

**Perry County Health Needs Review and Strategic Planning Report**  
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## Executive Summary

In comparison to urban and suburban communities, rural America is at a significant disadvantage when it comes to accessing quality and affordable healthcare. As an illustration of this consensus opinion, the National Rural Health Association describes the factors that contribute to these disparities.<sup>i</sup>

*Economic factors, cultural and social differences, educational shortcomings, lack of recognition by legislators and the sheer isolation of living in remote rural areas, all conspire to impede rural Americans in their struggle to lead a normal, healthy life.*

Consistent with that generalization, people who live in rural areas of Perry County experience many health-related challenges that are both distinct and more complex than those of nearby urban and suburban communities.

The Perry County Health Coalition (PCHC) was formed in 2013 to address these issues. The PCHC aims to influence positive change in conditions that effect the health status of Perry County residents. To date, the coalition's efforts have centered on increasing access to health care services. Since 2015, PCHC has relied on a strategic framework included in the February 2015 report *Characterizations of Health Care Access in Perry County* to guide their efforts. Since 2015, there have been notable coalition led improvements in health care access in the county. Yet, among Pennsylvania counties, Perry County currently ranks as the sixty-sixth of sixty-seven counties when measured by number of health care providers (physicians, dentists, behavioral health providers) per population. Regarding health outcomes, Perry County ranks in the lower middle range (25%-50%) of Pennsylvania counties based on the Robert Wood Johnson 2022 County Health Profile rankings.

This report represents an update to the PCHC health care access study but more fully framed within the context of additional social determinants of health. This approach was purposefully chosen to better respond to key questions outlined within the scope of the consulting work.

- Should the coalition's focus continue to be on addressing core health access goals—to increase access to primary, dental, and behavioral health services and improving health literacy
- Should the coalition's focus expand to also address basic needs that affect health, such as access to affordable housing, food, quality jobs, workforce training and other social determinants?
- What is the level of effectiveness and capacity of the Perry County Health Coalition to deliver on current, new, and potentially expanded action plan goals, towards measurably improving health?
- How might the coalition need to grow or change to address future health needs?
- Given responses to the questions above, what should the coalition's actions and goals be over the next four years?

A mixed method research design was selected to address the questions listed above. Often used in health research, mixed methods research combines elements of both quantitative and qualitative research to gain a more complete picture than a standalone quantitative or qualitative study may

provide. Quantitative methods were used to identify and assess the impact of social determinants. A statistical model was developed to identify the relationship between certain social determinants and health outcomes. The statistical model includes key components of the World Health Organization's (WHO) widely accepted schema for action on social determinants of health. The model's methodology incorporates operational measures adopted from the County Health Rankings Model, a program of the University of Wisconsin Population Health Institute, and the Health Equity Analysis Tool developed by the Pennsylvania Department of Health. Data for the model was sourced from the 2013-2017 American Community Survey (ACS), American Medical Association, and the 2018 Behavioral Risk Factor Surveillance System (BRFSS). It is important to note that data for the study predates the COVID-19 pandemic and therefore may not fully reflect current conditions within Perry County. The qualitative method exclusively relied upon was the focus group interview. Over the period beginning December 08, 2021, and ending on April 01, 2022, six separate focus group sessions were held. In all cases the topic of discussion was on health care services access. Three of the sessions were attended by county residents representing consumers of services and three by health care providers offering services within the county.

The report consists of five parts. Part I provides an overview of findings and recommendations. Part II presents quantitative findings related to community characteristics, health access, health outcomes, and the association between social determinants of health and health outcomes. Part III reviews qualitative findings describing community member views on healthcare accessibility and provider perspectives on health care services currently accessible and available within the county. Part IV attempts to integrate findings from each research method to identify common themes to serve as the rationale for recommendations. Part V first outlines a strategic framework which is then relied upon to organize and present recommendations.

## **I. Overview of Findings and Recommendations**

### ***Summary of Quantitative Findings***

Throughout this report, the social determinants of health used to characterize Perry County include measures of educational attainment, socioeconomic status, and housing (physical environment). When combined these three measures (the SDOH index) rank Perry County in the lower-middle range (25%-50%) of Pennsylvania counties. Health outcomes measures include life expectancy at birth and self-reported poor health days (both physical and mental health). These measures again consistently place Perry County's health outcomes in the lower middle range (25%-50%) of Pennsylvania counties. This health outcome finding is consistent with the Robert Wood Johnson 2022 County Health Profile rankings which positioned Perry County health outcomes within the same quartile. A health access index was also developed which includes measures of provider per population and the percentage of the population uninsured. In this instance, Perry County ranks within the lowest quartile (0%-25%) of Pennsylvania counties. An initial review of the data using a simple scatter plot technique shows a clear relationship between the SDOH index and life expectancy at birth. Using the same approach, a relationship between self-reported poor health days and health care access is apparent. Of critical importance is that improvements in self-reported poor health days do not occur until significantly higher levels of health access are achieved. Following the initial review, further analysis was conducted to determine the impact of each determinant including health access, while holding others constant, on health outcomes. The regression model results revealed statistically significant relationships between the independent variables educational attainment and economic status and the dependent variable life expectancy at birth. Regarding health access, the model produces a statistically significant but confounding result indicating a slightly inverse relationship between health access and life expectancy at birth. The underlying reason for this result may be traced to the observation that

improvements in health outcomes do not appear until significantly higher levels of health access are achieved. Finally, when the model allows the impact of changes in educational attainment, socioeconomic status, and physical environment at the census tract level to depend on the level of health access in the county, the results indicate that benefits resulting from improvements to any of the three social determinants are larger when health access is better (as measured by the health access index).

### ***Summary of Qualitative Findings***

#### **Consumer Perception of Health Care Service Access in Perry County**

Although consumers recognize efforts to improve the availability of county based primary care services, the overwhelming perceptions of healthcare in the county are the following: limited primary care service accessibility (to include medical, dental, and behavioral health); significant lack of specialty care providers and specialty centers; significant lack of emergency and urgent care services; and an on-going need to travel out of county to receive both primary and specialty care. In addition to the lack and variety of services, several other issues include concern over travel related costs, concerns about the level of health literacy, and issues related to existing practice accommodations (office hours, insurance participation, service coordination, customer service). Regarding most requested services, except for urgent care services, county resident's requests align with needs experienced throughout the region as documented in community health need assessments. These are specifically mental health services and additional primary care (to include medical and dental services).

#### **Characteristics of Perry County Health Care Services**

Since the 2015 report, the number of physicians and dentists as well as number of dental practices have decreased. Regarding primary care, the decline in physicians has been offset by an increase in the number of advanced practitioners serving county residents. Private counseling services have increased by one private practice during the same period. Both evening and weekend primary care and dental office hours have decreased during the period. Based on conversation with a sampling of primary care practices in the county, positive trends include the acceptance of Medical Assistance coverage without limiting the number of enrollees in the practice, acceptance of new patients, and the addition of telemedicine capability. Demand for services remains high. At times the existing services are unable to meet the need. Two of the practices surveyed acknowledge the need for additional physician staff but neither have successfully recruited. In a conversation about social determinants with family practice physicians from the surveyed practices, the providers cited education, socioeconomic determinants as factors which influence patient decisions and actions and correspondingly their practice style. Finally, concerns with behavioral health services are common across the three practices.

### ***Summary of Recommendations***

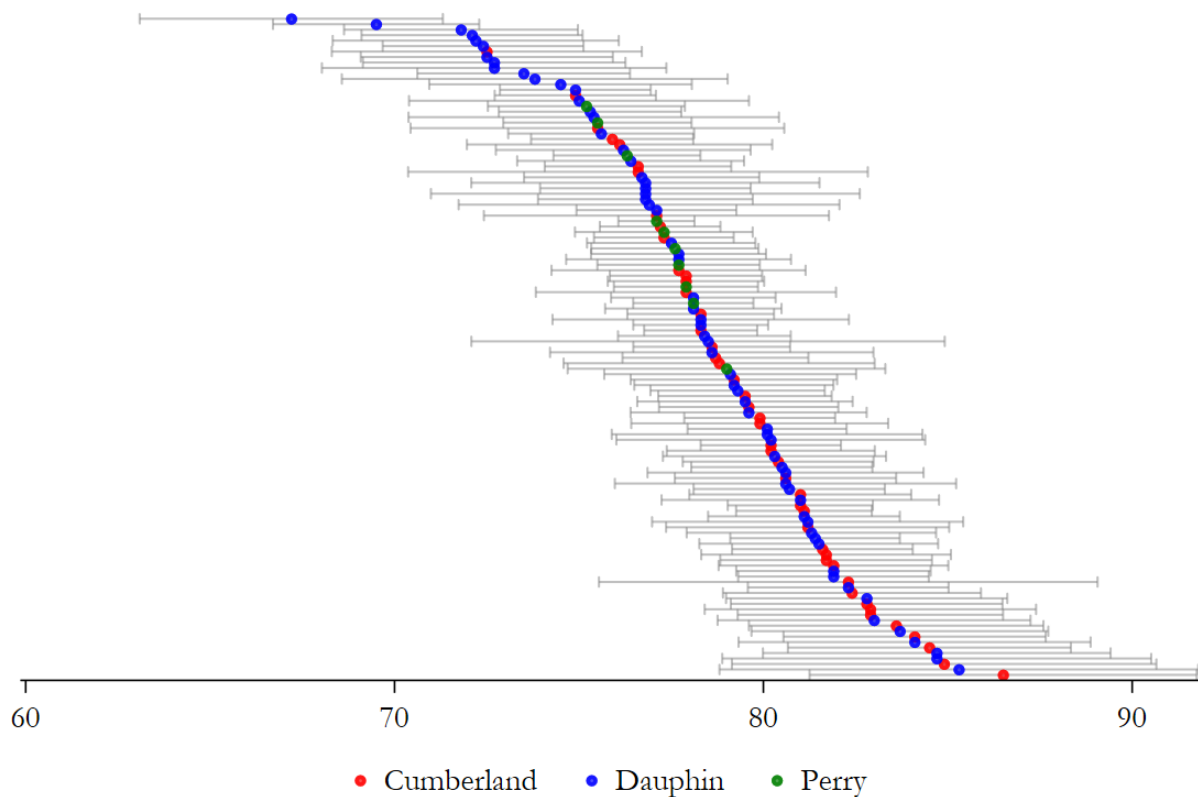
The importance of health care service accessibility as it relates to health outcomes; the gap between current resources and the average level of resources within Pennsylvania; and the plateauing and decline, in some instances, of county resources strongly support the coalition's continued effort to improve health care access. To achieve its mission of improved health outcomes through improved access to health care services, we encourage the PCHC to adopt a strategy that includes efforts to strengthen relationships with authorizing stakeholders; increase the capacity of the coalition; and prioritize and set realistic goals for initiatives intended to demonstrate the value of the PCHC to the Perry community. Regarding health care access initiatives, behavioral health, oral health, and health literacy should be prioritized. In all instances, the coalition should consider addressing other key health determinants (educational attainment and socioeconomic status) in the selection and design of initiatives.

## II. Quantitative Findings

### *Community Characteristics*

Life expectancy is often identified as an ideal measure of a population's mortality experience and a growing body of research is recognizing the importance of measuring mortality outcomes at small geographic areas – such as census tracts<sup>ii iii iv v vi vii viii</sup>. According to recently released census-tract level estimates of life expectancy at birth by the National Center for Health Statistics, life expectancy in Pennsylvania ranges from 62 to 91.9 years with a mean of 78.1 years. Life expectancy in the tri-county region (Cumberland, Dauphin, and Perry counties) is highly variable, ranging from 67.2 years (1<sup>st</sup> percentile) to 86.5 years (99<sup>th</sup> percentile) with an average life expectancy of 78.7 years, as shown in Figure 1.

**Figure 1: Life Expectancy at Birth in the Tri-County Region**



Note: error bars denote 95% confidence intervals

Using data from the 2013-2017 American Community Survey (ACS) on over 1000 demographic, economic, and housing characteristics of these census tracts we split the 3,060 census tracts (for which we have valid life expectancy at birth estimates) in Pennsylvania up into four groups based on their life expectancy. Those below the 25<sup>th</sup> percentile of life expectancy are in the first quartile while those above the 75<sup>th</sup> percentile are in the fourth quartile (the highest 25%). Then using a small subset of the tract characteristics from the ACS, well-established as structural determinants of health and mortality, such as household income, access to employment opportunities, race and ethnicity, and educational attainment, we summarize these census tracts by quartile in Table 1 to evaluate how these

characteristics vary with life expectancy. The associations are quite clear. Lower levels of educational attainment, higher unemployment rates, lower household incomes, high poverty (SNAP reciprocity), and large non-white populations are all associated with lower life expectancy.

