

ForesightData™

Sample from Adaptive Reuse  
Assessment for Bray Regional Health  
May 2018

## Foreword

### **SAMPLE FROM ADAPTIVE REUSE ASSESSMENT FOR BRAY REGIONAL HEALTH**

This assessment is much broader than what is shown here. This segment is limited to definition of the current revenue status of the failing hospital and the predictive analysis of potential revenue. While narrowly-defined, this part of the assessment is representative of a ForesightData™ analysis, how the analysis is presented and the information that it conveys. Some analyses are confined to only one of the questions listed here; some are much broader. We accommodate them all. The questions answered in this document have been developed independently by Data Reimagined with input from stakeholders in the Bray Regional Health Center franchise.

### **FORESIGHTDATA™**

ForesightData™ is a unique JIT business intelligence product that goes beyond the traditional bounds of data analysis. The overriding premise of this information is that it provides the facts required to make an assessment or decision but does not provide conclusions or recommendations. We provide the answers to your questions; you can use this information to make decisions. These professional, presentation-ready analyses assume the ability of the intended audience to draw its own conclusions.

Making critical decisions can be difficult enough: Acting without adequate, reliable information can make them questionable. Standard business intelligence tools, while extremely important, provide information that may or may not answer specific questions—the questions that need to be answered before you make an investment of time and money.

ForesightData™ is often used to provide predictive, quantitative input into the decision-making process. What will happen if I do this instead of this? What are the trends that can influence what I plan to do? What outcomes can I reasonably expect?

*We do not recommend a course of action. What ForesightData™ does--and how this differs from standard business intelligence data--is present quantitative data and an interpretation of that data so that you know what the data means and can then decide what it means for you. This tool is suitable for use by non-profits and for-profits alike.*

*That said, if you would like us to carry out a ForesightData™ analysis and provide conclusions and recommendations, we are happy to do that as well.*

Analysis is what we do and we are good at it. When we do a predictive analysis, for example, we can structure what the questions are that need to be answered and the framework that needs to be modeled to answer those questions. We used a machine-learning model to do the predictive analysis.

We have no one set methodology for performing these assessments. Whatever method of data analysis will produce the best result is the one we will use. We would not, for example, use RIMS II multipliers to analyze the information in this document. The impacts and predicted outcomes that the multipliers would yield would not be appropriate here. That doesn't mean that we wouldn't use them in another case.

Our work includes data analysis (running the gamut from machine-learning to Excel analysis), economic analysis, feasibility studies, and much more—large and small. Small to medium-size enterprises are our specialties, as are startups.

The cover and content in the following sample are as they were presented to Bray Regional Health. Use symbol done for hospital logo. There are no identifying names, including locations, in the document since this was an actual project. The rural hospital described herein is simply referred to as the Existing Hospital. The Bray Regional Health name and logo are likewise fictitious.

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[If you would like more information or a proposal, get in touch!](#)

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Sample from Adaptive Reuse Data Assessment for Bray Regional Health



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Adaptive Reuse Data Assessment for  
Bray Regional Health

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## Introduction

### Purpose of the Assessment

This portion of the Adaptive Reuse Data Assessment for Bray Regional Health is limited to data analysis of the Class I Revenue-related information that relates to the overarching question about whether or not to repurpose a rural hospital that filed for bankruptcy last year. The specific goals of the assessment are to provide a base of quantifiable information that will contribute to the decision-making process. The following questions are representative of the ones that established the parameters of the data gathering and analysis.

- What are the sources of Class I Revenue by payor?
- In particular, what is the level of Medicaid funding (in the context of the State's deferred payment of 50% of the monies due to the Existing Hospital)?
- What is the ranking of the amount of specialty revenue from 12 core revenue centers (hereinafter Class I Revenue): Cardiology, Dermatology, Endocrinology, Gastroenterology, General Medicine, General Surgery, Nephrology, Neurology, Orthopedics, Pediatrics, Psychiatry, and Pulmonary?
- What are the demographic and health-risk factors believed to affect the level of Class I Revenue?
- What is the Existing Hospital's market share in the target market area?
- What is the target market's demographic profile?
- What is the target market's health status profile?

### Scope of this Data Assessment

The data in this document is intended to provide Class I Revenue-related information used to assess the feasibility of making this a Bray Regional Health district hospital. The questions were developed with the input of all stakeholders. Several different data analysis methodologies were used to examine the following information: Current revenue, sources of Class I Revenue, projected revenue, and demographic and health risk factors that directly influenced the level of Class I Revenue.

Only revenue from the year prior to the bankruptcy filing was considered because the Existing Hospital stated that operating year 2015 was representative as well of the previous five years. Bray stakeholders request that 2015 be used as the

benchmark year and that data from that year be used as input into the models. To ensure consistency, demographic and health risk inputs were also from 2015.

## Stakeholder Profiles

### Existing Hospital

The Existing Hospital opened in the County in 1976 and is one of only two hospitals serving this County. It has operated under several names and owners through the years, including the city of the County. The Existing Hospital entered bankruptcy proceedings in 2016, owing more than \$4 million to 200 or more creditors. The closing leaves only the Competing Hospital as the only one serving the county.

The three-story, 79,851 square foot hospital building along with two one-story medical office buildings are located on an 11-acre campus. The Existing Hospital supports a total of 96 licensed beds comprised of 64 acute care/surgical beds, 26 behavioral/psychiatric beds, and six Intensive Care Unit beds.

- Behavioral Health Services
- Cancer Care
- Cardiac Rehabilitation
- Outpatient Imaging Center
- Emergency Services
- Endocrinology
- Endoscopy Suite
- Family Birth Place
- Healthy Screenings
- Heart Center
- Lactation Consultation
- Orthopedic
- Pediatrics
- Physical Medicine & Rehabilitation
- Physicians – Primary Care
- Physicians – Specialists
- Radiology
- Sleep Center
- Smoking Cessation
- Surgery
- Thoracic & Vascular Care
- Urgent Care – Sellersburg
- Vein Center
- Women’s Services
- Wound Care

### Bray Regional Health Center Network

The Bray Regional Health Center Network is a 1,700-bed healthcare system with 10 hospitals on eight campuses spanning 6,200 square miles of the State. The network employs more than 12,000 people and has nearly 3,000 attending physicians.

From Level 1, Level 2 and Pediatric Trauma Centers, the region’s only acute care children’s hospital, an academic medical center, several community hospitals,



## Sample from Adaptive Reuse Data Assessment for Bray Regional Health

dozens of specialized institutes and centers, skilled nursing, assisted living facilities, homecare services and one of the largest mental health systems in the State, today the Bray Regional Health Center network is the pre-eminent provider of integrated healthcare in the Hudson Valley.

