	20.0	18.4	17.3
Colon cancer (females)	15.0	13.2	12.2
Esophageal (males & females)	6.9	4.7	4.0
Esophageal (males)	12.7	8.6	7.2
Lung (male & females)	53.0	45.2	43.4
Lung (males)	67.0	57.1	53.8
Lung (females)	42.1	36.5	35.4
Oral cavity/pharynx (males & females)	2.9	2.2	2.5
Oral cavity/pharynx (males)	< 3 cases	3.4	3.9
Oral cavity/pharynx (females)	< 3 cases	1.2	1.3
Prostate (males)	24.7	19.2	19.5

RESULTS -- from cross-sectional survey

A total of 1121 residents of Crawford County aged 18 years of age and older completed the survey. Two-hundred sixty-six males completed the study along with 846 females. We had nine individuals complete the survey, who did not designate whether they were male or female. Although the number of females completing the survey was nearly triple the number of males, we did meet the minimum number of male and female participants to ensure 80 percent power in our study.

The breakdown of key demographic characteristics of our sample population compared to the population of Crawford County (when available) are shown in Table 3.

Table 3: Demographic and medical characteristics of the study population

	CHNA Participants n (column %)	Crawford County n (column %)
Paper survey	522 (45.6)	
Internet survey	573 (51.1)	n/a
Education		
Bachelor degree +	734 ()	13,399 (20.4)
Some high school	1,083 ()	59,294 (88.3)
Health Insurance		
Private Insurance	854 (76.2)	(43.6)
Government Insurance (or none)	235 (21.0)	(56.4)
Smoking status		
Current smoker	111(10.2)	10,073 (15.0)
Former smoker	273 (25.2)	--
Non-smoker	700 (64.6)	57,077 (75.0)
Do you have a doctor/primary health provider?		
Yes	963 (78.4)	
No	235 (21.6)	n/a
Where do you go first for care?		
Private doctor's office	357 ()	
MedExpress-type of establishment	316 ()	
ER	77 ()	n/a
Where do you get most of your health info?		
Doctor	734 (65.5)	
Friend/family member	56 (5.0)	
TV	5 (0.4)	
Internet	273 (24.4)	n/a

The study sample did differ from the general population of Crawford County. Those participating in the survey had a higher level of education than the general population, and more individuals in our sample had private health insurance compared to the general population of Crawford County. While

these results indicate that our sample was not entirely representative of the population, we feel that our sample comprised of a more educated population and one with a higher proportion of individuals with private insurance, provides a reliable estimate of the challenges and needs in our community. We know that access to health care, health literacy, and willingness to use and pay for preventative medicine -- including cancer screening tests and vaccines -- is more prevalent among those who have at least a college education and private health insurance. We make note of this here to preface all of our results with our conclusion. Based on the composition of the study sample, we have evidence to support the conclusion that the results presented here are conservative estimates of the knowledge and risky behaviors (namely smoking) of all individuals living in Crawford County. With regards to utilization of cancer screening services, we provide evidence that demonstrates that residents of Crawford County are aware of cancer screening tests and the majority of adults are getting the appropriate (based on age and sex) screening tests for cancer. The prevalence of adults getting the appropriate screening tests are likely over-estimations, given that our study population was more educated and comprised of more individuals with private health insurance compared to the population of Crawford County.

We found that females were more likely than males to report that they had cancer screening tests. Of all the females who completed the survey, 96.1 percent reported having had a Pap test screening for cervical cancer; 90.0 percent reported having a clinical breast exam to screen for breast cancer. Among females aged 40 years of age and older, 95.2 percent reported they had a mammogram to screen for breast cancer. Among females aged 50 years and older who completed the survey 80.2 percent reported they had a colonoscopy to screen for colon cancer. Among females aged 50 years and older who were also smokers (current or former) 21.0 percent reported having a lung CT to screen for lung cancer (Table 4).