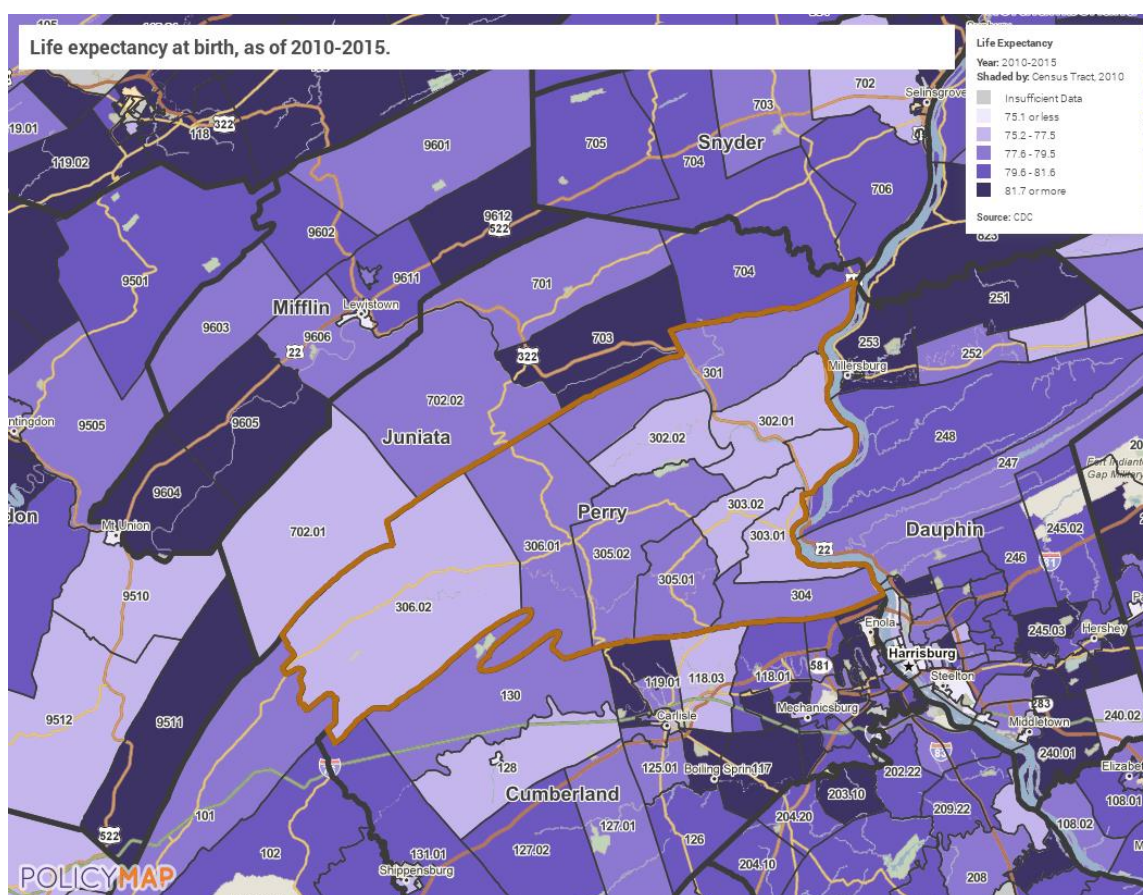
**Table 1: Characteristics of Census Tracts by Life Expectancy Quartile**

	<b><i>Perry County</i></b> <b>N = 10</b>	<i>Quartiles of Life Expectancy at Birth (Pennsylvania)</i> N = 769    N = 765    N = 776    N = 750				<i>Pennsylvania</i> N = 3,060
	<b><i>Average</i></b>	<i>Lowest 25%</i>	<i>Second Q</i>	<i>Third Q</i>	<i>Highest 25%</i>	<i>Average</i>
life expectancy at birth (years)	<b>77.2</b>	73.1	77.2	79.5	82.5	78.1
<b><i>Educational Attainment</i></b>						
% no high school diploma	<b>8.8</b>	10.3	7.5	6.1	4.7	7.1
% bachelor's degree or higher	<b>16.4</b>	16.9	24.9	31	43.1	28.9
<b><i>Socioeconomic Characteristics</i></b>						
unemployment rate (%; 2013-2017)	<b>4.3</b>	11.2	6.6	5.4	4.6	7.0
median household income (\$)	<b>\$60,026</b>	\$37,490	\$54,132	\$65,694	\$82,039	\$59,798
% SNAP recipients (of all households)	<b>9.4</b>	28.6	14.1	8.8	5.7	14.3
<b><i>Population and Age Structure</i></b>						
total population (per tract)	<b>4,588</b>	3,291	3,930	4,316	4,626	4,039
% of population under 19 years old	<b>23.8</b>	25.2	22.6	22.6	22.9	23.3
% of population over 65 years old	<b>16.7</b>	14.9	17.5	18.5	18.8	17.4
<b><i>Race and Ethnicity</i></b>						
% white	<b>95.9</b>	56	79.3	86.6	86.2	77.0
% hispanic or latino	<b>1.8</b>	11.2	6.6	4.5	3.9	6.6
% black or African American	<b>1.3</b>	31.3	11.4	5.8	5	13.4
<b><i>Housing and Vacancy</i></b>						
total housing units	<b>2,071</b>	1,548	1,778	1,896	1,955	1,794
% total housing units vacant	<b>14.2</b>	15.9	11.3	9.5	7.7	11.1

Average life expectancy in Perry County is 77 years with an average percentile ranking of the 10 census tracts in the county at the 37<sup>th</sup> percentile, meaning that 63% of the 3,060 census tracts in Pennsylvania have life expectancy higher than Perry County residents. The 10 census tracts within Perry County, fall within the second quartile along most determinants listed in Table 1. However, a few outliers are notable: (1) bachelor's degree attainment (16%) is below that of the first quartile (17%) and second quartile (25%) averages; (2) the population is more racially homogenous (96% white) than average for the second quartile; and (3) has housing vacancy rates (14%) more consistent with the first quartile average. Life expectancy in Perry County is less variable than both Pennsylvania and the tri-county

region but still ranges from 75 years (21<sup>st</sup> percentile) in tract 302.01 on the eastern end of the county along the Susquehanna River near Millersburg to 79 years (56<sup>th</sup> percentile) in tract 305.01 in the southcentral portion of the county near Shermans Dale (see Figure 2).

**Figure 2: Census-tract Life Expectancy in Perry County and the Surrounding Region**



Using a methodology like the County Health Rankings Model, a program of the University of Wisconsin Population Health Institute, and the Health Equity Analysis Tool developed by the Pennsylvania Department of Health we then rank each census tract in Pennsylvania along three categories of structural social determinants of health (SDOH): education, socioeconomic status, and physical environment, as shown in Table A2. Perry County is in the 29<sup>th</sup> percentile on the education index, ranging from the 23<sup>rd</sup> to the 39<sup>th</sup> percentile among the county's census tracts; in the 56<sup>th</sup> percentile on the socioeconomic status index, ranging from the 38<sup>th</sup> to the 67<sup>th</sup> percentile; and in the 49<sup>th</sup> percentile on the physical environment index, ranging from the 20<sup>th</sup> to the 60<sup>th</sup> percentile. Each index is comprised of several measures (see Table A1), and we combine these indices into an overall SDOH index using weights of 40%, 40%, and 20% for education, socioeconomic status, and physical environment, respectively. Perry County is in the 44<sup>th</sup> percentile of the SDOH index, ranging from the 28<sup>th</sup> percentile in tract 306.02 in the western portion of the county to the 53<sup>rd</sup> percentile in tract 304 in the southeastern portion of the county near Marysville.



## Health Outcomes

Life expectancy at birth is a summary measure but should capture current mortality risks, health outcomes, and self-reported perceptions of health in a population. In November 2021, the Pennsylvania Department of Health, Division of Health Informatics released [updated county profiles](#), reflecting data for the period 2015-2019, which include health statistics for each county in the state. Table 2 shows that all-cause, cancer, chronic respiratory disease, and diabetes mortality rates in Perry County are significantly higher than the Pennsylvania average. Table 3 indicates that behavioral risk factors and hospital utilization in Perry County is like the statewide average.

**Table 2: Perry County Mortality and Disease Profile**

Deaths	Age-adjusted Rates (per 100,000) of Selected Causes of Death, 2015-2019	Perry	Interval (95%)	Pennsylvania	Comparison
All causes of death		826.8	(793.2 - 860.3)	764.2	Higher
Heart disease		178.5	(163.2 - 193.9)	175.3	Similar
Cancer		176.4	(161.4 - 191.3)	160	Higher
Accidents		69.8	(58.8 - 80.8)	61	Similar
Cerebrovascular diseases		31.4	(25.0 - 37.9)	36.4	Similar
Chronic lower respiratory diseases		46.2	(38.3 - 54.0)	36.2	Higher
Alzheimer's disease		34.4	(27.3 - 41.5)	21.2	Higher
Diabetes mellitus		29.1	(23.0 - 35.3)	20.7	Higher
Nephritis, nephrotic syndrome and nephrosis		22.8	(17.3 - 28.4)	16	Higher
Influenza and pneumonia		19.1	(14.0 - 24.2)	14.6	Similar
Septicemia		12	(8.1 - 16.0)	13.3	Similar

Notes: Age-adjusted rates are per 100,000, and are calculated using the U.S. 2000 standard million population distribution.

Cancer	Age-adjusted Incidence Rates (per 100,000) of Selected Cancers, 2014-2019	Perry	Interval (95%)	Pennsylvania	Comparison
All cancers - male		496.5	(458.6 - 536.8)	497.6	Similar
All cancers - female		462.5	(427.4 - 499.8)	448.3	Similar
Breast - female		116.6	(99.0 - 136.6)	131.4	Similar
Colon and rectum - male		42.5	(31.4 - 56.4)	45.6	Similar
Colon and rectum - female		45.7	(35.3 - 58.6)	35.1	Higher
Corpus and uterus, nos (f) - female		44.4	(34.1 - 57.1)	32.7	Higher
Kidney and renal pelvis - male		25.3	(17.8 - 35.3)	23.8	Similar
Kidney and renal pelvis - female		ND	ND	11.9	ND
Lung and bronchus - male		95.1	(79.0 - 113.7)	70.9	Higher
Lung and bronchus - female		57	(45.9 - 70.4)	55.9	Similar
Melanoma of the skin - male		38.9	(28.5 - 51.8)	29.1	Similar
Melanoma of the skin - female		17.8	(11.3 - 26.8)	19.5	Similar
Non-hodgkin lymphoma - male		25	(17.3 - 35.3)	24.5	Similar
Non-hodgkin lymphoma - female		26	(18.3 - 36.0)	17.5	Higher
Prostate (m) - male		63.1	(51.2 - 77.3)	101.8	Lower
Urinary bladder - male		47.9	(36.3 - 62.0)	39.9	Similar
Urinary bladder - female		ND	ND	10.3	ND

Notes: ND = Not displayed when count is less than 20, or data is not available. Age-adjusted rates are calculated using the U.S. 2000 standard million population distribution.

Diseases	Incidence Rates (per 100,000) of Selected Diseases, 2017-2019	Perry	Interval (95%)	Pennsylvania	Comparison
Campylobacter		15.9	(9.2 - 22.5)	20.9	Similar
Chlamydia		197.8	(174.3 - 221.2)	462.1	Lower
Gonorrhea		28.2	(19.3 - 37.0)	122.9	Lower
Lyme disease		195.6	(172.3 - 218.9)	81	Higher
Salmonellosis		11.5	(5.9 - 17.2)	13.1	Similar



**Table 3: Perry County Behavioral Health and Hospitalization Profile**

Behavioral Health	Adult Behavioral Health Risk Factor Statistics, 2017-2019	Perry	Interval (95%)	Pennsylvania	Comparison
	Percent current smoker	18	(13.0 - 25.0)	18	Similar
	Percent currently has asthma	13	(9.0 - 18.0)	10	Similar
	Percent ever tested for HIV (ages 18-64)	39	(31.0 - 47.0)	44	Similar
	Percent ever told they have arthritis	32	(27.0 - 39.0)	29	Similar
	Percent ever told they have diabetes	12	(9.0 - 17.0)	11	Similar
	Percent fair or poor general health	20	(15.0 - 27.0)	19	Similar
	Percent no health insurance (ages 18-64)	16	(9.0 - 26.0)	9	Similar
	Percent obese	30	(24.0 - 37.0)	32	Similar
	Percent overweight	67	(60.0 - 73.0)	67	Similar
	Percent visited doctor for routine checkup in the past 2 years	85	(79.0 - 90.0)	87	Similar

Notes: ND = Not displayed if sample is considered statistically unreliable. County statistics are based on statistics for the region. Perry County is in a region containing the counties: Cumberland, Perry.

Hospitalizations	Age-adjusted Hospitalization Discharge Rates (per 100,000), 2019	Perry	Interval (95%)	Pennsylvania	Comparison
	All injuries (injury hospitalizations only)	645.8	(579.0 - 712.6)	764	<b>Lower</b>
	Cerebrovascular diseases	239.5	(201.7 - 277.3)	239	Similar
	Chronic lower respiratory diseases	158.7	(126.6 - 190.8)	210.7	<b>Lower</b>
	Chronic obstructive pulmonary disease (COPD)	105.5	(80.6 - 130.5)	136.9	<b>Lower</b>
	Fall (unintentional, self-harm, assault, undetermined)	378	(328.7 - 427.2)	437.7	<b>Lower</b>
	Heart attack	152.5	(121.1 - 183.8)	160.6	Similar
	Heart diseases	899	(825.3 - 972.8)	926.8	Similar
	Influenza and pneumonia	183.1	(148.9 - 217.3)	214.6	Similar
	Nephritis, nephrotic syndrome, nephrosis	153.3	(121.2 - 185.3)	152.9	Similar
	Septicemia	600	(537.4 - 662.6)	525.9	Higher

Notes: ND = Not displayed when count is less than 20, or data is not available. Age-adjusted rates are calculated using the U.S. 2000 standard million population distribution

The Behavioral Risk Factor Surveillance System (BRFSS), a system of telephone surveys conducted by the Centers for Disease Control (CDC) records the percentage of the population in each county reporting poor or fair health. In 2018, 18% of Perry County residents reported poor or fair health which is the 58<sup>th</sup> percentile among Pennsylvania counties. If we look more closely at the average number of poor physical or mental health (unhealthy) days in the past 30 days, as reported in BRFSS, we see that Perry County residents average 4.2 physically unhealthy days (67<sup>th</sup> percentile), meaning that Perry County residents have more poor physical health days than two-thirds of Pennsylvania residents. Similarly, Perry County residents average 4.9 mentally unhealthy days in the past 30 days (76<sup>th</sup> percentile), meaning that Perry County residents have more poor mental health days than three quarters of Pennsylvania residents.