All of the network hospitals have between 175 and 250 acute care beds; and, offer the following services in some combination depending on market demand:

- Allergy & Immunology
- Anesthesiology
- Cardiology
- Cardiovascular Surgery
- Colon/Rectal Surgery
- Dentistry/Oral Surgery
- Emergency Medicine
- Family Medicine
- Gastroenterology
- General Surgery
- Geriatrics
- Gynecologic Oncology
- Hospitalists
- Infectious Disease
- Internal Medicine
- Neonatology
- Nephrology
- Neurology
- Obstetrics/Gynecology
- Oncology/ Radiation Oncology
- Ophthalmology
- Orthopedic Surgery
- Otolaryngology
- Pathology
- Pediatrics
- Pediatric Cardiology
- Perinatology
- Physical Medicine and Rehabilitation
- Plastic and Reconstructive Surgery
- Podiatry
- Pulmonary Medicine
- Radiology
- Sports Medicine
- Urology
- Wound Care

Bray Health regional hospitals also have the following depending on location.

- Contingence Clinic
- Dialysis (Inpatient)
- Emergency Department/Trauma Center
- GI/Endoscopy Lab
- Healthy Woman Program
- Imaging
- Intensive Care Unit
- Neonatal Intensive Care Unit- Level III
- Nutritional Counseling
- Pet Therapy
- Rehabilitation Services
- Robotic-Assisted Surgery
- Senior Circle Program
- Skilled Nursing Unit
- Women's Services and Birthing Center
- Wound Care & Hyperbaric Center

## Key Findings

### Class I Revenue Predictive Model

The Class I Revenue potential segment of this analysis was constructed from three machine learning models: Demographic-based Class I Revenue projections; health risk-based Class I Revenue projections; and, historical performance-based Class I Revenue projections. Figures from eleven different specialties considered to be core Class I Revenue-generating centers were input into the model created.

The predictive model—and its variations—was designed to anticipate changes in the following five areas for 11 specialties:

- Number of Patients
- Number of Inpatients
- Average Length of Stay
- Total Charges (Revenue)
- Average Charges

### Predictive Model Inputs

#### *Payor Model*

This model was constructed to predict patient numbers and Class I Revenue based on a linear regression algorithm that included the following inputs:

- Patients
- Inpatients
- Length of Stay
- Total Charge
- Average Charge
- Medicare
- Medicaid
- Commercial
- Self-Pay

#### *Demographic Model*

This model was constructed to predict patient numbers and Class I Revenue based on a linear regression algorithm that included the following inputs:

- Patients
- Inpatient
- Length of Stay
- Total Charge
- Average Charge
- Total Population
- Under18
- Over 18
- Families
- Median Age
- Median Income
- Poverty
- Employed
- Unemployed
- Uninsured
- Medicare
- Medicaid
- Commercial
- Self-Pay

*Health-Risk Model*

This model was constructed to predict patient numbers and Class I Revenue based on a linear regression algorithm that included the following inputs:

- Patients
- Inpatient
- Length of Stay
- Total Charges
- Average Charge
- Over18
- Median Income
- Poverty
- Uninsured
- Smoking
- Obesity
- Mental Disorders
- Diabetes
- Alcohol Abuse
- Cardiovascular
- Respiratory
- Cancer
- Digestive
- Premature Death

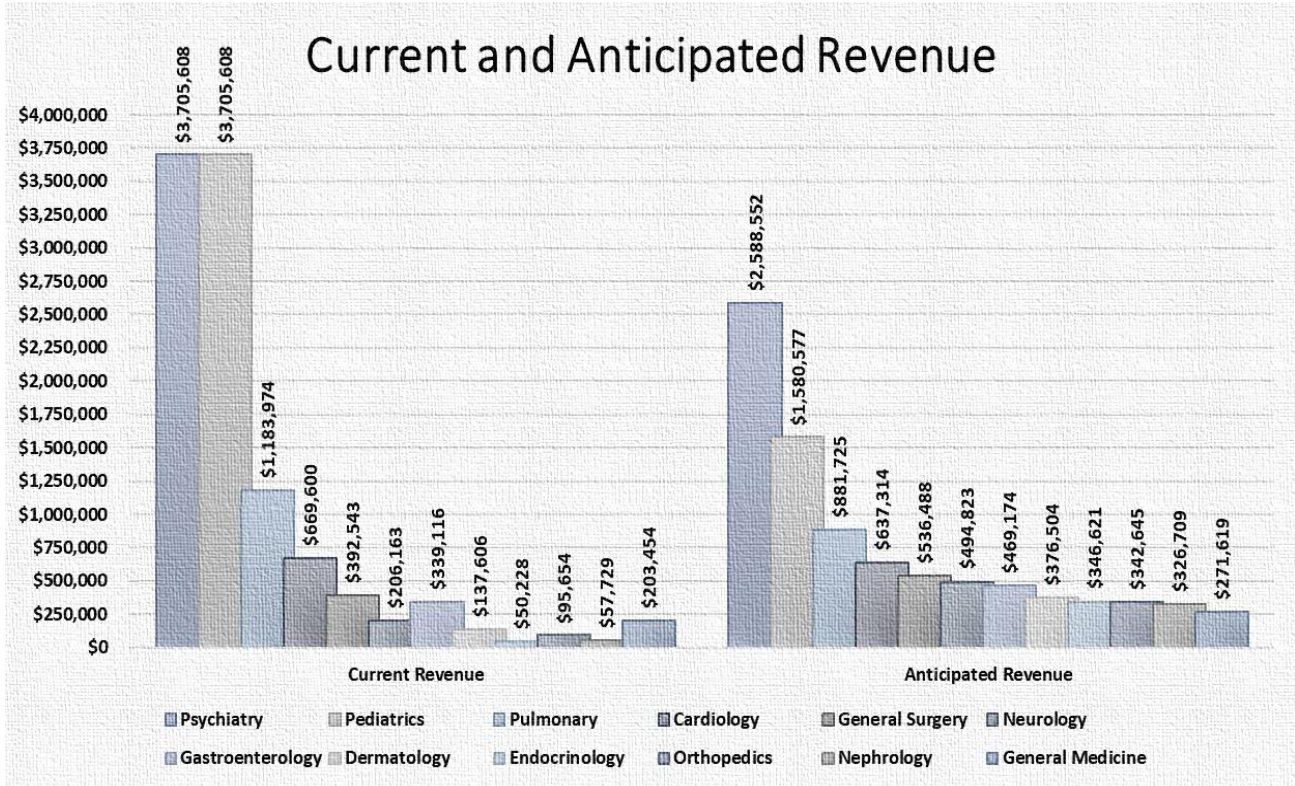
**Predictive Model Summary**

The client has requested that a summary scenario of the predictive model be presented that incorporates all of the projections as well as individual scenarios for each of the machine-learning models. These results are shown below with the inputs into each predictive model.

