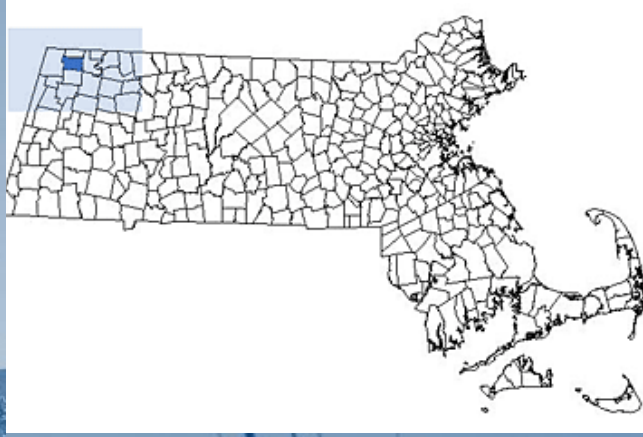

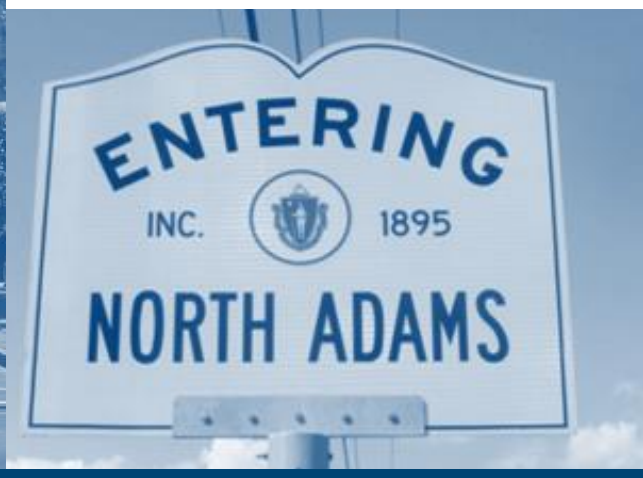

Healthcare Market Assessment: Northern Berkshire County, Massachusetts

September 17, 2014

STROUDWATER

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EXECUTIVE SUMMARY

Several healthcare market changes—a focus on reducing costs, high deductible health insurance plans, and public/private incentives to improve quality—have combined to exert downward pressure on utilization of healthcare services. Elective, inpatient, and high-cost procedural and diagnostic services are the most severely affected by this trend. Hospitals and physicians are increasingly pursuing service consolidation and the integration of delivery systems as a response to the market trends.

As a result of the closure of North Adams Regional Hospital (NARH) in March 2014, the Massachusetts Department of Public Health, Office of Rural Health engaged Stroudwater Associates (Stroudwater) in May 2014 to provide an independent and objective third-party assessment of the healthcare market in the North Adams region.

At just under 37,000 people, the North County region's population is relatively stable. Small declines are expected in the overall population, and what growth is seen comes from the 65+ age cohort. The region is worse off than the state and national average for a number of health status indicators. Asthma, most cancers, and heart disease incidences are all higher than the state average, and high percentages of the population are overweight, have a disability, and report poor general health. Combined, these factors create a vulnerable population for healthcare services. This health status data is from 2010-2012, indicating that the problems existed when NARH was in full operation, and have persisted.

Given the age and economic demographic of the county, Berkshire residents rely heavily on public sources of financing for health care. This makes the providers of healthcare services dependent on government reimbursement, and can directly influence what services are viable for provision locally.

Over 100 stakeholders from the North County region provided input for this study. They represented a broad spectrum, from consumers to leaders of local organizations and from social service agencies to healthcare professionals formerly practicing at NARH. The most frequent needs cited for local healthcare services were the emergency room and improved access to primary care. Many stakeholders expressed appreciation for Berkshire Health System's role in re-establishing emergency services. Obstetrics services were the most commonly cited needs for hospitalization. Stakeholder interviews indicated a diversity of opinion regarding the need for acute inpatient services. An active part of the community advocated strongly for re-establishing inpatient care, while other stakeholders cited the need for technology and access to specialists beyond what can be provided locally as reasons to consolidate acute care inpatient services at BMC. Stakeholders frequently cited social and environmental needs, including low socioeconomic status and poor transportation systems, in addition to health problems such as substance abuse, mental health, and obesity.