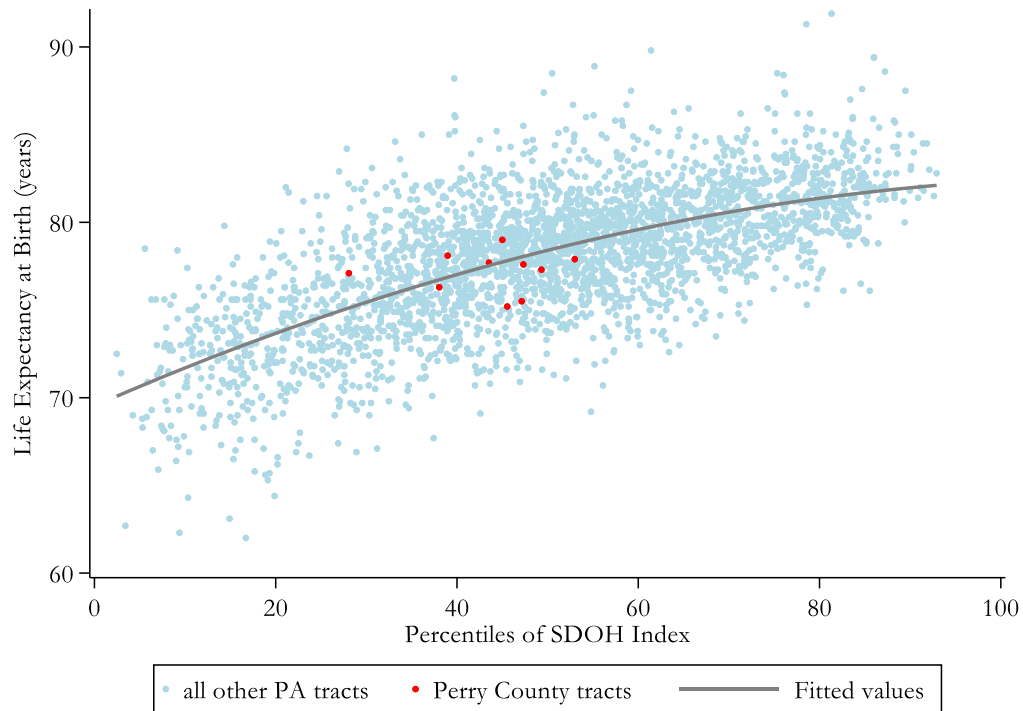
### ***Health Access***

Using 2018 county-level data from the American Medical Association we also construct a health access index using the number of the primary care physicians, dentists, and mental health providers per person and the percentage of the population uninsured. Among the 67 counties in Pennsylvania, Perry County ranks 66<sup>th</sup> (less than the 1<sup>st</sup> percentile). There is only one primary care physician for every 3,845 Perry County residents, one dentist for every 5,141 residents, and one mental health providers for every 2,892 residents, as of 2018. In Pennsylvania, the average county ratios are 1398:1 for primary care physicians, 1573:1 for dentists, and 593:1 for mental health providers. Only Juniata County, to the north of Perry County, demonstrates lower levels of health access in Pennsylvania. The top performer in the state is Montour County with ratios of 179:1, 729:1, and 177:1 respectively.

### ***Statistical Findings***

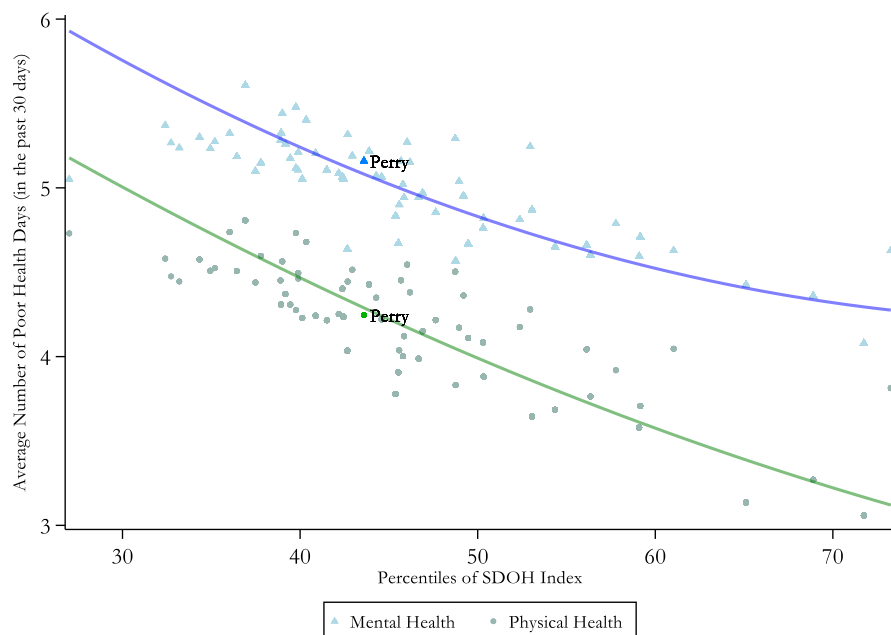
Both these structural social determinants of health are significant drivers of health outcomes as measured by life expectancy, as shown in Figure 3. A census tract with a higher SDOH ranking is likely to have higher life expectancy at birth, on average.

**Figure 3 Life Expectancy at Birth and the SDOH Index**



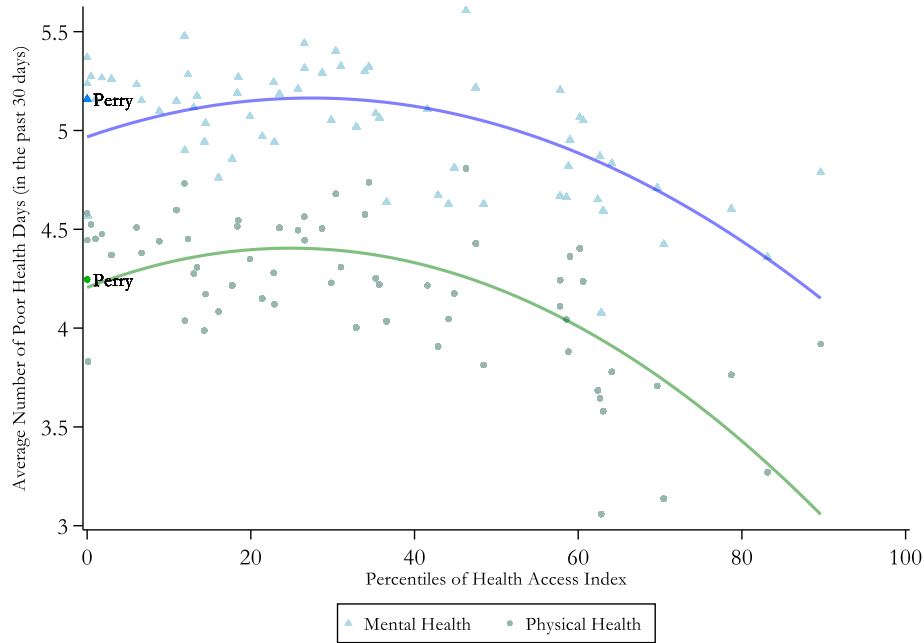
Consistent with our findings in Figure 3, Figure 4 shows that improvements in social determinants of health (as measured by the SDOH index) significantly reduce the prevalence of self-reported poor physical and mental health days.

**Figure 4 Poor Health Days and the SDOH Index**



On the other hand, Figure 5 shows the relationship between poor physical and mental health prevalence and health access (as measured by the health access index). Noticeably, improvements in health access do not begin to decrease the prevalence of self-reported poor physical and mental health days meaningfully until a county achieves improvements beyond the median (50<sup>th</sup> percentile).

**Figure 5 Poor Health Days and the Health Access Index**



Taken together, Figures 4 and 5 suggest that while improvements in SDOH will begin to reduce self-reported poor/fair health immediately; improvements in health access from very low levels may not yield meaningful improvements in community health until significantly higher levels of health access are achieved. In that sense, it is helpful to consider that access to healthcare services can either increase or decrease the saliency of the structural determinants of health. Thus, to determine the impact of each determinant, while holding others constant, we develop the following regression model:

$$Y_{ij} = \beta_0 + \beta_1 education_{ij} + \beta_2 SES_{ij} + \beta_3 environment_{ij} + \beta_4 access_j + u_i$$

where  $i$  denotes census tract and  $j$  denotes county.  $Y_{ij}$  denotes estimated life expectancy at birth or other health measure such as the number of poor physical or mental health days; *education* is the percentile of the tract-level education index; *SES* is the percentile of the tract-level socioeconomic status index; *environment* is the percentile of the tract-level physical environment index; and *access* is the percentile of the county-level health access index.

### Life Expectancy at Birth

We estimate this model for 3,055 census tracts in Pennsylvania (with complete data) using 2018 data, with life expectancy as the dependent variable ( $Y_{ij}$ ) and obtain the results in Column (4) of Table 4. These estimated coefficients reflect the change in life expectancy for a movement of one percentile in the associated index. For example, using the results in Column (4) and assuming no change in the other indices, a movement from the 25<sup>th</sup> to the 50<sup>th</sup> percentile on the education index increases life expectancy by around 0.4 years ( $= 0.016 \times 25$ ); a similar movement on the socioeconomic status (SES)

index increases life expectancy by around 2.5 years; and a similar movement on the physical environment index increases life expectancy by around 0.2 years. For context, the difference between the 25<sup>th</sup> percentile (75.7 years) and the 50<sup>th</sup> percentile (78.4 years) of life expectancy in Pennsylvania is 2.7 years.

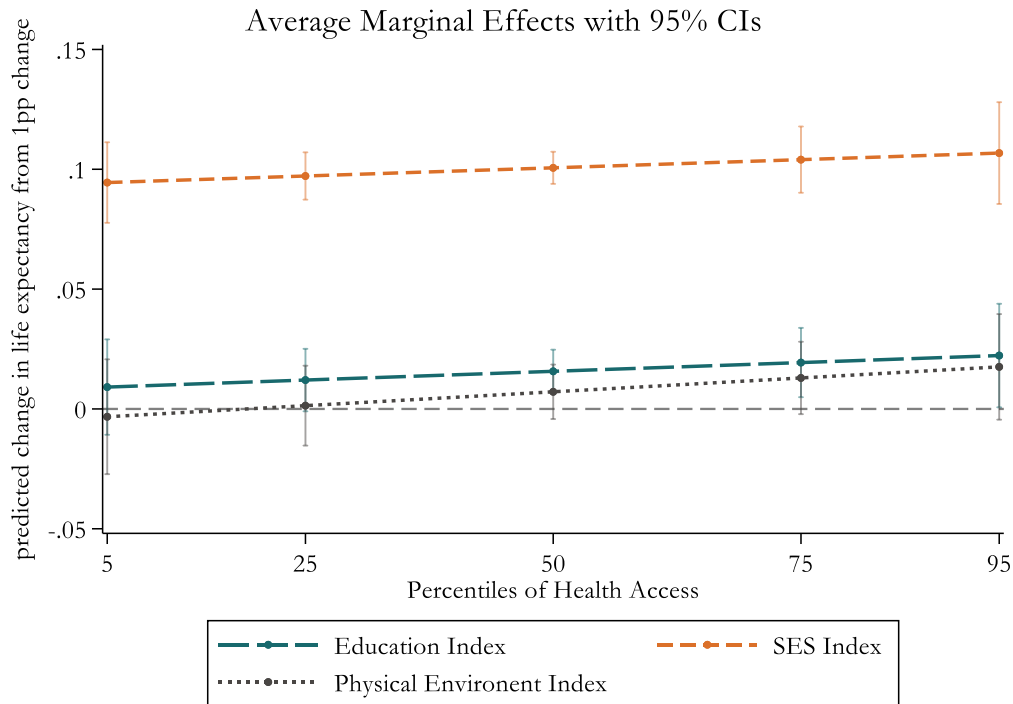
**Table 4 Life Expectancy at Birth Regression Results**

VARIABLES	(1) life expectancy at birth (years)	(2)	(3)	(4)	(5)
Education Index (percentile)		0.122*** (0.012)	0.016*** (0.005)	0.016*** (0.005)	0.008 (0.011)
SES Index (percentile)			0.103*** (0.00386)	0.102*** (0.00349)	0.094*** (0.00935)
Physical Environment Index (percentile)				0.008 (0.005)	-0.00442 (0.013)
Health Access Index (percentile)	0.0047 (0.0134)	-0.050*** (0.011)	-0.036*** (0.0062)	-0.036*** (0.0061)	-0.058** (0.0280)
Education * Access					0.00015 (0.00021)
SES * Access					0.00014 (0.0002)
Physical Environment * Access					0.0002 (0.0002)
Access * Access					-0.00003 (0.0003)
Constant	77.82*** (0.742)	74.61*** (0.659)	73.81*** (0.322)	73.44*** (0.378)	74.77*** (0.797)
Observations	3,055	3,055	3,055	3,055	3,055
R-squared	0.001	0.311	0.523	0.524	0.525

Notes: Robust standard errors in parentheses: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

However, this methodology suggests that improvements in education, socioeconomic status, or the physical environment will have the same impact on community health (as measured by life expectancy) regardless of the level of health access. In Column (5) we relax this assumption and allow the impact of changes in these social determinants of health in the census tract to depend on the level of health access in the county. We then evaluate these effects at various percentiles of the health access index: the 5<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 95<sup>th</sup> percentile. These estimated impacts are shown in Figure 6. Importantly, all these lines are upward sloping, meaning the benefits of improved SDOH are larger when health access is better. For example, if health access is in the 5th percentile (like Perry County) a movement from the 25<sup>th</sup> to the 50<sup>th</sup> percentile on the SES index increases life expectancy by around 2.3 years. However, when access is high, such as in Montour County, the benefits of SES improvement are enhanced, with a similar movement (from the 25<sup>th</sup> to 50<sup>th</sup> percentile on the SES index) increasing life expectancy by around 2.7 years.

**Figure 6**



### Poor Mental and Physical Health Days

The regression model was applied two additional times with poor mental health days as the dependent variable and again with poor physical health days as the dependent variable. The results of these tests are presented in Tables B1 and B2. As in the life expectancy analysis, the methodology suggests that improvements in education, socioeconomic status, or the physical environment will have the same impact on self-reported poor mental health status or self-reported poor physical health status regardless of the level of health access. However, when we relax this assumption and allow the impact of changes in these social determinants of health to depend on the level of health access in the county, the estimated effects are modest yet consistent with the life expectancy results.