*Class I Revenue Anticipated by Predictive Model*

The anticipated amount is the average of the predictive model total and payor amounts. Likewise, the percentage change is the calculated change between the total amount of the current Class I Revenue and the anticipated revenue.

CATEGORY <i>Specialty</i>	CURRENT CLASS I REVENUE		CLASS I REVENUE ANTICIPATED BY PREDICTIVE MODEL			
	Total	Payor	Total	Payor	Anticipated	% Change
<b>Psychiatry</b>	\$3,705,608	\$3,705,608	\$3,266,960	\$1,910,145	\$2,588,552	-30.1%
<b>Pediatrics</b>	\$3,705,608	\$3,705,608	\$835,370	\$2,325,783	\$1,580,577	-57.3%
<b>Pulmonary</b>	\$1,183,974	\$1,183,974	\$942,323	\$821,128	\$881,725	-25.5%
<b>Cardiology</b>	\$669,600	\$669,600	\$674,678	\$599,950	\$637,314	-4.8%
<b>General Surgery</b>	\$392,543	\$392,543	\$640,612	\$432,364	\$536,488	36.7%
<b>Neurology</b>	\$206,163	\$206,163	\$556,565	\$433,082	\$494,823	140.0%
<b>Gastroenterology</b>	\$339,116	\$339,116	\$543,371	\$394,977	\$469,174	38.4%
<b>Dermatology</b>	\$137,606	\$137,606	\$391,184	\$361,824	\$376,504	173.6%
<b>Endocrinology</b>	\$50,228	\$50,228	\$418,549	\$274,693	\$346,621	590.1%
<b>Orthopedics</b>	\$95,654	\$95,654	\$384,986	\$300,305	\$342,645	258.2%
<b>Nephrology</b>	\$57,729	\$57,729	\$341,026	\$312,393	\$326,709	465.9%
<b>General Medicine</b>	\$203,454	\$203,454	\$188,343	\$354,894	\$271,619	33.5%
<b>Total</b>	<b>\$10,747,283</b>	<b>\$10,747,283</b>	<b>\$9,183,966</b>	<b>\$8,521,537</b>	<b>\$8,852,752</b>	<b>-17.6%</b>



**OBSERVATIONS**

- Based on current (2015) revenue by specialty, Psychiatry is the source of the most revenue source and Endocrinology is the least.
- Figures generated by the predictive model show that potentially Psychiatry will still be the source of the most revenue but that General Medicine would be the least.
- There is no direct correlation between increased or decreased revenue and the percentage change in that revenue. There is often an inverse relationship between total revenue and percentage change.
- Wide variations exist in the anticipated percentage increases or decreases in revenue. These are attributable to the fact that the total predicted revenue takes into account figures generated by the payor model, the demographic model and the health risk model.
- The 17.6% decrease in overall Class I Revenue for 11 specialties assumes that the operating framework is as it was in 2015, the year prior to the bankruptcy filing.
- Anticipated revenue by Payor does not reflect unpaid Medicaid amounts by the State since that situation was still in flux at the time of this writing.

Sample from Adaptive Reuse Data Assessment for Bray Regional Health

*Class I Revenue by Payor*

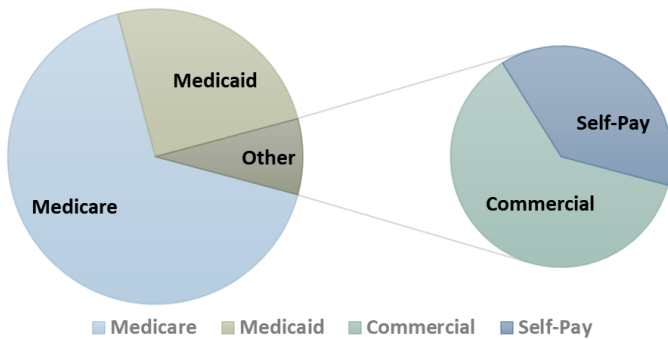
**Current Class I Revenue by Payor**

SPECIALTY	TOTAL REVENUE	MEDICARE	MEDICAID	COMMERCIAL	SELF-PAY
Pediatrics	\$3,705,608	\$2,446,138	\$1,255,436	\$0	\$4,034
Psychiatry	\$3,705,608	\$2,446,138	\$1,255,436	\$0	\$4,034
Pulmonary	\$1,183,974	\$1,183,974	\$846,435	\$2,325,783	\$1,586,109
Cardiology	\$669,600	\$363,477	\$153,616	\$81,322	\$71,185
General Surgery	\$392,543	\$279,934	\$11,380		\$101,229
Gastroenterology	\$339,116	\$131,912	\$59,890	\$137,234	\$10,080
Neurology	\$206,163	\$101,751	\$77,124	\$13,861	\$13,427
General Medicine	\$203,454	\$173,675			\$29,779
Dermatology	\$137,606	\$15,959	\$55,695	\$10,952	\$55,000
Orthopedics	\$95,654	\$71,064			\$24,590
Nephrology	\$57,729	\$9,394	\$7,173	\$17,037	\$24,125
Endocrinology	\$50,228	\$10,199	\$17,066	\$17,676	\$5,287
<b>Totals</b>	<b>\$10,747,283</b>	<b>\$7,233,615</b>	<b>\$3,739,251</b>	<b>\$2,603,865</b>	<b>\$1,928,879</b>

**Projected Class I Revenue by Payor**

SPECIALTY	TOTAL REVENUE	MEDICARE	MEDICAID	COMMERCIAL	SELF-PAY
Pediatrics	\$2,325,783	\$1,531,245	\$783,876	\$5,344	\$5,318
Psychiatry	\$1,910,145	\$1,256,047	\$641,520	\$6,989	\$5,590
Pulmonary	\$821,128	\$519,912	\$263,970	\$26,877	\$10,369
Cardiology	\$599,950	\$397,867	\$177,155	\$17,863	\$7,064
Neurology	\$433,082	\$271,229	\$132,595	\$17,488	\$11,770
General Surgery	\$432,364	\$285,430	\$118,396	\$21,490	\$7,047
Gastroenterology	\$394,977	\$243,782	\$118,642	\$25,548	\$7,005
Dermatology	\$361,824	\$244,721	\$95,014	\$15,849	\$6,240
General Medicine	\$354,894	\$231,194	\$101,389	\$12,467	\$9,845
Nephrology	\$312,393	\$201,874	\$89,995	\$13,532	\$6,993
Orthopedics	\$300,305	\$193,257	\$86,888	\$11,759	\$8,401
Endocrinology	\$274,693	\$172,680	\$83,051	\$12,147	\$6,815
<b>Totals</b>	<b>\$8,521,537</b>	<b>\$5,549,236</b>	<b>\$2,692,490</b>	<b>\$187,354</b>	<b>\$92,457</b>

## Anticipated Revenue by Payor



REVENUE SOURCE	ANTICIPATED REVENUE
Medicare	\$5,549,236
Medicaid	\$2,692,490
Commercial	\$187,354
Self-Pay	\$92,457

### OBSERVATIONS

- The predicted change in Medicaid revenue does not account for the portion of that revenue that remained unpaid by the State in 2015 (50%) since the resolution of the situation is still in question.
- Unlike the total revenue predicted on the basis of Payor, Demographics and Health Risk, this revenue prediction is based solely on payments during the year prior to 2016, when the bankruptcy filing was made.
- Pediatrics and Psychiatry are the two top sources of revenue based on inpatient numbers and anticipated payments from all four sources.