Based on findings from stakeholder interviews as well as the market needs assessment, Stroudwater offers the following recommendation highlights. Further supportive recommendations are included in the body of the report.

- Stroudwater recommends that stakeholders in the North Adams region develop a shared vision of improving the community's health status by aligning medical services available to the community with social services and other community assets in support of health status improvement.
- Stroudwater recommends immediate efforts to expand primary care, including full support of Community Health Programs' grant to expand primary care services and recruit additional providers to the North County in a Federally Qualified Health Center.
- Stroudwater recommends continuing to provide emergency care and associated diagnostic services, as well as expansion of outpatient services, ambulatory procedures, disease management, and prevention/wellness services that can be provided safely and sustainably in North County.
- Stroudwater recommends developing a clinically integrated delivery system for inpatient service with BMC, to include limited inpatient services provided in North County *only* if the BMC North site is designated as a Critical Access Hospital.
- Stroudwater recommends the immediate development of a coordinated effort for providing locally accessible prenatal care and education, together with a plan for appropriate transportation assistance to other nearby facilities for childbirth and a comprehensive protocol for addressing emergencies.

Engagement Overview

As a result of the closure of North Adams Regional Hospital (NARH) in March 2014, the Massachusetts Department of Public Health, Office of Rural Health engaged Stroudwater Associates (Stroudwater) to provide an independent and objective third-party assessment of the healthcare market in the North County region. The purpose of the engagement is to evaluate the viability of healthcare services in existing and future healthcare market conditions. Stroudwater's assessment **does not** include an analysis of factors or decision-making leading to the closure of the former NARH, now BHC North Campus.

Over the course of the engagement, Stroudwater sought input from local and statewide stakeholders on the needs and concerns of their community around the critical issue of access to care. Stroudwater interviewed the stakeholders in June and July of 2014. We also analyzed national, state, and local market trends affecting the current and projected use of healthcare services.

Acknowledgements

Stroudwater would like to acknowledge the over 100 citizens of Berkshire County, including public and elected officials, who contributed their time, energy, resources, and perspectives to this study. We regret that we cannot recognize each person by name, but would like to single out the following stakeholders, who have been instrumental in making this study possible:

- Richard Alcombright, the mayor of North Adams, who has been very active in providing both direct feedback on community needs and organizing opportunities for other stakeholders
- Elected officials, including Senator Ben Downing and Representative Gailanne Cariddi, for their input on the process and perspectives on constituent needs
- The Berkshire Community Coalition, for allowing Stroudwater to use space for stakeholder meetings and focus groups, as well as the American Legion for hosting the "Tuesday night meetings" and the Massachusetts College of Liberal Arts for the community meetings
- Secretary John Polanowicz, Cathleen McElligott, and their student intern, Peter Bergstrom, for identifying stakeholders, scheduling meetings, and providing supplemental data to the study