### III. Qualitative Findings

A summary of findings from six separate focus group sessions is provided below. The sessions were held over the period beginning December 08, 2021, ending on April 01, 2022. Three of the sessions were attended by county residents representing consumers of services and three by health care providers offering services within the county. Consumer focus group sessions were designed to elicit county residents' views on the current state of health care service access in the county. Related to health care service access, the provider sessions were conducted to gain a deeper understanding of the current state of county health care resources.

#### *Consumer Perception of Health Care Service Access in Perry County*

The five components model of health care access developed by Aday and Andersen<sup>ix</sup> served as the organizing framework for the consumer focus group agenda. The five components of the Aday and Anderson model include accessibility, availability, affordability, accommodation, and acceptability<sup>x</sup>. The summary below is organized using this framework. Additionally, feedback on consumer

perception of social determinants of health along with a listing of requested additional services for the county are provided.

### **Accessibility**

The location of health care services in relation to the location of county residents remains the most significant issue within the access framework. The distance from care can influence patient decisions on seeking care. Focus group members noted the significant lack of specialty care providers/specialty centers in the county along with the significant lack of emergency and urgent care services. The addition of the following types of specialty care centers were suggested by participants – urgent care, cancer center, and mental health facilities. A desire for improved access to the following specialists were also voiced - psychiatrist, allergist, immunologist, and dentists.

### **Availability**

Given the limited number of health care services in the county, it is not surprising that participants expressed dissatisfaction with the ability to see a health care provider in a timely manner. One factor which negatively affects availability is limited evening and weekend hours. As discussed in the next segment, this is an issue with health care practices in the county. The most significant issue, however, is simply the imbalance between available resources and community demand. On occasion this can boil over as illustrated in the following comments posted to Perry Talk on Facebook in January 2022.

Does anyone else think it is ludicrous that Perry County does not have an urgent care? \_\_\_\_\_ barely serve its purpose as a family care practice.

I called yesterday morning to make an appointment for my husband. Scheduling is out till the end of February! I am still waiting for a call back to “squeeze” him in.

Perry County desperately needs an urgent care! Over the holidays you cannot find a doctor open. How about it local officials???

In addition to the drum beat by most participants for the introduction of urgent care in the county, participants also suggested the addition of home-based care services, the addition of mobile services, increase in the number of providers at existing sites and better utilization of newly acquired telemedicine capabilities within the primary care practices.

### **Affordability**

Affordability often centers on the ability of the patient to afford insurance premiums, deductibles, and co-payments. Although these concerns surfaced during the focus group sessions, affordability concerns reached beyond insurance matters to include recommendation on how best to reduce service utilization and to offset transportation costs. Specific suggestions on “how best to help people afford health care” included:

- Greater availability of health promotion and disease prevention initiatives in the county
- Reduce travel and loss work costs associated with travel out of county to providers
- Subsidize costs through free or low-cost transportation for those without reliable transportation and/or the provision of free services
- Greater acceptance of Medicaid by existing practices
- Small employers in county providing more robust health insurance coverage

## **Accommodation**

Focus group participants indicated that the office hours of county health care practices did not fully align with their preferences. Participants did offer several recommendations, including extended office hours, to improve the patient experience. These include

- Expanded insurance coverage
- Improved interoperability of electronic medical information
- Availability of a patient navigator/ advocate
- Extended evening and weekend hours to provide options other than working hours to schedule appointments

## **Acceptability**

A patient's selection and acceptance of a health care provider requires both an informed patient and a provider capable of engendering trust. The critical nature of patient or in this instance community acceptance was never more obvious than in the case of the proposed Sadler Health Center school-based health clinic at West Perry High School. Despite efforts by Sadler Health Center to address all concerns and build trust with the community, The West Perry School Board failed to approve the lease that would allow the health clinic to begin operations. Influenced by this event, focus group participants strongly supported a PCHC effort to develop readily available educational resources on health and health care services designed to appeal to multiple target groups and delivered via multiple channels and locations. Beyond educational resources, the creation and implementation of a well-designed marketing campaign was suggested to create greater awareness of county resources and educate consumers about how to access services. Patient hesitancy to use services is reduced when the practice purposefully invests in establishing and maintaining a positive image/brand and individual practitioners invest time in getting to know their patients to strengthen the patient provider bond. Focus group participants expressed concerns that county practices did not dedicate sufficient attention to these matters allowing gossip and negative information typical of small communities to influence patient use of county-based services and prioritizing financial considerations over building long term relationships to better help ensure patient adherence.

## **Social Determinants of Health**

Socioeconomic status was consistently identified by focus group members as a primary determinant of health outcomes. The importance of socioeconomic status to health outcomes is encapsulated in the following focus group observation.

I think that the economic end of things. It kind of encompasses a lot of things because if you can't afford good transportation if you can't afford childcare like some people are saying, those sorts of things it all goes hand in hand your economic stance, or you know even what kind of insurance you may have it all kind of trickles down to the next level and just kind of determine how it's going to go for you. And for some people it's, it comes down to. I'm sick like go to the doctors and they're going to give me a prescription that I can't afford to pay for, or do I go to the store, and do I buy, you know, a couple of items to feed my family for the week.

Following closely behind socioeconomic status, focus group members identified education and the physical environment, specifically affordable quality housing, as major influencers of health outcomes.



## **Requested Services**

The common consensus among focus group participants was the desire for the addition of urgent care services in the county. The limited number of primary care services in the county combined with the associated issues of availability and accommodation serve as the impetus for this selection. The second and third top requests align with needs experienced throughout the region as documented in community health need assessments. These are specifically mental health services and additional primary care (to include medical and dental services).

## ***Characteristics of Perry County Health Care Services***

### **Primary Care**

Currently there are fifteen (15) physicians in ten (10) separate practices providing primary care services in the county. These physicians are supported by twelve (12) advanced practitioners (See Appendix C). The number of primary care providers in the county declined by two since a review of this type was conducted in 2014. Although the reduction in number of providers appears small, the change in provider composition is significant. In 2014, the provider complement consisted of twenty-two physicians and eight (8) advanced practitioners. In 2022, the provider complement consists of fifteen (15) physicians and twelve (12) advanced practitioners.

A critical aspect of practice operations (evening and weekend hours) remains an area of concern. In 2014, total evening hours for county practices totaled 28 hours and weekend hours totaled 3 hours. In 2022, total evening hours for county practices total 21 hours and weekend hours totaled 7 hours. Increase in weekend hours result from Loysville family practice extension of Saturday hours until 1:00 PM.

As part of the research, three primary care practices (Duncannon Family Health Center, Loysville Family Practice, Pinnacle Health Family Care in Newport) were contacted and agreed to share additional information on practice activities. On a positive note, all the practices accept patients enrolled in the Medical Assistance program without limitations; two of the three practices remain open to new patients; two of the three practices are certified patient-centered medical homes. All three practices now have telemedicine capability. Of concern is the increasing intensity of service demand and the unmet need for increased staffing. The average waiting time for a newly accepted patient into the open practices is approximately two weeks; however, if the new patient is experiencing an acute problem, an appointment is scheduled within 24 to 48 hours. Although not routine procedure, one practice has suggested urgent care services to patients requesting to be seen but unable to be scheduled because there are no acute care slots remaining in the schedule.

We are at 100% utilization every day, and the only time we ever have open slots is when a patient no shows last minute. Right, so we have patients calling in every day who are unable to get an appointment even though my providers do double book. But they can only do so much in one day, so we do end up asking you know we're recommending urgent cares to patients calling in, and so we do it more often than we would like to.

Recognizing the need to grow the practice, two of the three practices acknowledge the need for an additional physician on staff. Currently only one of the two practices is actively recruiting for a physician to add to their staff.

Regarding social determinants, their effect on the health care process and ultimately health outcomes become even more evident when seen from the provider perspective. Each of the practices acknowledged the impact of educational, social, and socioeconomic factors on their practices. Provider responses listed below demonstrate the influence of these factors.

I guess to some degree how much they can afford where they want to travel to get to other studies, um, education level, for sure. Yeah. Their willingness to come in for this or that, you know, as far as what they place as important in their health.

Economic factors as well as social factors strongly influence our patients' ability to get the care they require. We often see patients are not as compliant when we try to refer them to specialties that are outside of the Perry County area and are in more urban areas. I contribute this to economic factors with the cost of transportation as well as many social factors. Patients want to stay in the area, and we are hard pressed to find the services they need that are within their driving distance, in an area they are comfortable driving to, and many of our patients are unable to self-transport.

Finally concerns with behavioral health services are common across the three practices. These concerns include limited support managing patients with serious mental health issues; inability to secure timely referrals to psychiatrists; lack of communication with behavioral health providers; and lack of local substance abuse services. Remarks by providers supporting these observations are as follows.

That that would be one of the greatest needs in the county [mental health services]. Um, and I think that's everywhere too, but yeah, I agree. There's there, there's, there's so much only so much that we can do. I mean, as far as even our training is in, you know, we can handle a lot of the run of the mill depression and anxiety. Um, at least as far as medications go and maybe some simple counseling and then when, when you go beyond, um, you know, the, those simple things, like people that are getting out of a from a hospital, a psychological hospitalization, that's beyond our, our scope. And, and we, we are of stuck in a rock in a hard place where we don't know how to best manage this person, but they can't get into see a psychiatrist.

Substance abuse issues are usually urgent, and Perry County does not have any inpatient treatment that we have found, only outpatient. It seems to be much easier to help them find treatment/placement in the Harrisburg area. We do see patients that are affected by substance abuse that could use more resources than we can offer or are available to them currently in this area.

Sometimes at it, but it's not a routine, hey, here's my progress report on how your patient's doing. Yeah. You know, more of a word of mouth from the patient. When we see them, they suggest that I go up on, on this medicine or, or try, or, you know, something. So, it's not a, this is not a as good a communication as, as we would hope. Yeah. And I, I didn't even add, you know, if you make it a child it's even 10 times harder, right.

## **Dental Services**

Currently there are eight (8) dentists across eight (8) practices providing services in the county (See Appendix C). The number of dentists in the county declined by three since a review of this type was conducted in 2014. The total combined weekly evening appointment hours offered by dental practices is fourteen (14) hours. Evening appointment hours have declined by fourteen (14) hours since

completion of this survey in 2014 due to the retirement in the interim of two dentists who routinely offered evening hours.

### **Behavioral Health Services**

Mental health and addiction services available to county residents are broad in scope. However, financial, and human resources fully committed to these services and located within the county are limited. Two key governmental organizations are responsible for mental health services and addiction (drug and alcohol) services for residents of both Cumberland and Perry counties: Cumberland-Perry Mental Health Intellectual & Developmental Disabilities (MH.IDD), and the Cumberland-Perry Drug & Alcohol Commission. Located in Carlisle, Pennsylvania, both organizations directly provide or contract for an array of services (education, prevention, treatment, and service coordination) for their respective areas of responsibility.

At the current time, there are five mental health service providers with offices physically located in Perry County (See Appendix C). There are four private counseling services and one service offered on a part-time basis through a satellite office of a Cumberland County based community mental health center. There currently are two locations within the county at which outpatient drug and alcohol counseling services are provided. The closest comprehensive substance abuse services are in Cumberland and Dauphin Counties.

Regarding current market dynamics, behavioral health specialists participating in the focus group cite a significant pandemic driven spike in the incidence of mental health crises. They also acknowledge the challenge of responding to increased demand. A significant part of the challenge is linked to a record number of departures of trained crisis workers. These concerns are reflected below in the comments of a focus group member.

Yes, we've seen a significant increase it's gone down the last couple of months, especially crisis information has dropped just a little bit the last couple of months. But, right through the pandemic it's been very, very challenging to try to support people in crisis. We've seen huge capacity issues with people resigning from their jobs, choosing other lines of work, so you know we're losing people who have worked prices for a long time to go to a warehouse because there's less stress and about the same amount of money.

Despite the increased demand for crisis services, a behavioral health specialist expressed frustration with the hesitancy of county residents to utilize existing county-based counseling services.

what we've seen because we put a several providers in Perry County the use of those providers is low, some of it is cultural I think it's rural. And they keep their problems to themselves, they deal with the issues themselves that that's just my take I don't have data to prove that other than the low penetration rate (the numbers of people that are eligible for medical assistance and utilize mental health services).

Focus group members additionally remarked on the need for greater communication and collaboration with physical medicine providers. Concern over the lack of routine interaction is noted in the focus group participant's comment below.

So, there's not ongoing you know and I'm not so sure sometimes that either, has the time to do that either you know if things are a status quo of things are going fine. They're not bothering to communicate that it's only when something maybe blows up that they need some additional information or support one side or the other right.

Finally commenting on ways to improve services within the county, focus group members advocated for increased use of mobile teams, greater use of telehealth applications, and the introduction of physical medicine/ behavioral health models within county primary care practice sites.

#### **IV. Discussion**

The current state of health within Perry County remains at an unacceptably low level relative to the overall state of health in Pennsylvania. As revealed by the statistical analysis, structural determinants of health, specifically educational attainment and socioeconomic status strongly influence county health outcomes. The influence of these determinants is readily recognized by community residents as well as health care providers serving the county. Amplifying the negative effects of these determinants is the chronic shortage of county-based health care services which appear to have deteriorated somewhat since the prior assessment conducted in 2014. The impact of limited health care services is disclosed in focus group members' concerns with health care service accessibility, availability, and accommodation. And, of course it is best demonstrated in the focus groups' overwhelming support for the establishment of urgent care services within the county. There are several actions regarding availability, accommodation, and acceptability of existing practices which can improve healthcare service accessibility. But measurable improvement requires the addition of easily accessible health care services within the county. From the provider perspective, there is interest in increasing resources but there is currently a shortage of trained and experienced health care providers in all primary care specialties.