## Class I Revenue Predictive Model Breakdown

The anticipated change in the number of patients is an average derived from the predicted figures from the Payor, Demographic and Health-Risk models.

### Patient Number Anticipated Change

CATEGORY	CURRENT	CLASS I REVENUE ANTICIPATED BY PREDICTIVE MODEL				
		Patients	Payor	Demographics	Risk Factors	Anticipated
<b>Specialty</b>						
<i>Pediatrics</i>	101	211	330	194	245	141.5%
<i>Endocrinology</i>	19	5	43	49	32	70.6%
<i>Dermatology</i>	29	62	43	39	48	66.1%
<i>General Surgery</i>	37	85	28	69	61	63.7%
<i>Orthopedics</i>	21	11	40	42	31	48.1%
<i>Nephrology</i>	14	12	16	33	20	46.2%
<i>Neurology</i>	27	20	40	58	39	45.6%
<i>Gastroenterology</i>	31	31	40	52	41	31.4%
<i>Cardiology</i>	68	138	58	49	81	19.4%
<i>General Medicine</i>	26	15	54	23	31	18.3%
<i>Psychiatry</i>	169	211	86	97	131	-22.4%
<i>Pulmonary</i>	94	68	68	82	73	-22.8%
<b>Total</b>	<b>636</b>	<b>868</b>	<b>845</b>	<b>786</b>	<b>833</b>	<b>14142.1%%</b>

*Inpatient Days Number Anticipated Change*

CATEGORY	CURRENT	CLASS I REVENUE ANTICIPATED BY PREDICTIVE MODEL				
<i>Specialty</i>	Inpatient Days	Payor	Demographics	Risk Factors	Anticipated	% Change
<i>Psychiatry</i>	1,123	391	511	492	465	733.3%
<i>Gastroenterology</i>	176	237	91	513	280	490.7%
<i>Dermatology</i>	82	89	41	156	95	302.5%
<i>Pulmonary</i>	391	513	391	349	418	184.3%
<i>Endocrinology</i>	229	166	332	445	314	170.0%
<i>Neurology</i>	263	260	101	563	308	63.2%
<i>Cardiology</i>	174	387	174	422	328	60.2%
<i>Pediatrics</i>	945	478	1,022	400	633	0.8%
<i>General Surgery</i>	220	255	78	345	226	-7.4%
<i>Nephrology</i>	176	184	122	271	192	-11.8%
<i>Orthopedics</i>	118	179	85	143	136	-20.4%
<i>General Medicine</i>	133	212	120	153	162	-77.5%
<b>Total</b>	<b>4,030</b>	<b>3,350</b>	<b>3,067</b>	<b>4,251</b>	<b>3,556</b>	<b>15.1%</b>

*Average Length of Stay Anticipated Change*

CATEGORY	CURRENT	CLASS I REVENUE ANTICIPATED BY PREDICTIVE MODEL				
<i>Specialty</i>	Length of Stay	Payor	Demographics	Risk Factors	Anticipated	% Change
<i>Pulmonary</i>	8.3	4.9	4.5	3.9	5.6	-32.5%
<i>Neurology</i>	6.9	3.2	7.2	3.2	4.5	-34.2%
<i>General Surgery</i>	3.5	3.9	4.2	4.0	4.0	14.7%
<i>Cardiology</i>	2.9	3.2	4.0	3.4	3.5	21.8%
<i>Dermatology</i>	2.5	2.6	2.8	3.1	2.8	13.6%
<i>General Medicine</i>	3	2.2	3.0	3.2	2.8	-7.0%
<i>Gastroenterology</i>	1.8	1.7	3.3	3.2	2.7	51.4%
<i>Orthopedics</i>	3	2.0	2.6	3.1	2.6	-14.7%
<i>Endocrinology</i>	3.6	1.6	2.7	3.1	2.5	-31.7%
<i>Nephrology</i>	3.5	1.9	2.1	3.1	2.4	-31.9%
<i>Psychiatry</i>	1.5	1.6	1.8	2.4	1.9	28.2%
<i>Pediatrics</i>	1.5	1.6	1.7	1.5	1.6	5.6%
<b>Total</b>	<b>3.5</b>	<b>2.5</b>	<b>3.3</b>	<b>3.1</b>	<b>3.1</b>	<b>-1.4%</b>

*Average Charge Anticipated Change*

CATEGORY	CURRENT	CLASS I REVENUE ANTICIPATED BY PREDICTIVE MODEL				
Specialty	Average Charge	Payor	Demographics	Risk Factors	Anticipated	% Change
<i>Pulmonary</i>	\$11,175	\$22,058	\$12,728	\$13,147	\$15,978	43.0%
<i>General Surgery</i>	\$10,834	\$14,870	\$9,287	\$12,746	\$12,301	13.5%
<i>Cardiology</i>	\$9,689	\$12,480	\$8,137	\$11,633	\$10,750	10.9%
<i>Neurology</i>	\$29,172	\$14,208	\$7,787	\$10,014	\$10,670	-63.4%
<i>General Medicine</i>	\$7,932	\$8,544	\$8,287	\$12,746	\$9,859	24.3%
<i>Dermatology</i>	\$7,188	\$10,195	\$7,131	\$10,325	\$9,217	28.2%
<i>Nephrology</i>	\$9,585	\$8,227	\$8,009	\$11,275	\$9,170	-4.3%
<i>Gastroenterology</i>	\$7,233	\$6,880	\$6,980	\$10,982	\$8,280	14.5%
<i>Orthopedics</i>	\$7,894	\$8,047	\$6,624	\$9,813	\$8,161	3.4%
<i>Endocrinology</i>	\$8,539	\$7,046	\$6,569	\$10,138	\$7,918	-7.3%
<i>Psychiatry</i>	\$4,679	\$6,111	\$6,072	\$7,310	\$6,498	38.9%
<i>Pediatrics</i>	\$4,679	\$6,041	\$5,735	\$4,711	\$5,496	17.4%
<b>Total</b>	<b>\$9,883</b>	<b>\$124,707</b>	<b>\$93,346</b>	<b>\$124,839</b>	<b>\$114,297</b>	<b>9.9%</b>

**OBSERVATIONS**

- The overall expected increase in patient numbers is more than triple the number of expected inpatient days.
- Pediatrics patient numbers are expected to increase the most and Pulmonary patients the least.