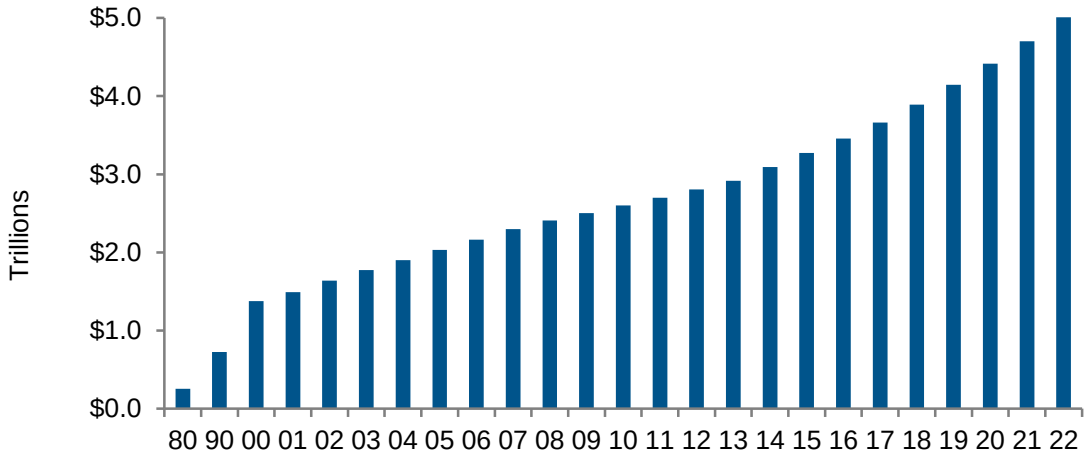
INTRODUCTION

INDUSTRY OVERVIEW

The healthcare industry is in a time of significant change, transitioning from a fee-for-service payment system that has led to dramatic increases in the cost of care to a population-based system that focuses on the health of a community, and moderates costs over time. The changes in the approach to financing healthcare are driving dramatic changes in the way healthcare is delivered, in physician offices, in hospitals, and in long-term care settings. Over the past several years, reductions in payment and new incentives have driven an emphasis on efficiency and quality. The ability of providers to meet these new success factors—these new imperatives—will determine their viability over time.

Historically, healthcare spending has been well in excess of United States economic growth, and now accounts for 17.2% of the gross domestic product (GDP). US healthcare expenditures are projected to reach $5 trillion by 2022.

National Health Expenditures [1] 1980 - 2022[2]

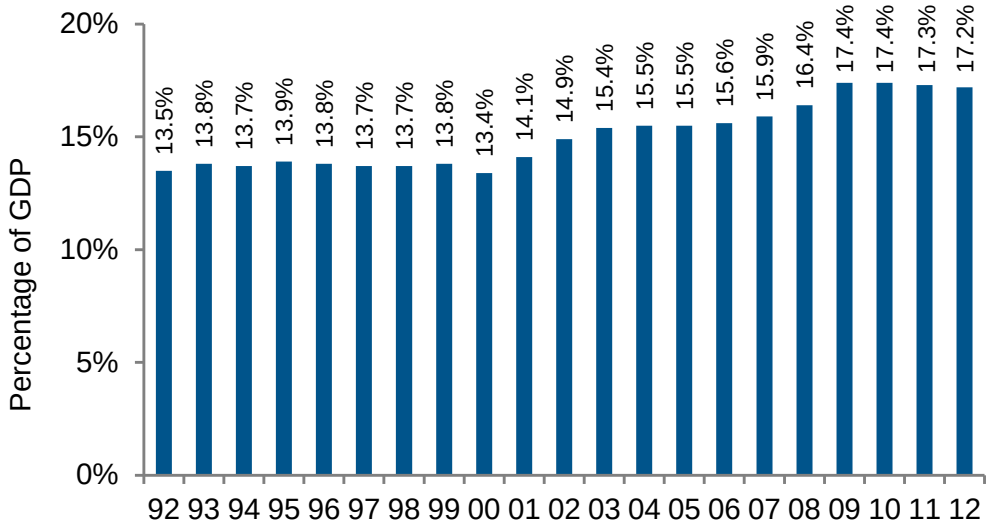


Source: Centers for Medicare & Medicaid Services, Office of the Actuary. Data released September 2013.

(1) Years 2012 – 2022 are projections.

(2) CMS completed a benchmark revision in 2009, introducing changes in methods, definitions and source data that are applied to the entire time series (back to 1960). For more information on this revision, see http://www.cms.gov/nationalhealthexpenddata/downloads/benchmark2009.pdf.

National Health Expenditures as a Percentage of Gross Domestic Product



Source: Centers for Medicare & Medicaid Services, Office of the Actuary. Data released January 7, 2014.