Aware of the major determinants of health outcome within the county, PCHC now has an opportunity to redefine its role and related scope of activities. PCHC may move beyond an exclusive focus on access to include improvement of the broad range of social determinants of health. We strongly recommend that PCHC remain focused on the improvement of health care service access. There are several reasons for this recommendation. First, PCHC's existing knowledge, experience, and expertise relate to health care service development and management. Second, PCHC has invested time and effort in building a network of health care service providers committed to improving access within the county. Third, PCHC efforts have met with some success in improving health care service access within the county. These efforts include support for the Hamilton Health Family Health Center, initiation of the school based oral health program, and the recent start-up of the community paramedicine program in collaboration with UPMC and the Landisburg EMS. Fourth, the results of PCHC direct efforts to improve education levels and/or socioeconomic status would be very difficult to document given the time required to generate positive outcomes and the challenge of separating PCHC driven outcomes from interventions of other organizations in play over the same time. Finally, based on analysis of the data, improvements in health care service access boosts the benefits of improvements in other critical social determinants of health. In other words, improving health care access amplifies the positive impacts of reduced poverty and/or increased educational attainment on community health.

Since its inception, the determination and efforts of the PCHC have been admirable. But progress has been slow due to the intransigent nature of factors influencing system-wide improvement and ultimately health outcomes. To a certain extent, progress has also been slow due to the limited resources devoted to creating change. To measurably improve health outcomes by increasing health services access will require increased effort and resources. As suggested by the statistical findings, in the absence of changes in other social determinants, improvements in access to healthcare services may not lead to noticeable improvements in health until access approaches state-wide averages. Like

Chief Brody's realization of the challenge that lie ahead after coming face to face with the great white, PCHC too is "gonna need a bigger boat" to succeed in its efforts to improve health care access and reduce health disparities.

## V. Recommendations

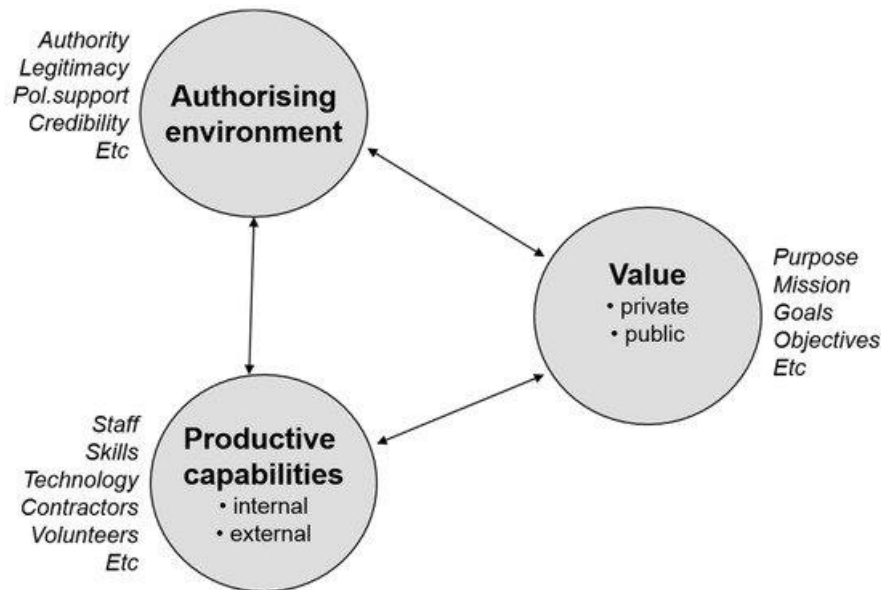
### *A Strategic Framework*

The critically important relationship between an organization's mission and its strategy is captured by John Bryson in his text on strategic planning<sup>xi</sup>.

"A strategy may be thought of as a pattern of purposes, policies, programs, actions, decisions, and/or resource allocations that defines what an organization is, what it does, and why it does it. A strategy, therefore, is the extension of the organization's mission, forming a bridge between the organization and its environment". (p. 130)

The strategic recommendations outlined in the next section are organized based on a strategic model developed by Mark H. Moore<sup>xii</sup> and illustrated in Figure 1. Within the figure, *value* represents the value proposition that guides the enterprise. For an enterprise to succeed in producing value, the leaders of the enterprise must have an account of why the enterprise exists, what purposes the enterprise is pursuing, and a claim about the way in which the world would be made better through the operations of the enterprise. The second point—labeled *legitimacy and support*—refers to the source of support for the value proposition. It is not enough that an individual or small group judge some purposes to be valuable. Others, who provide the necessary financial resources and authorization, must agree with that judgment. The third point—labeled *operational capacity*—refers to the know-how and capability controlled by the enterprise to achieve the desired results. Often, this capability lies entirely in the enterprise. However, sometimes it lies outside the enterprise's boundary, and the enterprise must find ways to engage capacities beyond its own to achieve the desired result.

Figure 7 Strategy in the Non-Profit Sector



This model provides the ideal structure to accurately capture both the strategic opportunities and challenges faced by PCHC. In brief, non-profit organization's missions differ from their for-profit counterparts with respect to the relationship between revenue and value. The value generated by a for-profit is revealed in its ability to generate revenue by meeting the needs and/or wants of motivated customers which in turn generates a financial return used to support and grow the firm. This strong connection between value, authorizing environment, and productive capability is not necessarily in place for non-profit enterprises. Thus, for non-profits such as PCHC it is essential to consider strategies for each of the three key components. In fact, failure to fully develop all three components typically lead to underperformance or failure. The logic of this approach is insightfully summarized by Mark Moore in the following key points.

***value, support but no capacity***

If a manager has a valuable purpose that is widely supported, but nobody knows how to achieve it, the enterprise will fail for want of accomplishment.

***value, capacity but no support***

If a manager has a valuable purpose and capabilities for achieving it but no one wants or needs it, the enterprise will fail for lack of a sponsor.

***support, capacity, no value***

If a manager has support and capabilities, but nothing of value is being created, then the enterprise will succeed only in staying alive, but not in creating value. (p.198)

### ***Strategic Recommendations***

Without question PCHC has experienced meaningful successes over its eight-year history. But continued success leading to measurable improvement in community health outcomes will require a more robust strategy addressing each of the key strategic components of the model described above. We encourage PCHC to adopt a strategy “forming a bridge between the organization and its environment” that includes initiatives to strengthen relationships with authorizing stakeholders; increase the capacity of the coalition; and prioritize and set realistic goals for initiatives intended to demonstrate the value of the PCHC to the Perry County community.

We realize that the strategic recommendations are ambitious and at first a bit overwhelming. We suggest proceeding based on the order of strategic components listed below. More specifically, we recommend the following initial actions over a twelve-month period.

1. Design and develop an integrated communication plan to create awareness of the county’s health challenges and to elicit support especially from those who are favorably disposed but not fully engaged. This is not simply a one-time public presentation but a sustained effort which remains the responsibility of the coalition over time.
2. Develop an operational model/plan that details both operational and financial resources required to achieve the coalition’s mission.
- 3a. Recruit and/or retain the partners necessary to achieve the coalition’s mission.
- 3b. Secure the financial and operational resources outlined in the operational plan.
4. Select a high priority health care services access goal and stand up a learning and action team committed to achieving the goal.

### **Strengthen Relationships with Authorizing Stakeholders**

It is not enough that PCHC judge healthcare access in the county as critically important and thus a worthy mission. Others, who provide the necessary resources, support, and authorization, must agree with that judgment. Those others include county residents, elected representatives, interest groups, the media, healthcare providers, other human service agencies, health related services, and contributors/investors. This grouping is generally called the “authorizing environment” of the organization.

In simple terms, the authorizing environment consists of four subgroups. These include individual and organizations unaware of the PCHC; individuals and organizations publicly expressing support for PCHC initiatives; individuals and organizations favorably disposed but not offering support; and of course, those individuals and groups wary of and in opposition to PCHC efforts.

Optimistically an opportunity exists to engage more fully those who are either unaware or favorably disposed to the PCHC mission. To date, however, the PCHC has not consistently communicated the urgency of the issue, its mission and/or the value created through its efforts.

To achieve broad community support beyond the “true believers” requires an active and sustained marketing and development effort. Like any new entity attempting to gain traction, PCHC needs the equivalent of a pitchbook in business to solicit support. Skills required include the ability to develop and maintain an integrated marketing plan/strategy; grant writing skills; and advancement (fund raising) knowledge and skills.



Failure to secure funds and/or broad public support will continue to seriously hamper PCHC's ability to achieve its mission.

### **Increase the Capacity of the Coalition**

The PCHC's current capacity to deliver on current, new, and potentially expanded action plan goals is low. There are insufficient organizational, operational, and financial resources to consistently take on deliberative strategic initiatives capable of impactful community /system change. To address future needs, PCHC requires an organizational structure and processes which directly links to its mission and the types of projects it prioritizes and initiates.

Shamelessly borrowing from the work of John Kania and Mark Kramer, PCHC should consider adopting a structured form of collaboration employed to solve specific problems. Without question, transitioning to a "collective impact" model will require an investment in management capacity capable of strategic planning, formation and oversight of learning and action groups around specific problems; managing meetings and related logistics; developing and sustaining an active marketing effort; securing sufficient funds to sustain coalition operations; and maintaining data-driven documentation of progress. Conditions for success identified in collaborative models of this type include: the need for a common vision; common goals which matter to community residents; community partnerships to include cross-sector collaborations; strategic planning; coordinated plan implementation; a common measurement system; data driven commitment to continuous improvement; and adequate financial resources to sustain collaborative efforts.

The good news is that there are numerous organizational models available from which to select. Frameworks to champion health equity through the reduction/elimination of disparities are offered by the Robert Wood Johnson Foundation (RWJF), the National Association of County Health Officials (NACCHO) in collaboration with the Centers for Disease Control and Prevention (CDC), and the Population Health Alliance (PHA). Collaborative models of this type are common throughout central Pennsylvania. A good example is the York Opioid Collaborative [Our Work - York Opioid Collaborative](#).

To complete this restart, we encourage the retention of a consulting group expert in collaborative formation to assist in the reassessment of resources required; to assist in the development of formal coalition structures and process (the rules); to help formulate the responsibilities and accountability of coalition members (the roles); and to lead a formal strategic planning process.

### **Prioritize and Set Realistic Goals for Initiatives Intended to Demonstrate Value**

To succeed in producing value, PCHC needs a purpose and a claim about the way in which the world would be made better through its operations. This purpose and claim clearly exist for the coalition. PCHC purpose and claim - to better the quality and length of county residents' lives through collaborative efforts to increase access to health care services - should resonate with every resident who experiences accessibility, availability, affordability, acceptability, and accommodation challenges when seeking care within the county. Four initiatives are offered below to address what we believe are the most pressing access related issues. These initiatives are in priority order. The selection and prioritization of these initiatives was based on consideration of the following: the current community health status, the level of current county resources, perceived need for additional/ new services by community residents, existence of effective evidence-based interventions, the existence of a role for the coalition; and health outcome improvements expected from implementation of the intervention/s.

## ***Behavioral Health Services***

### ***The Issue***

In the 2022 Robert Wood Johnson County Health Profile, self-reported “poor mental health” days serves as a measure of community mental health. In the 2022 report, Perry County’s “poor mental health” days measured 5.1 days. In comparison, the Pennsylvania average was 4.6 days, and a national best performer was 4.0 days. To serve those in need, there is one mental health provider for every 2720 Perry County residents in contrast to 1 for every 460 Pennsylvania residents and a national best performer of 1 for every 250 residents. Concern over the prevalence and incidence of behavioral health disorders/ illness along with the dearth of available resources are either the first or second pressing health care issue cited in the most recent Community Health Needs Assessment of both Penn State Health and UPMC. It is cited as the second most needed service in Perry County by those participating in focus group completed over the last several months. Challenges and evidence-based responses are well documented. Some are in place in Perry County. Given the historically low collaboration between physical medicine providers and behavioral health specialists, the coalition serves as the ideal forum to continue bringing these providers together. Based on the statistical analysis, upon reaching a health access tipping point, improved access can lower the number of days being reported as “poor mental health” days.

### ***The Challenges***

The core challenges outline in the Center for Rural Pennsylvania’s report, *Access to Mental Health Services in Rural Pennsylvania*, and echoed in focus group responses include (1) transportation issues, (2) health insurance as an access issue, (3) stigma and mental health acceptance, (4) distance and travel time and conflicting work hours, (5) family engagement and the role of family (6) telehealth, internet access, and technology issues, (7) fragmented levels of care and poor coordination across disciplines, (8) shortage of behavioral health professionals.

### ***Possible Solutions***

The Center for Rural Pennsylvania’s report, *Access to Mental Health Services in Rural Pennsylvania* also offers policy initiatives to pursue to address the above listed challenges. Several of these which are viable at the county level include (1) Promote the de-stigmatization of mental health through education, prevention, and normalization. (2) Expand and fund telehealth, case management services, and in-home and mobile therapy to address rural service access barriers. (3) Amplify the role of schools in addressing youth mental health and expand school-based therapy. (4) Integrate physical and behavioral health for prevention and early intervention purposes<sup>xiii</sup>. (5) Improve and strengthen interagency collaboration for streamlined communication and resources sharing. (6) Bridge gaps in the levels of care to access appropriate services based on mental health needs. (7) Design/offer recruitment incentives to attract and retain behavioral health providers. Many of these initiatives are possible with support from health systems serving the county. An excellent example of these practices is presented by Penn Medicine Lancaster General: [Behavioral Health at Lancaster General Health - Penn Medicine Lancaster General Health](#).

### ***The Role of the Coalition***

A learning and action team committed to the design and implementation of proven interventions serves as a forum for coordinated planning; formation of partnerships required to implement interventions; a resource for both technical and ideally financial support to launch initiatives; and an entity accountable for collecting and assessing performance data on supported initiatives.