Among males aged 50 years of age and older, 75.5 percent reported having had a colonoscopy; and 56.1 percent a digital prostate exam.. Among males 50 years of age and older who were current or former smokers, 32.0 percent reported having a lung CT to screen for lung cancer (Table 4).

Table 4: Proportion of Respondents Who Reported Having Had Cancer Screening Tests by Age and Sex

Cancer Screening Tests	Proportion of Males Responding YES they had the screening test	Proportion of Females Responding YES they had the screening test
Among those aged 50 years and older, had a colonoscopy	75.5%	80.2%
Among those aged 50 years and older, had fecal occult blood test	43.8%	46.7%
Among those aged 50 years and older, had sigmoidoscopy	12.4%	18.5%
Among those aged 50 years and older + current/former smokers had a lung CT	32%	21%
Among those 50 years and older, had a digital prostate exam	56.1%	--
Among those 40 years and older, had a mammogram	--	95.1%
Among all ages, had a Pap test	--	96.1%
Among all ages, had a clinical breast exam	--	90.0%
Among all ages, had skin exam	32.0%	55.5%

While these proportions (Table 4) overestimate the prevalence of screening tests completed, the proportion of respondents who completed mammogram, the proportions found in Crawford County are higher than the national averages. The proportion of adults aged 50 and older who have had a colonoscopy in the US was 68.1 percent.¹⁶ The proportion of females 40 years of age and older who had a mammogram in the US was 65.3 percent;¹⁷ and the proportion of all females who had a Pap test in the US was 69.0 percent.¹⁸

¹⁶ <https://www.cdc.gov/cancer/dcpc/research/articles/use-colorectal-screening-tests-state.htm>

¹⁷ <https://www.cdc.gov/nchs/fastats/mammography.htm>

¹⁸ <https://www.cdc.gov/nchs/fastats/pap-tests.htm>

Colonoscopy

Through our bivariate analyses, we found that males aged 50 years and older who reported not having a PCP, were less likely to have a colonoscopy (20 percent) compared to those who reported having a PCP (78 percent). Similarly, for females aged 50 years of age and older, those with a PCP were more likely (96 percent) to have a colonoscopy compared to those without a PCP (2 percent).

We asked survey participants a series of questions regarding their knowledge and attitudes about colon cancer and colonoscopies. We found that nearly 100 percent of male and females at least 50 years of age in Crawford County had heard of a colonoscopy; however, only 81 percent of these males and 91 percent of these females reported that they had had heard of a test to find colon cancer. These results suggest that while the vocabulary of cancer screenings is familiar to adults aged 50 year and older in Crawford County, the definitions and applications of words, such as colonoscopy, are not completely understood. Among the males aged 50 years of age and older, 79 percent said they would be willing to get a colonoscopy; among the females aged 50 years of age and older 90.5 percent would be willing to get a colonoscopy. Willingness to get a colonoscopy among females was statistically significantly higher among those with a college/graduate degree compared to those with no more than an associates degree ($p=0.0004$); among those with private health insurance compared to those with governmental insurance or none ($p=0.003$); and among those with a primary care physician compared to those without ($p=0.049$). Among the males completing the survey, willingness to get a colonoscopy did not differ by level of education or type of insurance. However, there was a statistically significant difference among male 50 years of age and older in their willingness to get a colonoscopy when comparing those with a PCP and those without ($p=0.005$).

These data confirm the value of having a PCP.

Mammogram

Among females 40 years of age or older, we found a statistically significant association between getting a mammogram and having a PCP. Ninety-six percent of females with a PCP had a mammogram compared to 4 percent of females without a PCP (OR=6.4; 95% CI: 2.1-19.0).