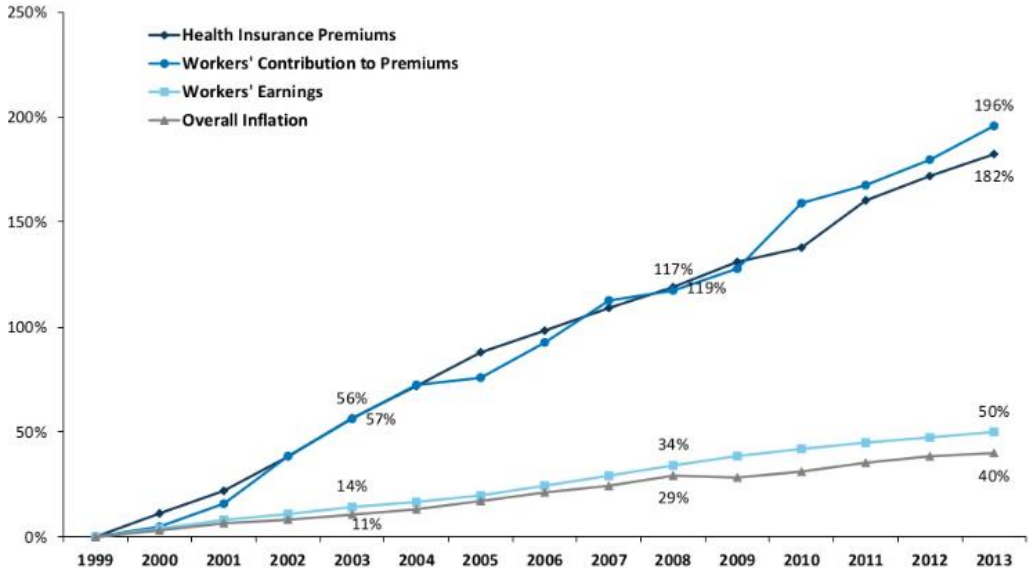
The unsustainable growth of healthcare costs created an economic imperative that was a key factor in the passage of the Affordable Care Act and in leading to employer and insurance company reforms in the private sector. The short-term result is that health spending has been lower than GDP growth for four years. Estimates from the Centers for Medicare and Medicaid Services (CMS) indicated that health spending increased 3.7% in 2012, while the overall economy grew 4.6%.

Government is taking on a larger and larger role in healthcare funding. From 1987 to 2011, public spending on healthcare increased from 31.8% of the total spend to 44.9% of the total. The biggest portion of this growth is federal spending, which increased from 16.6% to 28.6% over this period. The increasing costs—from $519 billion to $2.7 trillion—are the major reason for payment system reform. The need for reform is particularly acute at the state and local levels, because it is at this level of government that budgets must remain in balance. Over this same period, from 1987 to 2011, the burden of healthcare spending in comparison to revenue has doubled from 15.8% to 31.5%. Hospitals, in particular, are subject to continued pressure from federal reform and insurance companies to reduce prices, and have started to base payments on quality, as measured through both clinical outcomes and patient satisfaction.

For years, the Federal government has published data on the quality performance of hospitals; however, payment incentives were given for participation, not for performance. That has changed, and quality is increasingly tied to payment. The Medicare Value Based Purchasing

Program, for example, withholds a portion of Medicare payments; hospitals must earn them back by outperforming their peers on quality measures.

In the private market, the growth of healthcare costs has driven businesses to shift the costs to employees. The cumulative increase in premiums since 1999 have been largely passed off to employees, and these increases are greater than both overall earning and overall inflation.

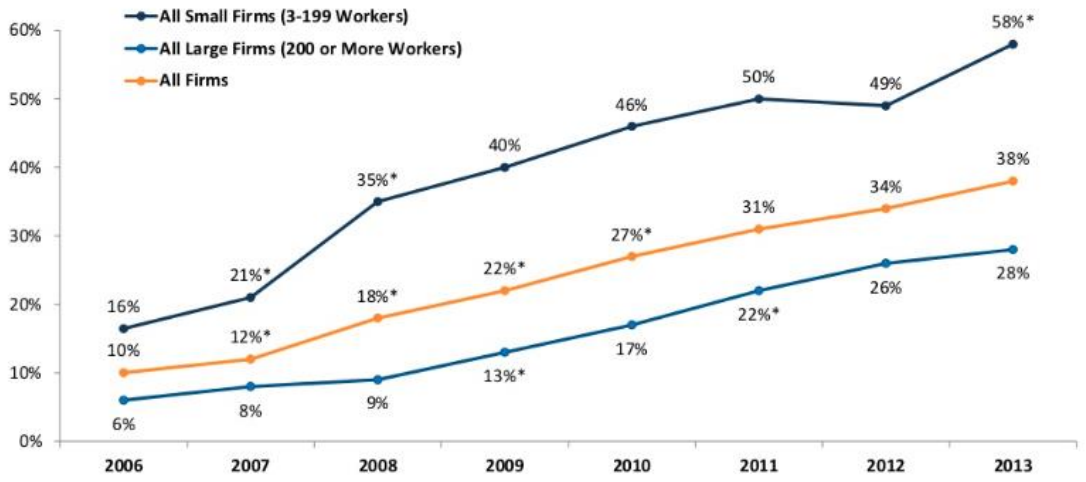


SOURCE: Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 1999-2013. Bureau of Labor Statistics, Consumer Price Index, U.S. City Average of Annual Inflation (April to April), 1999-2013; Bureau of Labor Statistics, Seasonally Adjusted Data from the Current Employment Statistics Survey, 1999-2013 (April to April).