**Market Share**

*Summary Market Share by Specialty*

For the three areas Patients, Inpatient Days and Total Revenue, the Existing Hospital has an average 12% share of the market.

SPECIALTY	PATIENTS	INPATIENT DAYS	TOTAL REVENUE	AVERAGE
<i>Psychiatry</i>	25.1%	5.1%	38.5%	22.9%
<i>Pediatrics</i>	13.4%	15.8%	34.2%	21.1%
<i>Dermatology</i>	4.5%	38.8%	3.3%	15.6%
<i>Cardiology</i>	14.1%	25.1%	6.7%	15.3%
<i>Neurology</i>	14.3%	15.2%	8.2%	12.6%
<i>Gastroenterology</i>	7.2%	21.8%	2.9%	10.6%
<i>Nephrology</i>	3.9%	19.6%	2.0%	8.5%
<i>Pulmonary</i>	8.6%	5.5%	4.7%	6.3%
<i>Orthopedics</i>	2.2%	10.1%	0.6%	4.3%
<i>Endocrinology</i>	2.1%	6.2%	1.3%	3.2%
<b>Averages</b>	<b>9.5%</b>	<b>16.3%</b>	<b>10.3%</b>	<b>12.0%</b>



**COMPETING HOSPITAL MARKET SHARE DATA**

SPECIALTY	PATIENTS	INPATIENT DAYS	TOTAL REVENUE
<i>Cardiology</i>	944	3,244	\$22,447,729
<i>Pulmonary</i>	668	3,470	\$16,399,291
<i>Gastrointestinal</i>	797	3,048	\$16,211,088
<i>Orthopedic</i>	504	1,784	\$14,898,214
<i>Pediatrics</i>	1,577	3,389	\$7,135,036
<i>Psychiatry</i>	840	4,618	\$5,926,444
<i>Nephrology</i>	283	979	\$4,324,165
<i>Neurology</i>	232	784	\$4,159,224
<i>Dermatology</i>	105	436	\$1,536,756
<i>Endocrinology</i>	110	362	\$1,456,472
<b>Totals</b>	<b>6,058</b>	<b>22,113</b>	<b>\$94,494,417</b>

**EXISTING HOSPITAL MARKET SHARE DATA**

SPECIALTY	PATIENTS	INPATIENT DAYS	TOTAL REVENUE
<i>Pediatrics</i>	211	945	\$3,705,608
<i>Psychiatry</i>	211	1123	\$3,705,608
<i>Pulmonary</i>	94	391	\$1,183,974
<i>Cardiology</i>	68	174	\$669,600
<i>Gastroenterology</i>	31	176	\$339,116
<i>Neurology</i>	20	263	\$206,163
<i>Dermatology</i>	15	82	\$137,606
<i>Orthopedics</i>	11	118	\$95,654
<i>Nephrology</i>	6	176	\$57,729
<i>Endocrinology</i>	5	229	\$50,228
<b>Totals</b>	<b>672</b>	<b>3,677</b>	<b>\$10,151,286</b>

**OBSERVATIONS**

- This average market share number is skewed since four specialties—Psychiatry, Pediatrics, Dermatology, and Pulmonary—have an average of 19% while the remainder have an average market share of eight percent.
- Only Psychiatry and Pediatrics have a sizable market share as far as total revenue.
- Dermatology, Cardiology, Gastroenterology, and Nephrology have a sizable market share as far as Inpatient Days.

**ESTIMATED AND PROJECTED NUMBER OF AMBULATORY SURGERY PROCEDURES**

PROCEDURE CATEGORY	ESTIMATED 2015					ESTIMATED 2020					MARKET % DIFFERENCE
	TOTAL	<15	15-44	45-64	>65	TOTAL	<15	15-44	45-64	>65	
<b>Total Provider Service Area Population</b>	<b>192,576</b>	<b>37,403</b>	<b>74,555</b>	<b>53,614</b>	<b>27,004</b>	<b>198,135</b>	<b>37,942</b>	<b>74,411</b>	<b>53,692</b>	<b>32,090</b>	
<b>All procedures</b>	24,923	1,543	6,003	8,811	8,565	26,560	1,565	5,992	8,824	10,179	6.60%
Operations on the eye	4,342	89	166	876	3,211	4,949	90	166	877	3,816	14.00%
Operations on the urinary system	1,165	48	195	427	495	1,259	48	195	427	588	8.10%
Operations on the cardiovascular system	755	0	87	361	306	813	0	87	362	364	7.70%
Miscellaneous diagnostic and therapeutic procedures	2,494	100	465	1,011	917	2,668	101	464	1,013	1,090	7.00%
Operations on the respiratory system	354	27	48	154	125	378	27	48	154	149	6.80%
Operations on the digestive system	5,557	120	1,305	2,207	1,924	5,922	122	1,303	2,210	2,287	6.60%
Operations on the male genital organs	399	92	104	100	103	420	93	104	100	123	5.20%
Operations on the nervous system	1,002	7	292	462	241	1,047	7	292	462	286	4.50%
Operations on the integumentary system	1,902	78	561	827	436	1,985	79	560	828	518	4.40%
Operations on musculoskeletal system	3,308	105	1,234	1,466	504	3,405	107	1,232	1,468	598	2.90%
Operations on the ear	570	412	64	60	34	582	418	64	60	40	2.20%
Operations on nose, mouth, and pharynx	1,507	440	526	410	132	1,538	446	525	411	157	2.00%
Operations on the female genital organs	1,394	8	907	381	99	1,412	8	905	381	118	1.30%