## ***Oral Health***

### ***The Issue***

The prevalence and severity of oral diseases and disorders directly impacts the general health and well-being of every individual most severely affecting those experiencing health care access disparities. Regarding general health outcomes, Perry County ranks in the lower middle range (25%-50%) of Pennsylvania counties based on the Robert Wood Johnson 2022 County Health Profile rankings. In the 2022 Robert Wood Johnson County Health Profile, Perry County's "poor physical health" days measured 4.3 days. In comparison, the Pennsylvania average was 3.9 days, and a national best performer was 3.4 days. Supporting these findings are results from the Behavioral Health Risk Surveillance System estimates ranking Perry County in the lower middle range (25%-50%) of Pennsylvania counties in the category "visited dentist in the past year". To serve those in need, there is a dentist for every 5130 Perry County residents in contrast to 1 for every 1410 Pennsylvania residents and a national best performer of 1 for every 1210 residents. Concern over the prevalence and incidence of oral health diseases and disorders along with insufficient available is cited as the third most needed service in Perry County by those participating in focus group completed over the last several months. Challenges and evidence-based responses are well documented. Some are in place in Perry County. Given the market characteristics of dental practices, the coalition serves as the ideal community forum to assist exist the expansion of existing practices and to develop strategies to attract new providers to the county. Based on the statistical analysis, upon reaching a health access tipping point, improved access can lower the number of days being reported as "poor physical health" days.

### ***The Challenge***

A projected decline in dental school graduates, the number of dentists retiring from practice, and the increases in the U.S. population have raised serious concerns about the adequacy of the dental workforce to provide needed health services in the country. Of the nation's dentists, approximately 90% provide services in the private sector of the dental care delivery system. Of these private practitioners, 92% are in privately owned solo or 2-person practices. The distribution of dentists varies across regions in the U.S and within each state. The distribution does not necessarily align with need. Geographic maldistribution of dentists contributes to poor access to dental care in many communities, especially in rural, low-income, and minority communities.

### ***Possible Solution***

Given the market structure, reliance on larger health care institutions to actively recruit and support dental practice expansion or start up at least at this time is not realistic. To address the issue of access disparity requires community-based action. There is no single best practice. Resolution requires the implementation of multiple interrelated strategies. Examples of these evidence-based approaches include workforce, allied health professional, outreach and education, school-based, and mobile dental services models. Detail on these models including case studies of communities adapting these models are readily available: [Oral Health in Rural Communities Overview - Rural Health Information Hub](#)

### ***The Role of the Coalition***

Recognizing the market structure of dental services, a learning and action team committed to proven interventions serves as a resource for both technical and ideally financial support to launch community-based initiatives and monitor performance.

### ***Primary Care The Issue***

In the 2022 Robert Wood Johnson County Health Profile, self-reported “poor physical health” days serves as a measure of community mental health. In the 2022 report, Perry County’s “poor physical health” days measured 4.3 days. In comparison, the Pennsylvania average was 3.9 days, and a national best performer was 3.4 days. To serve those in need, there is one primary care physician for every 3860 Perry County residents in contrast to 1 for every 1220 Pennsylvania residents and a national best performer of 1 for every 1010 residents. Driven by concern over the lack of available resources, focus group participants cited primary care service as the third most needed service in Perry County. Challenges and evidence-based responses are well documented. The coalition is in an ideal leadership position to affect change given the coalition’s positive relations with major health systems serving the county and their partial success in collaborating on county projects with the two FQHC’s serving the county. Based on the statistical analysis, upon reaching a health access tipping point, improved access can lower the number of days being reported as “poor physical health” days.

### ***The Challenge***

Like dentistry, the major challenge remains the shortage of primary care physicians. In June 2021, the AAMC (Association of American Medical Colleges) published its seventh annual report on physician shortage projections. *The Complexities of Physician Supply and Demand: Projections from 2019 to 2034* analyzes physician supply based on trends in physician workforce and healthcare delivery, as well as physician demand based on population demographics, population health goals, and the impact of advanced practice nurses and physician assistants. The findings of the 2021 study continue to raise alarms, as did the predecessor studies dating back to 2015. The current projections forecast that physician demand will grow faster than supply. The projected shortage by 2034 of primary care physicians (17,800 – 48,000) is almost as large as the projected shortage for *all other specialties combined* (21,000 – 77,100). The primary care shortage is particularly concentrated in rural and low-income urban areas. Beyond provider shortage, a looming issue is acceptance by community members of targeted efforts to increase county primary care resources. An excellent example involves efforts to develop a school-based health clinic by the Sadler Health Center at the West Perry High School. Concerns over increase in costs to the school district resulting from the addition of the health clinic, compliance with parental consent requirements by the health clinic, and more remarkably, skepticism over the need of the health clinic in the first place resulted in failure by the West Perry School Board to approve a lease for the clinic in 2022.

### ***Possible Solution***

The solution in this instance is relatively straightforward. The only way to “move the needle” is the addition of providers through expansion of existing practices and/or through the development of new practices most likely through FQHC initiatives. The increase of supporting services such as home health workers and paramedicine services will be of benefit but will not by themselves address the gap in resources.

### ***The Role of the Coalition***

Recognizing the positive working relations maintained with the regional health systems and FQHC’s serving the county, the coalition through the formation of a learning and action team committed to proven interventions may continue to explore collaborative projects with the FQHC’s and support ongoing health system efforts to recruit and retain primary care providers. The coalition should also serve as a source of primary care innovation advocating for supporting programs such as community

health workers, community paramedicine services, and continued development and use of telemedicine services.

## ***Health Literacy***

### ***The Issue***

Healthy Literacy is the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions. The National Assessment of Adult Literacy (NAAL) found that only 12% of adults have proficient health literacy and they found that Adults aged 65 and over and adults who receive Medicare and Medicaid or who do not have health insurance, had the lowest average health literacy scores. Limited health literacy is associated with medication errors, increased health costs, and inadequate knowledge and care for chronic health conditions. As a component of the SDOH index, the Perry County composite educational measure ranks in the lower-middle part of the Pennsylvania education range (25%-50%). And most importantly, education strongly influences health outcomes. Higher levels of education are related to better health outcomes. Finally based on the report's statistical model, increasing access to health care services reinforces the value of increased educational levels on health outcomes. Stated another way, increasing access to health care services helps buffer the negative impact of low and or declining level of education on health outcomes.

### ***The Challenge***

The general level of health literacy among county residents was cited on multiple occasions in individual and focus group discussions as an impediment to timely and appropriate use of health care services. A sense of community members' undervaluation of health care services is captured in the following remark from a community member during a December focus group session.

One of the things that we struggle with here in Perry County, uh, especially among the older generation of Perry County folks is very independent and it doesn't matter how much we have available here. <laugh>, it's tough to get them to go to the hospital, to go to the doctor. Um, so part of it is the mentality of Perry County is our independence

In addition, traditional efforts to provide educational opportunities often generate disappointing results as shared by a community resident focus group member at a December session.

It's hard to know what the people in Perry County will respond to. When I was a member of the Perry County Elder Abuse Task Force. For 3 years in a row, we planned an educational day for the elder residents. Members of this Task Force included Law Enforcement, County Solicitor, Agency on Aging, Bank manager, Medical, and others. Topics were chosen to educate our elders about the various types of abuse/mistreatments, financial exploitation, scams, etc., and what they can do to protect themselves. We were excited to do this for our elder population. However, these events were poorly attended, even though we had 'advertised' them. The Task Force was a bit discouraged after all the time and planning we put into this venture.

Finally, the limited understanding of population health issues by community members can lead to miscommunication, misunderstandings, and distrust. This is clearly epitomized in the failed effort to increase health care services accessibility to a vulnerable population through the introduction of a school-based health clinic by the Sadler Health Center at the West Perry High School.

### ***Possible Solution***

The literature is replete with best health literacy promotion best practices. An excellent source again is the Rural Health Information Hub ([Search results for Models & Innovations: health literacy \(ruralhealthinfo.org\)](#)). Closer to home, the Healthy Adams County may serve as an excellent organizational model on literacy programming as well as other recommended initiatives. Healthy Adams County is an ongoing collaborative effort to improve the health and wellness of the county. Their effort is guided by: (1) A broad definition of health that addresses the cause of problems, not just the absence of disease. (2) Development of community problem solving capacity that involves diverse participation. (3) Strategies that use both long-term systems level change and short-term high impact projects. (4) Measurable assessment of community health and wellness. (5) Evaluation of outcomes. [Healthy Adams County - Home](#)

### ***The Role of the Coalition***

A learning and action team committed to the design and implementation of proven interventions serves as a forum for coordinated planning a resource for both technical and ideally financial support to launch initiatives; and an entity accountable for collecting and assessing performance data on supported initiatives.

## Appendix A. Additional Tables

**Table A1. SDOH Index Components**

Measure	Description
<b>Education</b>	
<i>Primary &amp; Secondary</i>	
Early childhood education enrollment	Percentage 3- and 4-year-olds enrolled in nursery school, preschool, or kindergarten.
High school graduation rate	Percentage ninth graders graduating from high school on time.
Third grade math proficiency	Percentage third graders scoring proficient on standardized math tests, converted to NAEP scale score points.
Early childhood education centers	Number of ECE centers within a 5-mile radius, converted to natural log units.
Third grade reading proficiency	Percentage third graders scoring proficient on standardized reading tests, converted to NAEP scale score points.
School poverty	Percentage students in elementary schools eligible for free or reduced-price lunches.
Teacher experience	Percentage teachers in their first and second year.
<i>Tertiary</i>	
Advanced Placement course enrollment	Ratio of students enrolled in at least one AP course to the number of 11th and 12th graders.
Adult educational attainment	Percentage adults ages 25 and over with a college degree or higher.
College enrollment in nearby institutions	Percentage 18-24 year-olds enrolled in college within 25-mile radius.
<b>Socioeconomic Status</b>	
<i>Employment</i>	
Employment rate	Percentage adults ages 25-54 who are employed.
High-skill employment	Percentage individuals ages 16 and over employed in management, business, financial, computer, engineering, science, education, legal, community service, health care practitioner, health technology, arts and media occupations.
<i>Income &amp; Poverty</i>	
Median household income	Median income of all households.
Poverty rate	Percentage individuals living in households with incomes below 100% of the federal poverty threshold.
Public assistance rate	Percentage households receiving cash public assistance or Food Stamps/Supplemental Nutrition Assistance Program.



Single-headed households	Percentage family households that are single parent headed
<b>Physical Environment</b>	
<i>Food</i>	
Access to healthy food	Percentage households without a car located further than a half-mile from the nearest supermarket.
<i>Housing</i>	
Homeownership rate	Percentage owner-occupied housing units.
Housing vacancy rate	Percentage housing units that are vacant.
<i>Walkability</i>	
Commute duration	Percentage workers commuting more than one hour one way.
Walkability	EPA Walkability Index.
<i>Environmental Quality</i>	
Access to green space	Percentage impenetrable surface areas such as rooftops, roads or parking lots.
Extreme heat exposure	Summer days with maximum temperature above 90F.
Ozone concentration	Mean estimated 8-hour average ozone concentration.
Airborne microparticles	Mean estimated microparticle (PM2.5) concentration.
Industrial pollutants in air, water or soil	Index of toxic chemicals released by industrial facilities, converted to natural log units.

**Table A2. SDOH and ACCESS Index Summary Statistics and Percentiles**

Measure	Perry County (Average)	Census Tracts in Perry County									
		302.01	303.01	302.02	306.02	303.02	305.02	301	304	306.01	305.01
<b>Life Expectancy at Birth</b>	77.2	75.2	75.5	76.3	77.1	77.3	77.6	77.7	77.9	78.1	79
<b>Percentile (Life Expectancy)</b>	37	20	23	29	36	38	40	41	44	46	56
<b>ACCESS Index (percentile)</b>	<1										
Primary care physicians (per person)	3,845										
Dentists (per person)	5,141										
Mental health providers (per person)	2,892										
Uninsured (% of population)	8.5										
<b>SDOH Index (percentile)</b>	44	46	47	38	28	49	47	44	53	39	45
<b>Education (percentile) [40%]</b>	29	29	35	28	23	32	30	26	39	26	25
<i>Primary &amp; Secondary</i>											
Early childhood education enrollment (%)	27.0	17.2	50.4	23.5	6.4	43.5	40.4	25.9	46.2	16.5	
High school graduation rate (%)	89.8	89.4	92.6	87.6	82.5	92.7	88.8	95.6	92.6	88.1	88.2
Third grade math proficiency	204.3	196.4	196.5	214.2	239.2	186.4	208.6	207.4	186.9	209.2	198.2
Early childhood education centers (%)	1.1	1.1	1.5	0.7		1.0	1.1	0.7	3.0	0.8	1.1
Third grade reading proficiency	209.6	198.2	200.8	204.9	246.0	195.4	223.9	206.1	196.5	223.1	200.8
School poverty (%)	43.4	53.0	42.0	56.6	43.4	42.0	39.7	33.9	42.1	40.8	40.1
Teacher experience (%)	6.6	8.7	7.5	9.0	7.6	7.3	2.1	10.3	7.3	3.8	2.7
<i>Tertiary (percentile)</i>											
Advanced Placement course enrollment (%)	13.3	19.8	20.5	23.7	4.9	19.7	5.8	4.6	20.4	5.0	8.3
Adult educational attainment (%)	16.4	18.7	15.3	18.2	10.4	17.1	18.6	21.4	20.0	13.6	10.9
College enrollment in nearby institutions (%)	32.8	33.6	34.1	29.7	33.5	33.2	31.7	29.1	35.0	33.3	34.6
<b>Socioeconomic Status (percentile) [40%]</b>	56	59	56	44	38	65	59	61	67	54	59
<i>Employment</i>											
Employment rate (%)	81.8	83.0	82.7	77.5	67.5	85.7	84.4	82.2	88.9	81.6	84.1
High-skill employment (%)	30.1	32.0	31.1	28.8	25.5	31.4	30.1	34.2	34.1	23.5	30.5
<i>Income &amp; Poverty</i>											
Median household income (\$)	\$60,026	\$67,202	\$55,417	\$51,331	\$50,667	\$68,636	\$63,779	\$62,270	\$67,544	\$61,000	\$52,410
Poverty rate (%)	8.6	7.9	7.0	13.9	14.1	8.0	5.7	8.8	5.4	7.5	7.9
Public assistance rate (%)	10	12.4	9.4	15.1	7.6	10.7	9.4	7.4	9.8	8.8	9.1
Single-headed households (%)	26.5	30.5	36.5	33.2	18.8	14.3	32.3	27.3	29.6	19.1	23.7
<b>Physical Environment (percentile) [20%]</b>	49	54	56	49	20	52	58	47	52	36	60
<i>Food</i>											
Access to healthy food (%)	4.5	2.0	3.8	5.5	11.9	1.9	1.7	5.7	4.4	5.7	2.3
<i>Housing</i>											
Homeownership rate (%)	80.7	90.0	64.8	65.8	84.4	89.6	80.5	82.0	80.8	79.2	89.6
Housing vacancy rate (%)	6.6	6.3	11.2	10.5	2.3	5.0	7.1	8.0	5.2	6.9	3.2
<i>Walkability</i>											
Commute duration (%)	11.1	10.2	7.5	12.7	27.0	7.0	8.5	11.1	5.0	21.0	1.4
Walkability (Index; 20 highest)	5.6	5.9	8.2	7.3	3.9	2.9	6.6	5.5	5.9	5.7	4.3
<i>Environmental Quality</i>											
Access to green space (%)	1.3	1.1	2.6	1.8	0.4	1.5	1.0	0.9	1.8	0.7	1.5
Extreme heat exposure (days)	11.9	13.7	13.0	11.7	6.7	13.3	11.3	12.7	14.3	10.0	12.0
Ozone concentration (ppb)	37.7	37.7	37.6	37.7	38.2	37.6	37.8	37.7	37.6	37.9	37.8
Airborne microparticles (ppm)	10.7	10.9	11.1	10.7	10.0	11.0	10.6	10.7	11.2	10.3	10.8
Industrial pollutants in air, water or soil	6	5.5	6.7	5.5	5.2	6.2	6.0	5.3	7.5	5.7	6.5