We found among the group of females aged 40 years and younger that 12 percent reported that they had previously had a mammogram. While it is likely that a handful of females aged 40 years and younger may have had diagnostic tests, including mammography, it is not standard of care to offer females less than 40 years of age a screening mammogram. According to the Cleveland Clinic, regular mammograms are not recommended for females who are at average risk for breast cancer because the breast tissue is more dense in young females, making mammograms less effective as a screening tool. Females under 40 at an increased risk for breast cancer may be screened through

mammograms; however tomosynthesis (3D mammography) and MRIs are more commonly used among females less than 40 years of age.¹⁹

We are unsure why 63 females under 40 years of age reported having a mammogram, since this is not a common practice. It may be that these 63 females did not understand what a mammogram is and whether or not they have had one. This finding suggests that more research is needed, as are educational efforts among females less than 40 years of age so that they can understand cancer screening tests and the eligibility criteria for completing those tests. The Pennsylvania High School Curriculum for Health Education does not require that high school students learn about carcinogenesis, cancer risk factors (aside from smoking), or screening tests to detect cancer early.²⁰ We would recommend exploring potential collaborations with the school districts within the county, especially Crawford Central School District in Meadville and Titusville Area School District in Titusville.

Pap Test

We found a similar pattern related to having a PCP and having a Pap test among all females completing the survey. Females who reported having a PCP were 3.9 times more likely to get a Pap test compared to females without a PCP (95% CI: 1.5-9.5). We also found evidence that females who had at least a college education and females who reported never smoking were more likely to get a Pap test compared to females with less education and who reported smoking, respectively.

Access to PCPs

We found a trend that having a PCP increases the probability that a male or female will have the appropriate screening tests. This may appear obvious -- having a physician who is recommending and facilitating scheduling and education about screening tests makes it easier or more likely that one would have the necessary screenings -- and it is. Of particular note to both the Meadville Medical Center and Titusville Area Hospital is the following --

Between the 2015 and 2018, the proportion of Crawford County residents reporting that they have a PCP fell from 92.4 percent in 2015 to 85.9 percent.

With fewer individuals (especially those aged 50 years and young) reporting they have a PCP, we can anticipate the number of individuals getting the appropriate screening tests could decrease in the

¹⁹ <https://my.clevelandclinic.org/health/articles/16805-breast-cancer-in-young-women>

²⁰ <http://www.pdesas.org/CMap/CFramework#>

coming years if an effort is not made to increase access, availability, and consistency in PCPs across Crawford County.

RESULTS -- Knowledge about cancer screening tests and the HPV vaccine

The National Immunization Survey (conducted by CDC) estimates that 66 percent of teenagers 13-17 years of age living in Pennsylvania (excluding those in Philadelphia) had at least one dose of the HPV vaccine in 2017.²¹ This is equivalent to the national average of teenagers who have at least one dose of the HPV vaccine (national prevalence is 65.5 percent).²² Since we were not surveying teenagers as part of this project, we did not ask respondents if they had received an HPV vaccination. Instead we focused our work on understanding respondents knowledge and attitudes regarding the HPV vaccine. To this end, we asked all participants of the survey to answer a series of knowledge questions HPV and the HPV vaccine.

Specifically, we asked participants the following: (1) have you heard of HPV; (2) do you know HPV is sexually transmitted; (3) do you know that HPV causes cancer; and (4) do you know there is an HPV vaccine? We found that 92.9 percent of the study population had heard of HPV; 89.1 percent knew HPV was sexually transmitted; 88.4 percent knew HPV causes cancer; and 85.7 percent knew there was an HPV vaccine. From these results we see that awareness of HPV as a disease is well known throughout Crawford County. While the majority of respondents know that HPV causes cancer and is sexually transmitted, there is a decrease in knowledge and awareness regarding the significant health risks associated with HPV. Only 79 percent of those who had heard about HPV recognized that there is a HPV vaccine (Table 5).

We did find statistically significantly different levels of knowledge about HPV between males and females completing the survey. Males had statistically significantly lower levels of knowledge about HPV and the vaccine compared with females (Table 5). Among the females surveyed we found that female with private health insurance were more likely to know that cervical cancer can be prevented via the HPV vaccine (OR=3.07; 95% CI: 1.62-4.95).