**ESTIMATED AND PROJECTED NUMBER OF ACUTE CARE DISCHARGES**

PROCEDURE CATEGORY	ESTIMATED 2015					ESTIMATED 2020					MARKET % DIFFERENCE
	TOTAL	<15	15-44	45-64	>65	TOTAL	<15	15-44	45-64	>65	
<b>Total County Population</b>	<b>192,576</b>	<b>37,403</b>	<b>74,555</b>	<b>53,614</b>	<b>27,004</b>	<b>198,135</b>	<b>37,942</b>	<b>74,411</b>	<b>53,692</b>	<b>32,090</b>	
<b>All Conditions</b>	24,156	1,581	6,460	6,315	9,799	26,021	1,604	6,448	6,324	11,645	7.70%
Diseases of the circulatory system	4,693	19	268	1,428	2,979	5,256	19	267	1,430	3,540	12.00%
Diseases of the respiratory system	2,513	423	207	559	1,325	2,769	429	206	559	1,574	10.20%
Diseases of the musculoskeletal system	1,389	24	186	517	662	1,514	24	186	518	787	9.00%
Infectious and parasitic diseases	664	96	103	161	304	723	97	103	162	361	8.80%
Neoplasms (Cancer)	1,183	23	171	460	528	1,283	24	171	461	627	8.50%
Diseases of blood, blood-forming organs	312	36	65	75	137	338	36	65	75	162	8.40%
Diseases of the genitourinary system	1,356	52	347	376	582	1,467	52	346	377	691	8.10%
Endocrine, nutritional and metabolic diseases and immunity disorders	1,230	116	231	367	516	1,329	118	231	368	613	8.00%
Diseases of the digestive system	2,523	153	514	812	1,045	2,722	155	513	813	1,242	7.90%
Diseases of the nervous system	384	49	80	100	155	414	50	80	100	184	7.80%
Injury and poisoning	1,976	148	495	538	795	2,127	150	494	539	945	7.70%
Diseases of the skin, subcutaneous tissue	495	33	128	160	174	528	33	128	160	207	6.70%
Mental disorders	1,530	79	750	502	200	1,568	80	749	503	237	2.50%
Congenital anomalies	130	88	19	17	7	133	89	19	17	8	1.90%

# County Health Profile

## Demographic Profile

POPULATION	MEDIAN AGE	MEDIAN HOUSEHOLD INCOME	
114,605	38.9	\$50,208	
POVERTY RATE	NUMBER OF FAMILIES	UNEMPLOYMENT RATE	MEDIAN PROPERTY VALUE
15.9%	54,754	4.7%	\$129,000

2015 POPULATION BY AGE	
<b>Total</b>	<b>104,605</b>
6050 - 4	6.2%
5 - 9	6.3%
10 - 14	6.3%
15 - 24	11.6%
25 - 34	13.7%
35 - 44	13.8%
45 - 54	13.3%
55 - 64	13.3%
65 - 74	9.6%
75 - 84	4.2%
85 +	1.7%
<b>18 +</b>	<b>77.7%</b>

2022 POPULATION BY AGE	
<b>TOTAL</b>	<b>120,914</b>
0 - 4	6.1%
5 - 9	6.2%
10 - 14	6.5%
15 - 24	11.2%
25 - 34	13.3%
35 - 44	13.7%
45 - 54	12.7%
55 - 64	12.7%
65 - 74	10.7%
75 - 84	5.2%
85 +	1.7%
<b>18 +</b>	<b>77.6%</b>

Sample from Adaptive Reuse Data Assessment for Bray Regional Health

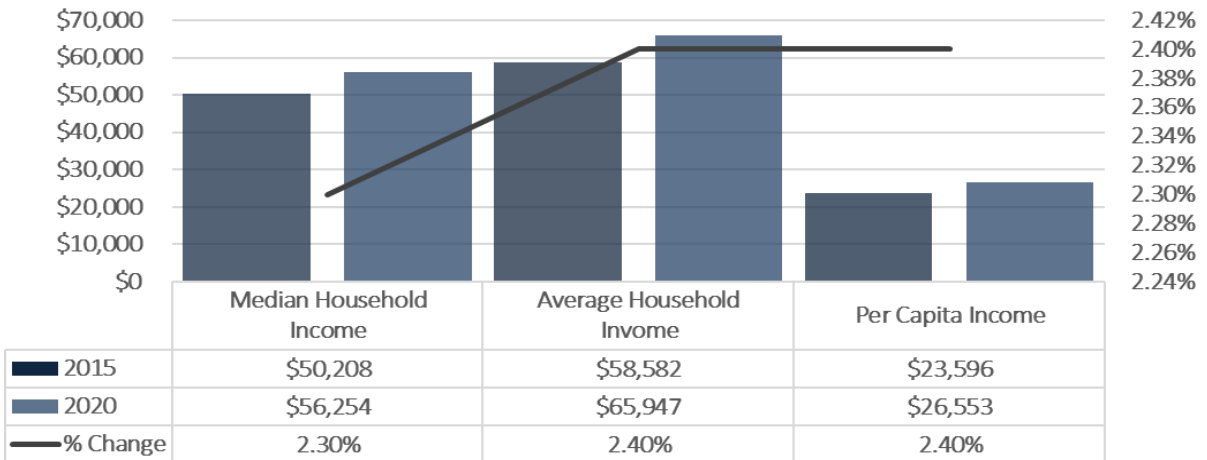
The socioeconomic characteristics of a geographic area influence the way residents access health care services and perceive the need for health care services within society. The economic status of an area may be assessed by examining multiple variables within the community. The following exhibits are a compilation of data including household income, labor force, employees by types of industry, employment rates, educational attainment and poverty for the community served by the Existing Hospital and the Competing Hospital.

The current year population is 114,605. In 2010, the Census count in the area was 110,232. The rate of change since 2010 was 0.74% annually. The five-year projection for the population in the area is 119,642 representing a change of 0.86% annually from 2015 to 2020. Currently, the population is 49.1% male and 50.9% female.

**2010 POPULATION BY RELATIONSHIP AND HOUSEHOLD TYPE**

<b>Total</b>	<b>114,605</b>
In Households	98.6%
In Family Households	82.2%
Householder	26.7%
Spouse	19.4%
Child	30.5%
Other relative	3.0%
Nonrelative	2.6%
<b>In Nonfamily Households</b>	<b>16.4%</b>

**HOUSEHOLDS BY INCOME**



## Sample from Adaptive Reuse Data Assessment for Bray Regional Health

Current median household income is \$50,208 in the area, compared to \$53,217 for all United States households. Median household income is projected to be \$56,254 in five years, compared to \$60,683 for all United States households. Current average household income is \$58,582 in this area, compared to \$74,699 for all United States households. Average household income is projected to be \$65,947 in five years, compared to \$84,910 for all United States households.

Current per capita income is \$23,596 in the area, compared to the United States per capita income of \$28,597. The per capita income is projected to be \$26,553 in five years, compared to \$32,501 for all United States households.