## Appendix B. Technical Summary

### 1. Census Tract Life Expectancy Estimates

The calculation of life expectancy is relatively complex compared to other summary mortality measures, such as crude death rates or age-specific death rates, because it entails the calculation of six distinct functions and requires a minimum number of age groups and total population size. If these fall below those minimums, estimates become unstable and unreliable. For geographic areas, like census tracts, with relatively small populations two important data issues must be overcome to produce reliable and useful life expectancy estimates: availability of death counts and population estimates. In the United States, death counts are only available for the county of residence of decedents and the Census Bureau does not produce annual population estimates for geographic areas smaller than counties. These small death counts and populations also pose significant methodological challenges.

A period life table presents the mortality experience of a population during a particular point (period) in time and applies the age-specific death rates of an actual population to a hypothetical birth cohort. Under the assumption that the hypothetical cohort will experience at every age the mortality of a real population in a particular period, the period life table provides detailed mortality information such as the probability of dying and life expectancy by age. This period life table is then used to calculate the life expectancy at birth for this hypothetical birth cohort. A complete life table includes information for every single year of age except the final age group, which is usually open-ended. An abridged life table aggregates ages into 5- or 10-year intervals (Arias et al. 2017). For small areas, like census tracts, it is impossible to estimate complete life tables due to the small number of people at each age and the resulting small or nonexistent death counts. It is difficult to estimate a reliable age-specific death rate, which is the first function needed to calculate a life table, and thus, life expectancy. As a result, the abridged life table is the most appropriate type for small populations (Arias et al. 2018). Even in the case of an abridged life table, many census tracts, with populations between 1,500 and 8,000, had nonexistent death counts in particular age intervals of the life table.

Despite these data and methodological challenges, Arias et al. (2018) report the first set of abridged U.S. census-tract life tables for 2010–2015 for the District of Columbia (D.C.) and all states excluding Maine and Wisconsin. The resulting life expectancy at birth estimates were based on both observed and predicted age-specific death rates. In practice, this means that these estimates are uncertain. That is, they are estimated with a margin of error. For all 65,662 census tracts in the United States for which reliable estimates of life expectancy at birth were obtained, the average life expectancy was 78.7 years with an average margin of error of  $\pm 3.5$  years (Arias et al. 2018).

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## 2. Additional Regression Results

### *Poor Mental Health Days*

Using the same regression model used in the body of the report (with life expectancy as the dependent variable) we now estimate the model with the number of poor or fair mental health days (in the last 30 days) as the dependent variable ( $Y_{ij}$ ) and obtain the results in Column (4) of Table B1. These estimated coefficients reflect the change in the number of poor or fair mental health days from a movement of one percentile in the associated index. For example, using the results in Column (4) and assuming no change in the other indices, a movement from the 25<sup>th</sup> to the 50<sup>th</sup> percentile on the education index or the SES index decreases the number of mentally unhealthy days by around 0.1 days. The difference between the 25<sup>th</sup> percentile (4.6 days) and the 50<sup>th</sup> percentile (4.8 days) of the number of poor/fair mental health days in Pennsylvania is 0.2 days.

**Table B1**

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Average Number of Poor Mental Health Days (in the past 30 days)				
Education Index (percentile)		-0.00690*** (0.00232)	-0.00367* (0.00204)	-0.00363* (0.00203)	-0.00436 (0.00287)
SES Index (percentile)			-0.00316*** (0.00117)	-0.00388*** (0.00110)	-0.00593*** (0.00168)
Physical Environment Index (percentile)				0.00422*** (0.00116)	0.00556*** (0.00168)
Health Access Index (percentile)	-0.0101*** (0.00189)	-0.00704*** (0.00146)	-0.00747*** (0.00143)	-0.00729*** (0.00138)	0.0122 (0.0106)
Education * Access					2.21e-05 (5.66e-05)
SES * Access					5.09e-05* (2.66e-05)
Physical Environment * Access					-3.96e-05 (3.17e-05)
Access * Access					-0.000231* (0.000126)
Constant	5.408*** (0.153)	5.589*** (0.179)	5.614*** (0.174)	5.427*** (0.173)	5.122*** (0.182)
Observations	3,055	3,055	3,055	3,055	3,055
R-squared	0.311	0.400	0.418	0.436	0.511

Notes: Robust standard errors in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

However, as in the life expectancy analysis, this methodology suggests that improvements in education, socioeconomic status, or the physical environment will have the same impact on self-reported poor mental health status regardless of the level of health access. In Column (5) we relax this assumption and allow the impact of changes in these social determinants of health to depend on the level of health access in the county. We then evaluate these effects at various percentiles of the health access index: the 5<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 95<sup>th</sup> percentile. The estimated effects are modest yet consistent with the life expectancy results.

Importantly, these results confirm that improvements in health access reduce poor mental health days only when access to healthcare services is above the 50<sup>th</sup> percentile.

#### *Poor Physical Health Days*

Finally, we now estimate the model with the average number of poor or fair physical health days (in the last 30 days) as the dependent variable ( $Y_{ij}$ ) and obtain the results in Column (4) of Table B2. These estimated coefficients reflect the change in the number of poor or fair physical health days from a movement of one percentile in the associated index. For example, using the results in Column (4) and assuming no change in the other indices, a movement from the 25<sup>th</sup> to the 50<sup>th</sup> percentile on the education index or the SES index decreases the number of mentally unhealthy days by around 0.12 days. The difference between the 25<sup>th</sup> percentile (3.7 days) and the 50<sup>th</sup> percentile (4.0 days) of the number of poor/fair physical health days in Pennsylvania is 0.3 days.

**Table B2**

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Average Number of Poor Physical Health Days (in the past 30 days)				
Education Index (percentile)		-0.00855*** (0.00249)	-0.00479** (0.00224)	-0.00474** (0.00221)	-0.00666** (0.00313)
SES Index (percentile)			-0.00368*** (0.00120)	-0.00467*** (0.00110)	-0.00369** (0.00182)
Physical Environment Index (percentile)				0.00583*** (0.00122)	0.00556*** (0.00204)
Health Access Index (percentile)	-0.0141*** (0.00254)	-0.0102*** (0.00188)	-0.0107*** (0.00187)	-0.0105*** (0.00187)	0.0130 (0.0112)
Education * Access					5.22e-05 (6.73e-05)
SES * Access					-6.39e-06 (3.47e-05)
Physical Environment * Access					-7.68e-06 (4.34e-05)
Access * Access					-0.000276** (0.000137)
Constant	4.746*** (0.166)	4.971*** (0.191)	5.000*** (0.187)	4.741*** (0.183)	4.350*** (0.170)
Observations	3,055	3,055	3,055	3,055	3,055
R-squared	0.384	0.472	0.487	0.509	0.577

Notes: Robust standard errors in parentheses: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

However, as previously, this methodology suggests that improvements in education, socioeconomic status, or the physical environment will have the same impact on self-reported poor mental health status regardless of the level of health access. In Column (5) we relax this assumption and allow the impact of changes in these social determinants of health to depend on the level of health access in the county. We then evaluate these effects at various percentiles of the health access index: the 5<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 95<sup>th</sup> percentile. The estimated effects are modest yet consistent with the life expectancy results. Importantly, these results confirm that improvements in health access reduce poor physical health days only when access to healthcare services is above the 50<sup>th</sup> percentile.

## Appendix C

### Health Care Resources Inventory Medical, Dental, Behavioral Health

#### MEDICAL CARE

##### Location: Duncannon

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**Name:** Two Rivers Family Health Center  
**Practice Affiliation:** Independent  
**Specialty:** Family Practice  
**Address:** 4 South Market Street 1st Floor, Rear Entrance Duncannon, PA 17020  
**Telephone:** 717-834-3900  
**Web Address:** n/a  
**Hours of Operation:** M-TH=8:30am-5pm/ F=8:30am-4pm  
• Weekend Hours: 0  
• Weeknight Hours: 0

##### **Ancillary Services:**

- Laboratory Yes
- Radiology No
- Physical Therapy No

**Open to New Patients:** No  
**Open to New Patients with Medical Assistance:** No  
**Provider Name(s)/Age:** Lynn A. Cornelius, DO (50)

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**Name:** Duncannon Family Health Center  
**Practice Affiliation:** Penn State Health  
**Specialty:** Family Practice  
**Address:** 51 Business Campus Way Suite 200 Duncannon PA 17020  
**Telephone:** 717-834-3108  
**Web Address:** [Penn State Health Duncannon Outpatient Center Primary Care | Penn State Health](#)

**Hours of Operation:** M, W Th (7:00 AM – 5:00 PM); Tuesday (7:00 AM – 7:00 PM) Friday (7:00 AM - 4:00 PM)  
• Weekend Hours: 0  
• Weeknight Hours: 2

##### **Ancillary Services:**

- Laboratory Yes
- Radiology Yes
- Physical Therapy Yes

**Open to New Patients:** Yes  
**Open to New Patients with Medical Assistance:** Yes (limited)  
**Provider Name(s)/Age:** Daniel Mateer DO (59); Lindsay Rinfrette CRNP



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**Location: Loysville**

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**Name:** Family Practice Centers, P.C.  
**Practice Affiliation:** Independent  
**Specialty:** Family Practice  
**Address:** 1100 Montour Road Loysville PA 17047  
**Telephone:** 717-789-3553  
**Web Address:** <http://www.fpcdoctors.com/Locations/Loysville.aspx>  
**Hours of Operation:** M, W, Th 7AM – 8PM; T, Fr 7AM – 5PM; Sat 8AM – 1 PM  
• Weekend Hours: 5  
• Weeknight Hours: 9

**Ancillary Services:**

- Laboratory Yes
- Radiology Yes
- Physical Therapy Yes

**Open to New Patients:** Yes

**Open to New Patients with Medical Assistance:** Yes

**Provider Name(s)/Age:** John Caruso, DO (53)/Benjamin Stewart DO (44) Donald Dangle DO (37); Joseph Lendvay, Erin R. McCluskey (PA-C)/ Elizabeth A. Sheaffer (CRNP)

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**Location: Marysville**

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**Name:** Holy Spirit Health System Family Medicine - Marysville  
**Practice Affiliation:** Penn State Health  
**Specialty:** Family Practice  
**Address:** 211 Broad Street Marysville PA 17053  
**Telephone:** 717-957-3500  
**Web Address:** [Penn State Health Medical Group - Marysville Primary Care | Penn State Health](#)  
**Hours of Operation:** M-Th 7:30 AM – 4:30 PM; Wed 7:30 AM - 6:00 PM  
• Weekend Hours: 0  
• Weeknight Hours: 1

**Ancillary Services:**

- Laboratory Yes
- Radiology No
- Physical Therapy No

**Open to New Patients:** Yes

**Open to New Patients with Medical Assistance:** Yes (Limited)

**Provider Name(s)/Age:** Tatiana A. Dalton Md (43); Allison Bredbenner CRNP; Wendy Oberdorf CRNP; Amber Thomas CRNP

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**Location: New Bloomfield**

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**Name:** Perry Pediatrics  
**Practice Affiliation:** Holy Spirit Hospital/ Pinnacle Health  
**Specialty:** Pediatrics  
**Address:** 106 Centre Drive New Bloomfield PA  
**Telephone:** 717-582-2181  
**Web Address:** n/a  
**Hours of Operation:** M,TH=8:30am-6:30pm/ T,W,F=8:30am-5pm/ S=8am-10am  
• Weekend Hours: 2  
• Weeknight Hours: 3

**Ancillary Services:**

- Laboratory Yes
- Radiology No
- Physical Therapy No

**Open to New Patients:** Yes  
**Open to New Patients with Medical Assistance:** Yes  
**Provider Name(s)/Age:** Corey D. Shambaugh, MD (42)

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**Location: Newport**

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**Name:** David E Tanner, DO  
**Practice Affiliation:** Independent  
**Specialty:** Family Practice  
**Address:** 82 Red Hill Road Newport PA 17074  
**Telephone:** 717-567-7884  
**Web Address:** n/a  
**Hours of Operation:** M,T=9am-4:30pm/ TH=10am-4pm  
• Weekend Hours: 0  
• Weeknight Hours: 0

**Ancillary Services:**

- Laboratory Yes
- Radiology No
- Physical Therapy No

**Open to New Patients:** Yes  
**Open to New Patients with Medical Assistance:** No  
**Provider Name(s)/Age:** David E Tanner, DO (61)