²¹ <https://stacks.cdc.gov/view/cdc/58075>

²² <https://www.cdc.gov/mmwr/volumes/67/wr/mm6733a1.htm>

Table 5: Knowledge of HPV among survey participants + stratification of knowledge by sex

	CHNA Participants n (column %)	Male Participants n (column %)	Female Participants n (column %)
Have you heard about HPV?			
Yes	1001 (92.9)	200 (82.6)	769 (96.4)
No	76 (7.4)	42 (17.4)	29 (3.6)
Do you know that HPV is sexually transmitted?			
Yes	953 (89.1)	192 (80.0)	736 (92.9)
No	116 (10.9)	48 (20.0)	56 (7.1)
Do you know HPV causes cancer?			
Yes	945 (88.4)		
No	126 (11.8)	n/a	n/a
Do you know there is an HPV vaccine?			
Yes	914 (85.7)	163 (68.8)	728 (92.2)
No	153 (14.3)	75 (31.3)	62 (7.9)

Results --- Related to Current & Former Smokers in Crawford County

According to the American Cancer Society, approximately one out of every 5 deaths in the United States are associated with smoking; smoking cigarettes kills more Americans than alcohol, car crashes, HIV, guns, and illegal drugs combined.²³ The high prevalence of smoking in Crawford County should be of concern to the medical and public health communities interested in reducing cancer incidence and improving the quality of life for all residents.

Through the community survey we found that 78.3 percent of the current smokers in Crawford County are between the ages of 18-54 years old. These individuals are not yet eligible to be screened for lung cancer, but the need for the lung CT test will likely increase in the years to come as this group of smokers become eligible for the test. We also found that 56.8 percent of 18-54 years olds were once smokers, but have quit smoking; 41.7 percent of the former smokers are 55 years of age or older. The majority of smokers (70.4 percent) had no more than an associates degree or high school education; meaning that the majority of smokers in the county have less formal education than the non-smokers. We also found that smokers are the least likely group of individuals to have a PCP in Crawford County (less than 75 percent of current smokers reported having a PCP).

We also found that male smokers were less likely than male non-smokers to get a colonoscopy ($p=0.07$). Female smokers were less likely than female non-smokers to get a skin cancer screening exam ($p=0.07$), Pap test ($p=0.02$), mammogram ($p=0.008$), and colonoscopy (0.006). These results are concerning given that the risk of developing colorectal, cervical, and breast cancer is increased among individuals who smoke (or previously smoked) cigarettes. The need for smokers to be screened for each of these cancers should be a priority.

²³ <https://www.cancer.org/cancer/cancer-causes/tobacco-and-cancer/health-risks-of-smoking-tobacco.html>

Conclusions & Next Steps

The findings of this multi-year community health needs assessment illustrate the public perceptions and attitudes regarding cancer prevalence and screening opportunities in Crawford County as well as the incidence and mortality rates of cancer throughout Crawford County. Specifically, we found that cancer incidence in Crawford County is higher than state and national rates. The prevalence of residents being screened for colorectal, breast, cervical, and prostate cancer is equal to or slightly higher than state and national screening rates.

Work to reduce cancer incidence in Crawford County should be focused on anti-smoking education and outreach programs as well as smoking cessation. Additionally, efforts to increase uptake of the HPV vaccine among males and females between the ages of 9 and 46 should be made.

Finally, this needs assessment found a strong association between getting the appropriate screening tests and having a PCP. This finding is coupled with the fact that the percent of Crawford County residents reporting that they have a PCP has fallen by 14 percent in the past three years and the patient to PCP ratio has increased by nearly 5 percent. There is a great need to increase the number of PCPs throughout the county as well as to connect county residents with PCPs who they can build relationships with and trust to guide them through the cancer screening process.

Data from this needs assessment will be shared with administrators and boards at both the Meadville Medical Center and Titusville Area Hospital. Additionally, this report will be shared with residents of Crawford County through community forums as well as other agencies/organizations whose work focuses on public health. Together we will develop a strategy to address the needs identified in this report.