**COUNTY POPULATION BY RACE AND ETHNICITY**

2017 POPULATION BY RACE/ETHNICITY	
<b>Total</b>	<b>114,605</b>
White Alone	85.2%
Black Alone	7.6%
American Indian Alone	0.3%
Asian Alone	1.1%
Pacific Islander Alone	0.1%
Some Other Race Alone	3.0%
Two or More Races	2.8%
Hispanic Origin	5.5%
Diversity Index	34.5
2022 POPULATION BY RACE/ETHNICITY	
<b>Total</b>	<b>120,914</b>
White Alone	83.8%
Black Alone	8.0%
American Indian Alone	0.3%
Asian Alone	1.3%
Pacific Islander Alone	0.1%
Some Other Race Alone	3.3%
Two or More Races	3.2%
Hispanic Origin	6.1%
Diversity Index	37.3

**COUNTY LABOR FORCE PROFILE**

2017 Civilian Population 16+ in Labor Force	
Civilian Employed	95.7%
Civilian Unemployed (Unemployment Rate)	4.3%

2017 EMPLOYED POPULATION 16+ BY INDUSTRY	
<b>TOTAL</b>	<b>62,547</b>
Agriculture/Mining	0.6%
Construction	5.3%
Manufacturing	15.3%
Wholesale Trade	2.9%
Retail Trade	11.9%
Transportation/Utilities	6.8%
Information	1.3%
Finance/Insurance/Real Estate	6.7%
Services	45.3%
Public Administration	4.0%

2017 Employed Population 16+ by Occupation	
<b>TOTAL</b>	<b>62,547</b>
White Collar	55.8%
Management/Business/Financial	12.6%
Professional	16.9%
Sales	9.6%
Administrative Support	16.6%
Services	17.0%
Blue Collar	27.2%
Farming/Forestry/Fishing	0.3%
Construction/Extraction	4.6%
Installation/Maintenance/Repair	3.5%
Production	8.4%
Transportation/Material Moving	10.4%

## Health Status Profile

# Health Risk Profile



Uninsured – 16,004	Cardiovascular – 4,693
Poverty – 12,386	Respiratory – 2,513
Smoking – 30,672	Mental Disorders – 1,530
Obesity – 35,391	Alcohol Abuse – 18,875
Diabetes – 1,230	Cancer – 1,183

**HEALTH OUTCOMES**

Rankings are based on an equal weighting of one length of life (mortality) measure and four quality of life (morbidity) measures. While most of the County health outcomes were comparable to the State (ranking 51 and 55 out of 92 counties, respectively), each measure was significantly below national benchmarks with opportunities for improvement.

	COUNTY	STATE	NATION
<b>Mortality: Rank out of Counties in State</b>	<b>50</b>	<b>55</b>	<b>53</b>
<b>Premature Death: Years of Potential Life Lost Before Age 75 per 100,000 of Population</b>			
<b>Morbidity: Rank out of Counties in State</b>	<b>63</b>	<b>55</b>	<b>59</b>
<b>Poor physical health days: Average or poor health (age-adjusted)</b>	16%	16%	10%
<b>Poor physical health days: Average number of physically unhealthy days reported in past 30 days (age-adjusted)</b>	3.8	3.6	2.6
<b>Poor mental health days: Average number of mentally unhealthy days reported in past 30 days (age-adjusted)</b>	4.7	3.6	2.3
<b>Low birthweight: Percent of live births with low birthweight (&lt;2500 grams)</b>	8.2%	8.3%	6.0%

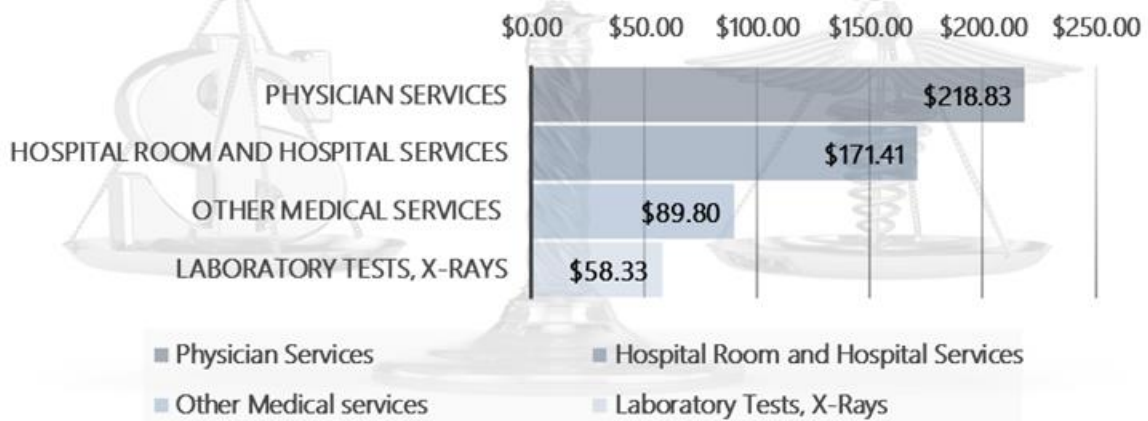
**COUNTY HEALTH NEEDS ASSESSMENT BASED ON NATIONAL HEALTH BENCHMARKS**

	National Benchmark	(A) 30% of National Benchmark	County Rate	(B) County Rate Less National Benchmark	If (B)>(A), then Health Need
Adult Smoking	13.0%	3.9%	28.0%	15.0%	Health Need
Adult Obesity	25.0%	7.5%	31.0%	6.0%	
Physical Inactivity	21.0%	6.3%	32.0%	11.0%	Health Need
Excessive Drinking	7.0%	2.1%	16.0%	9.0%	Health Need
Motor Vehicle Crash Rate	10	3	11	1	
Sexually Transmitted Infections	92	28	352	260	Health Need
Teen Birth Rate	21	6	49	28	Health Need
Uninsured	11.0%	3.3%	16.0%	5.0%	Health Need
Primary Care Physicians	1067	320	1940	873	Health Need
Diabetic Screen Rate	90.0%	27.0%	83.0%	7.0%	
Mammography Screening	73.0%	21.9%	63.0%	10.0%	
Violent Crime Rate	66	20	376	310	Health Need
Children in Poverty	14.0%	4.2%	19.0%	5.0%	Health Need
Children in Single-Parent Households	20.0%	6.0%	35.0%	15.0%	Health Need
Limited Access to Healthy Foods	1.0%	0.3%	7.0%	6.0%	Health Need

**COUNTY HEALTH NEEDS ASSESSMENT BASED ON US AGE-ADJUSTED DEATH RATES**

	Death Rates	(A) 10% of Death Rates	County Rate	(B) County Rate Less Death Rate	If (B)>(A), then Health Need
Cancer	188.7	18.9	236.2	47.5	Health Need
Heart Disease	220.0	22.0	250.0	30.0	Health Need
Diabetes	25.3	2.5	17.7	-7.6	
Cerebrovascular Disease	48.4	4.8	51.2	2.8	
Chronic Lower Respiratory Diseases	44.2	4.4	9.8	-34.4	

Average Resident Healthcare Expenditures





## Sources and Methodologies

### Sources

#### State Department of Health

Patient data was obtained by SQL query from the State Department of Health. All non-federal acute care hospitals are required to report inpatient and outpatient hospital discharges. Long-term care, rehabilitation, and behavioral health hospitals may voluntarily report. Data is shared for all reporting hospitals, and the number of reporting hospitals varies by year.