Another market trend is that employers are contracting directly with hospitals and health systems based on cost and quality performance. Examples of this include Lowe's and Wal-Mart, who have contracted with 5-6 hospital systems in the country to provide specialty services. Employers have figured out that they can spend less by flying people across the country to one of their preferred sites of care, and see better outcomes for getting people back on the job.

Finally, the nature of the type of insurance itself is also increasing the participation of individuals in their own healthcare. This is evidenced by the growth of high deductible plans, and reveals that for small firms (sized from 3-199 workers) high deductible plans now represent the majority of the plan types offered. [1]

[1] Additional information on trends in insurance is included in the appendix.



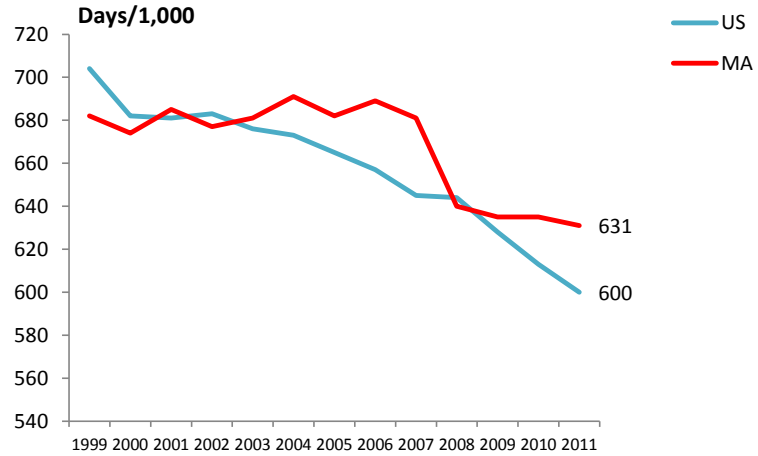
* Estimate is statistically different from estimate for the previous year shown (p<.05).

NOTE: These estimates include workers enrolled in HDHP/SO and other plan types. Average general annual health plan deductibles for PPOs, POS plans, and HDHP/SOs are for in-network services.

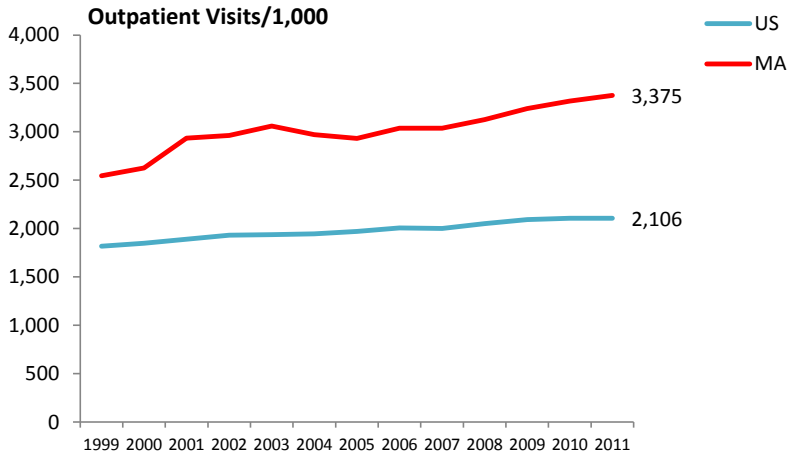
SOURCE: Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2006-2013.

The effect of out-of-pocket spending in healthcare is well documented: As cost sharing increases, use of services decreases. The classic "Rand" study was a randomized experiment that looked at varying levels of cost sharing by consumers. It found that a 20 percent reduction in use resulted when people were paying 25 percent of the total bill through coinsurance.

The effects of both consumer involvement and new public policies are leading to lower demand for inpatient beds and other high-cost services. Incentives to reduce lengths of stay, efforts to improve quality, and policies not to pay for readmissions to the hospital have combined to lower the number of inpatient days per 1000 people by about 2% annually since 1991. Nationally, Accountable Care Organizations are seeking to reduce utilization further. A study in California shows that overall use of hospital beds is down 25% after starting an ACO with public employees in 2010. The utilization of inpatient services in Massachusetts has also declined, signifying shorter average lengths of stay. Massachusetts days per 1,000 population declined 7.5% compared to the 14.5% decline in the United States.