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**Name:** Pinnacle Health Family Care (Newport)  
**Practice Affiliation:** Pinnacle Health System  
**Specialty:** Family Practice  
**Address:** 28 W. Shortcut Road Newport, PA 17074  
**Telephone:** 717-567-3174  
**Web Address:** [PinnacleHealthFamilyCareNewport - Newport, PA \(upmc.com\)](http://PinnacleHealthFamilyCareNewport-Newport,PA.upmc.com)  
**Hours of Operation:** M, T, TH=7am-7 pm/ W, F=8am-5pm  
• Weekend Hours: 0  
• Weeknight Hours: 4

**Ancillary Services:**

- Laboratory Yes
- Radiology Yes
- Physical Therapy No

**Open to New Patients:** Yes

**Open to New Patients with Medical Assistance:** No

**Provider Name(s)/Age:** Kendra Davis (52); Erin L. Gilson CRNP; Amy Olayiwola PA-C;  
Deidania E. Rosado CRNP

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**Name:** Newport Family Practice  
**Practice Affiliation:** Independent  
**Specialty:** Family Practice  
**Address:** 46 Red Hill Court Newport PA 17074  
**Telephone:** 717-567-3161  
**Web Address:** n/a  
**Hours of Operation:** M=8am-8pm/ T-F=8am-4:30pm  
• Weekend Hours: 0  
• Weeknight Hours: 3

**Ancillary Services:**

- Laboratory Yes
- Radiology No
- Physical Therapy No

**Open to New Patients:** Yes

**Open to New Patients with Medical Assistance:** No

**Provider Name(s)/Age:** Michelle L. Brenizer, MD (52); Albert B. Knouse, MD (59); Kathleen J. Knouse, MD (59); and Michael A. Thieblemont, MD (55); Jilian Sanno CRNP

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**Name:** Hamilton Health Center of Perry County  
**Practice Affiliation:** Hamilton Health Center  
**Address:** 46 Red Hill Court Newport PA 17074  
**Telephone:** 717-204- 7865  
**Web Address:** [Hamilton Health Center of Perry County - Hamilton Health Center](http://HamiltonHealthCenterofPerryCounty-HamiltonHealthCenter)  
**Hours of Operation:** M= 10AM-7PM; Th, Fr= 8AM -5PM  
• Weekend Hours: 0

- Weeknight Hours: 0

**Open to New Patients:** Yes

**Open to New Patients with Medical Assistance:** Yes

**Provider Name/Age:** Part Time Nurse Practitioner

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**Location: Shermans Dale**

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**Name:** Perry Physicians

**Practice Affiliation:** Independent

**Specialty:** Family Practice

**Address:** 4570 Valley Road Shermans Dale PA 17090

**Telephone:** 717-582-2090

**Web Address:** n/a

**Hours of Operation:** M-F=9am-5pm

- Weekend Hours: 0
- Weeknight Hours: 0

**Ancillary Services:**

- Laboratory Yes
- Radiology No
- Physical Therapy No

**Open to New Patients:** Yes

**Open to New Patients with Medical Assistance:** No

**Provider Name(s)/Age:** Steven R. Creps, MD (58); Richard G Bisbing, MD (57)

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**DENTAL CARE**

**Location: Loysville**

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**Name:** Sadler Health Center Corporation Perry County Dental

**Practice Affiliation:** Sadler Health Center

**Address:** 1104 Montour Road Loysville PA 17047

**Telephone:** 717-218-6670

**Web Address:** <http://sadlerhealth.org/perry.html>

**Hours of Operation:** M, T, TH, F=8am-4:30pm/ W=9am-4:30pm

- Weekend Hours: 0
- Weeknight Hours: 0

**Open to New Patients:** Yes

**Open to New Patients with Medical Assistance:** Yes

**Provider Name(s)/Age:** Rotating Staff

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**Location: Marysville**

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**Name:** Marysville Family Dentistry  
**Practice Affiliation:** Independent  
**Address:** 300 S State Rd Marysville PA 17053  
**Telephone:** 7179573711  
**Web Address:** [Home - Marysville Family Dentistry \(marysvillefamilydentistry.com\)](http://marysvillefamilydentistry.com)  
**Hours of Operation:** M-Th 8AM – 5 PM  
    • Weekend Hours: 0  
    • Weeknight Hours: 0

**Open to New Patients:** Yes  
**Open to New Patients with Medical Assistance:** No  
**Provider Name(s)/Age:** Saniya Setia DDS

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**Location: New Bloomfield**

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**Name:** Rodney Summerscales, DDS  
**Practice Affiliation:** Independent  
**Address:** 100 E Main New Bloomfield PA 17068  
**Telephone:** 717-582-8451  
**Web Address:** n/a  
**Hours of Operation:** M,T,W=8am-4pm  
    • Weekend Hours: 0  
    • Weeknight Hours: 0

**Open to New Patients:** No  
**Open to New Patients with Medical Assistance:** No  
**Provider Name(s)/Age:** Rodney Summerscales, DDS (70)

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**Name:** Robert Hensch, DMD  
**Practice Affiliation:** Independent  
**Address:** 31 Barnett Street New Bloomfield PA 17068  
**Telephone:** 717-582-2995  
**Web Address:** <http://www.bobhensch.pa.net>  
**Hours of Operation:** By appointment  
    • Weekend Hours: 0  
    • Weeknight Hours: 0

**Open to New Patients:** Yes  
**Open to New Patients with Medical Assistance:** No  
**Provider Name(s)/Age:** Robert Hensch, DMD (60)

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**Location: Newport**

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**Name:** Hengst and Stirling Family Dental  
**Practice Affiliation:** Independent

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**Address:** 24 N 2nd St Newport PA 17074  
**Telephone:** 717-567-3600  
**Web Address:** [hengstfamilydental.com](http://hengstfamilydental.com)  
**Hours of Operation:** M, T=9am-6pm/W,TH=8am-5pm; Fr 8AM – 1PM  
• Weekend Hours: 0  
• Weeknight Hours: 2

**Open to New Patients:** Yes  
**Open to New Patients with Medical Assistance:** No  
**Provider Name(s)/Age:** Daniel Hengst, DMD (51); Joseph Stirling DMD; and two full-time and two part-time Dental Hygienists

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**Name:** Hamilton Health Center of Perry County  
**Practice Affiliation:** Hamilton Health Center  
**Address:** 46 Red Hill Court Newport PA 17074  
**Telephone:** 717-204- 7865  
**Web Address:** [Hamilton Health Center of Perry County - Hamilton Health Center](#)  
**Hours of Operation:** M, Th, Fr= 8AM -5PM  
• Weekend Hours: 0  
• Weeknight Hours: 0

**Open to New Patients:** Yes  
**Open to New Patients with Medical Assistance:** Yes  
**Provider Name/Age:** Part Time Hygienist

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#### **Location: Shermans Dale**

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**Name:** Mark P Cook, DDS  
**Practice Affiliation:** Independent  
**Address:** 5200 Spring Rd Shermans Dale PA 17090  
**Telephone:** 717-582-2333  
**Web Address:** n/a  
**Hours of Operation:** M,F=8am-6pm/T,TH=8am-9pm  
• Weekend Hours: 0  
• Weeknight Hours: 10

**Open to New Patients:** Yes  
**Open to New Patients with Medical Assistance:** No  
**Provider Name(s)/Age:** Mark P, Cook (68)

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#### **Location: Millerstown**

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**Name:** McMillen Dental  
**Practice Affiliation:** Independent  
**Address:** 2 South Market Street Millerstown PA 17062

**Telephone:** 717-622-5903  
**Web Address:** [www.mcmillendentalllc.com](http://www.mcmillendentalllc.com)  
**Hours of Operation:** M, W, Th=8am-%pm/T=9am-7pm  
• Weekend Hours: 0  
• Weeknight Hours: 2  
**Open to New Patients:** Yes  
**Open to New Patients with Medical Assistance:** No  
**Provider Name(s)/Age:** Joshua Mc Millen DMD (34); one full time hygienist

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## **BEHAVIORAL HEALTH CARE**

### **Location: New Bloomfield**

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**Name:** Laurel Life Counseling Services  
**Address:** 217 South Carlisle Street, P.O. Box 718, New Bloomfield, PA 17068  
**Telephone:** 717-582-9922  
**Web Address:** <http://www.manito-inc.com/domain/31>  
**Provider Name(s):** Brett Leamer MSW; Tammy Rumbaugh, LPC; and David Van Dell (Ph.D.)

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### **Location: Newport**

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**Name:** Newport Counseling Center  
**Address:** 38 N 2nd St Newport PA 17074  
**Telephone:** 717-567-3524  
**Web Address:** <http://www.newportcc.org>  
**Provider Name(s):** Cherly Woodcock, LCSW; and Deborah A Collins, LCSW

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### **Location: Shermans Dale**

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**Name:** NHS The Stevens Center: Dromgold Center  
**Address:** 6097 Spring Rd Shermans Dale PA 17090  
**Telephone:** 717-243-6033 x225 or x234  
**Web Address:** [http://cumberland.pa.networkofcare.org/mh/services/agency.aspx?pid=NHSTheStevensCenterDromgoldCenter\\_776\\_2\\_0](http://cumberland.pa.networkofcare.org/mh/services/agency.aspx?pid=NHSTheStevensCenterDromgoldCenter_776_2_0)

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### **Location: Millerstown**

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**Name:** Tammy L. Rumbaugh, MA, LPC  
**Address:** 1 North Market St Suite IB Millerstown PA 17062  
**Telephone:** 717-254-4715  
**Web Address:** <http://therapists.psychologytoday.com/rms/county/PA/Perry.html>

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**Location: Landisburg**

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**Name:** Alpha Center

**Address:** 107 E. Main Street Landisburg PA 17040

**Telephone:** (717) 789-2118

**Web Address:** [Christian Counseling - Pachristiancounseling.com](http://ChristianCounseling.com)

**Provider Name:** Kurtz Cockley MFT

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<sup>i</sup> National Rural Health Association (NRHA), 2014, “What’s Different about Rural Health Care?” retrieved on March 7, 2021 (<http://www.ruralhealthweb.org/go/left/about-rural-health/what-s-different-about-rural-health-care>)

<sup>ii</sup> Alexander M, Zagheni E, Barbieri M. 2017. A flexible Bayesian model for estimating subnational mortality. *Demography*, 54(6): 2025–41.

<sup>iii</sup> Arias E, Heron M, Xu JQ. 2017. United States life tables, 2014. National Center for Health Statistics. *National Vital Statistics Reports*, 66(4). [https://www.cdc.gov/nchs/data/nvsr/nvsr66/nvsr66\\_04.pdf](https://www.cdc.gov/nchs/data/nvsr/nvsr66/nvsr66_04.pdf)

<sup>iv</sup> Arias E, Escobedo LA, Kennedy J, Fu C, Cisewski J. 2018. U.S. small-area life expectancy estimates project: Methodology and results summary. National Center for Health Statistics. *Vital Health Statistics*, 2(181).

<sup>v</sup> Chetty R, Stepner M, Abraham S, Lin S, Scuderi B, Turner N, Bergeron A, Cutler D. 2016. The association between income and life expectancy in the United States, 2001–2014. *JAMA*, 315(16): 1750–66.

<sup>vi</sup> Dwyer-Lindgren L, Bertozzi-Villa A, Stubbs RW, Morozoff C, Mackenbach JP, van Lenthe FJ, et al. 2017. Inequalities in life expectancy among US counties, 1980 to 2014: Temporal trends and key drivers. *JAMA Internal Medicine*, 177(7): 1003–11.

<sup>vii</sup> Kulkarni SC, Levin-Rector A, Ezzati M, Murray CJ. 2011. Falling behind: Life expectancy in US counties from 2000 to 2007 in an international context. *Population Health Metrics*, 9(1): 16.

<sup>viii</sup> Wang H, Schumacher AE, Levitz CE, Mokdad AH, Murray CJ. 2013. Left behind: Widening disparities for males and females in US county life expectancy, 1985–2010. *Population Health Metrics*, 11(1): 8.

<sup>ix</sup> Lu Ann Aday and Ronald Andersen (1974), “A Framework for the Study of Access to Medical Care, *Health Services Research*, Fall, pp. 208-220.

<sup>x</sup> **Affordability** – Affordability has to do with what the patient is willing to pay, but more importantly what they can pay. Not everyone is able to pay off a healthcare bill right away. For some it takes months and is not seen as a priority like car bills or mortgages. In most cases affordability really boils down to if a person is insured and if they can afford to pay insurance premiums.

**Availability** – This is all about the amount of time it takes a patient to see a physician. For some it can take upwards of three months to a year for an annual exam. Availability also evaluates what the physician must meet the needs of the patient; including but not limited to the amount personnel and technology available.



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**Accessibility** – How easy is it for the patient to reach their doctor’s office? The location of providers can vary greatly on where a patient is located. In some cases, this can prevent patients from seeking out the care that they need.

**Accommodation** – Does the provider meet the preferences of the patient and to what extent? This includes, when the provider is open, communication options, and how easy it is for a patient to get care without prior appointments.

**Acceptability** – Is the provider able to give the best care without passing judgement? Some of the characteristics include sex, social class, age, and ethnicity of the patient, and the provider.

<sup>xi</sup> Bryson, J. M. (2018). *Strategic planning for public and nonprofit organizations: A guide to strengthening and sustaining organizational achievement*. John Wiley & Sons.

<sup>xii</sup> Moore, M. H. (2000). Managing for value: Organizational strategy in for-profit, nonprofit, and governmental organizations. *Nonprofit and voluntary sector quarterly*, 29(1\_suppl), 183-204.

<sup>xiii</sup> To illustrate the impact of intervention (4) on acknowledged challenges consider the presence of an integrated behavioral health counselor at each major county primary care practice. Possible benefits include improved prevention and early intervention efforts; improved care coordination; reduction in stigma, greater acceptance of mental health services; and reduction in transportation related costs.