Hospitals submit data quarterly to the State Hospital Association (IHA). IHA processes the records for accuracy, consistency and completeness, and requests resubmissions as necessary. Once finalized, the State Department of Health combines the quarterly data for annual release.

Discharges are classified as inpatient or outpatient by each reporting hospital. The admission criteria distinguishing inpatient and outpatient visits may vary across hospitals. Billing procedures also vary by hospital, including the services provided and length of stay constituting one inpatient or outpatient discharge.

All counts reflect unique hospital discharge records. Counts do not necessarily reflect unique patients. Patients with more than one discharge from a hospital, for the same diagnosis, procedure, or condition in a year, are counted for each unique discharge record.

#### Centers for Medicare & Medicaid Services

##### *Medicare Provider Utilization and Payment Data: Physician and other Suppliers*

The Physician and Other Supplier Public Use File (Physician and Other Supplier PUF) provides information on services and procedures provided to Medicare beneficiaries by physicians and other healthcare professionals. The Physician and Other Supplier PUF contains information on utilization, payment (allowed amount and Medicare payment), and submitted charges organized by National Provider Identifier (NPI), Healthcare Common Procedure Coding System (HCPCS) code, and place of service. This PUF is based on information from CMS administrative claims data for Medicare beneficiaries enrolled in the fee-for-service program. The data in the Physician and Other Supplier PUF covers calendar years 2012 through 2016 and contains 100% final-action physician/supplier Part B non-institutional line items for the Medicare fee-for-service population.

***Medicare Provider Utilization and Payment Data: Inpatient***

The Inpatient Utilization and Payment Public Use File (Inpatient PUF) provides information on inpatient discharges for Medicare fee-for-service beneficiaries. The Inpatient PUF includes information on utilization, payment (total payment and Medicare payment), and hospital-specific charges for the more than 3,000 U.S. hospitals that receive Medicare Inpatient Prospective Payment System (IPPS) payments. The PUF is organized by hospital and Medicare Severity Diagnosis Related Group (MS-DRG) and covers Fiscal Year (FY) 2011 through FY 2016.

***Medicare Provider Utilization and Payment Data: Outpatient***

The Outpatient Utilization and Payment Public Use File (Outpatient PUF) presents information on common outpatient services provided to Medicare fee-for-service beneficiaries. The Outpatient PUF presents information on utilization, payment, and estimated hospital-specific charges for select Ambulatory Payment Classification (APC) Groups paid under the Medicare Outpatient Prospective Payment System (OPPS) for Calendar Years (CY) 2011 through 2015. The Medicare payment amount includes the APC payment amount, the beneficiary Part B coinsurance amount and the beneficiary deductible amount.

***Healthcare Cost Report Information***

Medicare-certified institutional providers are required to submit an annual cost report to a Medicare Administrative Contractor (MAC). The cost report contains provider information such as facility characteristics, utilization data, cost and charges by cost center (in total and for Medicare), Medicare settlement data, and financial statement data. CMS maintains the cost report data in the Healthcare Provider Cost Reporting Information System (HCRIS). HCRIS includes subsystems for the Hospital Cost Report (CMS-2552-96 and CMS-2552-10), Skilled Nursing Facility Cost Report (CMS-2540-96 and CMS-2540-10), Home Health Agency Cost Report (CMS-1728-94), Renal Facility Cost Report (CMS-265-94 and CMS-265-11), Health Clinic Cost Report (CMS-222-92), Hospice Cost Report (CMS-1984-99), Federally Qualified Health Clinic Cost Report (CMS-224-14) and Community Mental Health Center Cost Report (CMS-2088-92).

**Esri Demographic Data**

More than 2,000 variables on current-year estimates and five-year projection of US demographics including population, households, income, age, and ethnicity. In this case, county-specific reports were obtained: Community Profile, Executive Summary, Detailed Age Breakdown, and Financial and Healthcare Spending.

## Methodologies

There were two methodologies used to create the analyses presented in this document. Which methodology was used was entirely dependent on whether or not it would produce the best result.

### Excel

Excel-based formulas were used to calculate Existing Hospital market share, demographic changes by percentage and some anticipated revenue changes by percentage. Preliminary testing indicated that these results could best be obtained by using an Excel spreadsheet.

### Machine–Learning Predictive Model

What follows is the methodology used to create the machine learning model. Three different models were constructed to analyze the following data by payor, demographics and health-risk. A linear regression algorithm was used to train the scored models.

#### I. DATA SOURCING

Patient data was obtained by SQL query from the State Department of Health. Inputs into the predictive models included the following:

##### LOCATION

- Hospital of discharge
- ZIP code: 3-digit ZIP for the State and most other states; combined 058 and 059 areas; 5-digit ZIP for State areas with a population of over 10,000 (12 ZIP Codes)

##### PATIENT DEMOGRAPHICS

- Patient type (Inpatient, Outpatient, Emergency Department, Observation Bed, Series Patient, Expanded Outpatient)
- Age groups: Under 1, 1-17, 18-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75+
- Sex

##### INPATIENT DATA

- Admission type
- Admission source
- Patient days (length of stay)
- Discharge status
- Special Care Unit (SCU) days (Inpatient only)
- Diagnosis related group (MSDRG) (Inpatient only)

Sample from Adaptive Reuse Data Assessment for Bray Regional Health

- Major diagnostic category (MDC) (Inpatient only)
- Grouper used to assign DRG and MDC (Inpatient only)
- Principal diagnosis and up to 19 secondary diagnoses (ICD-9-CM coding system prior to October 1, 2015; ICD-10-CM coding system from October 1, 2015 forward)
- Principal procedure and up to 19 secondary procedures (ICD-9-CM coding system for all inpatients and outpatients prior to July 1, 2014; HCPCS/CPT coding system for outpatient procedures as of July 1, 2014; ICD-10-CM coding system for all inpatients from October 1, 2015 forward)
- Same day flag – flags those admitted and discharged on the same day
- Year of discharge, discharge quarter, admit quarter
- Emergency department flag (flags those records with an associated emergency department revenue record)

**PAYMENT DATA**

- Principal payment source
- Bill type
- Total charges
- Average charges
- Hospital service area

**II. DATA PREPARATION AND INPUTS**

In order to prepare the data for the machine-learning model, Excel and a computer program designed to cross-check data were used. The data was checked for accuracy and the inputs into the model were selected. The inputs varied depending on whether it was for Payor, Demographics or Health Risk.

**III. MODEL TRAINING AND SCORING**

The model was then trained using linear regression and each outcome required (e.g., patient number or inpatient days or total charges) was then scored to become part of the predictive model. Data was split before the model was scored and evaluated.

A complete discussion of this methodology is covered in the complete Project from which this sample was extracted.