At the same time, there is an increased focus on providing primary care and lower acuity procedures to keep people healthy. This is leading to a growth in the ambulatory presence, with community hospitals developing a distributed network of diagnostic centers, surgery centers, and medical offices to meet the demand for outpatient services. Since 1991, use of outpatient services has grown at a rate of 3.7% per year nationally. With the incentives in place to control costs, we expect a continued shift to less expensive, ambulatory sources of care.



In addition to dealing with lower payments, new sources of competition, and more consumerism, the healthcare system is developing new models for how care is paid and coordinated across settings. An example of this is the federal program that is focused on reducing hospital readmissions (when a patient is admitted back to the hospital for the same condition within 30 days of his/her initial stay). Nationally, an average of 20% of Medicare patients were readmitted; however, through better coordination of care, these numbers are dropping precipitously.

Stroudwater sees the healthcare provider response to these industry changes in three phases, starting with improvements to efficiency and quality. Providing low cost and high quality services is critical for hospitals to survive the current competitive challenges and payment trends. The National Rural Health Association has stated that more rural hospitals have closed in the last year than in the previous 10 years combined. As a result, there has been increased activity in mergers and acquisitions over the past several years among hospitals, with the some of the primary goals being to improve scale and save overhead and administrative costs.[2]

The next big challenge will be to ensure physicians are aligned within the future delivery system. Nationally, more and more physicians are employed by hospitals, and are becoming involved in more effective ways of managing the population's health, such as the Patient Centered Medical Home (PCMH) model of care.

Finally, we see hospital systems redefining the future of care delivery to consolidate high cost services in one location, and distribute other services across broad networks. The intended

[2] Additional information on the trends in the number of community hospitals, affiliations and mergers, and the list of closed hospitals is included in the appendix.

result is to have the resources in the right place to manage patients in the lowest possible cost to get the best outcomes. The current incentives are already pushing healthcare systems in this direction, and the pressures to manage costs will result in an acceleration of this work.

The new environment for healthcare is more focused on value, defined as quality divided by costs. Providers can improve value by lowering costs, or by increasing quality, but to improve sustainability, providers should be doing both. A third element—better health for populations—is also gaining importance. Together, these three components are called the Triple Aim in the healthcare industry, as defined by the Institute for Healthcare Improvement.

The approach for evaluating sustainability needs to reflect these market changes. In the fee-for-service payment environment of the past, sustainability was simply the ability to generate sufficient volumes to offset the costs of providing the service. Payment rates below the cost of providing the services were able to be passed off through pricing increases and higher payment rates from insurance companies. Now, in the new market dynamics of healthcare, sustainability is defined by the ability of sites of care to provide high levels of patient safety and quality at a low cost. The availability of, and support from, physicians is an important indicator for sustainability, as is customer satisfaction.

In conclusion, the transitioning healthcare industry requires a different approach. Today's market imperatives require an aggressive approach to quality and cost efficiencies to ensure sustainability. As a result, inpatient use has been declining and is expected to continue, leading to more consolidation of these services regionally. Ambulatory care, on the other hand, represents an opportunity to increase access to healthcare services that can improve community health and should be delivered as close to consumers as possible.

MARKET ASSESSMENT

Market Assessment Summary

Changes in the healthcare industry have hit rural markets particularly hard, with operating margins among not-for-profit hospitals experiencing significant pressures. Massachusetts and US inpatient and emergency department volumes continue to decline, while outpatient volumes continue to grow. In the face of these challenges, health systems are increasingly partnering outside the walls of the hospital with community agencies, primary care providers, and other components of the care continuum (long-term care, nursing homes, etc.) to manage the overall heath care of a population. As a result, health systems, particularly those in rural areas, are evaluating new models for meeting the needs of the population—moving away from inpatient care and toward outpatient and ambulatory care.

North Adams Regional Hospital (NARH) faced these changing market conditions before its closure.[3] Inpatient market share had consistently declined from 2008 through 2012, as had procedural volumes from 2010 to 2013; emergency volumes have remained constant at around 19,500. NARH's historical average length of stay is significantly shorter than that of the overall service area, indicating a lower acuity of cases in general. NARH saw minimal inpatient seasonality, though there were significant increases in ED volume in July.

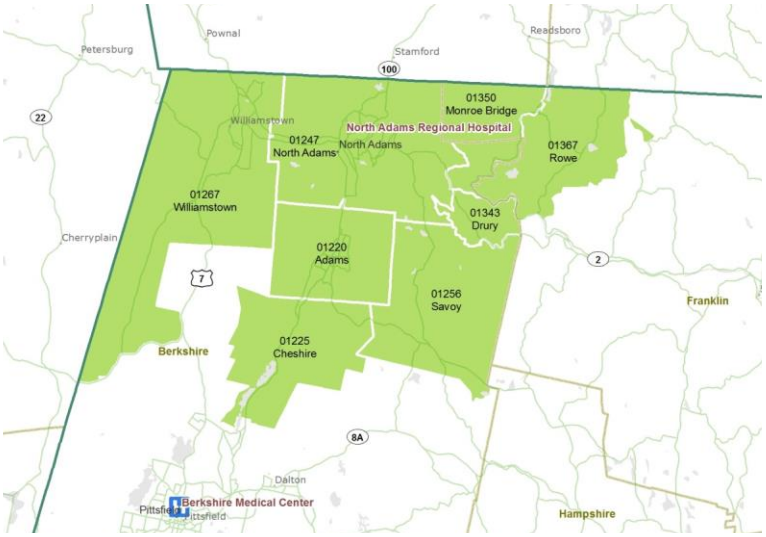
The North Adams market has historically experienced challenges with access to healthcare, particularly primary care, despite the fact that the federal government previously designated areas of North County as health professional shortage areas. The North County service area is just under 37,000 people, with small declines in overall population, but 9+% growth in the 65+ age cohort. The most heavily populated areas of the service area are located within a 30-minute drive of the BMC North site.

Berkshire Health Systems (BHS) has taken an active role in supporting the restoration of services following the closure of NARH. During the preparation of this report, the bankruptcy court accepted BHS's bid for the BMC North Campus assets. As such, recommendations on the use and development of these facilities are directed to BHS.

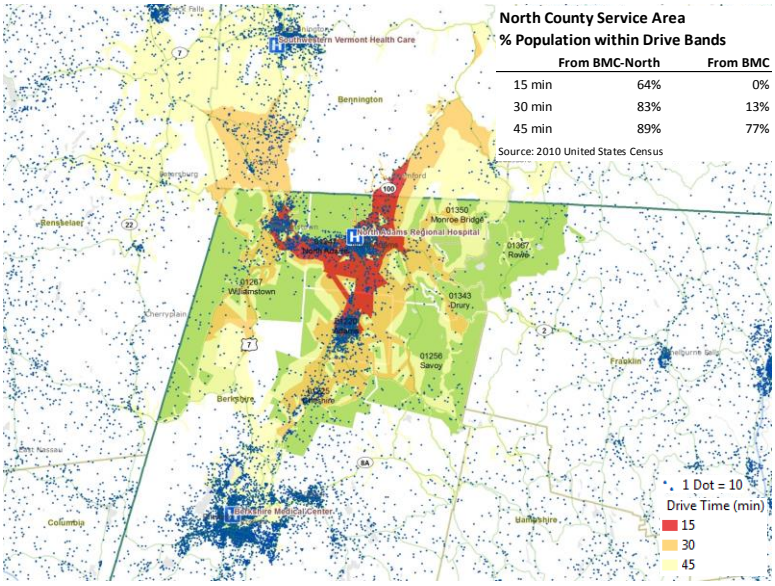
[3] Stroudwater's assessment did not include an analysis of factors or decision-making leading to the closure of the former NARH.

Service Area

The North County Service Area, identified in green in the map at right, includes the towns of North Adams, Adams, Williamstown, Cheshire, Savoy, Drury, Rowe, and Monroe Bridge. In addition, some use of the local delivery system is from areas outside of Massachusetts, including patients who travel from Vermont and New York ZIP codes, and students and visitors who are permanent residents of another area, yet may need to access the local delivery system. Using historical data, Stroudwater determined this resulted in a 15% "in-migration," and included this in the study for planning purposes.[4]

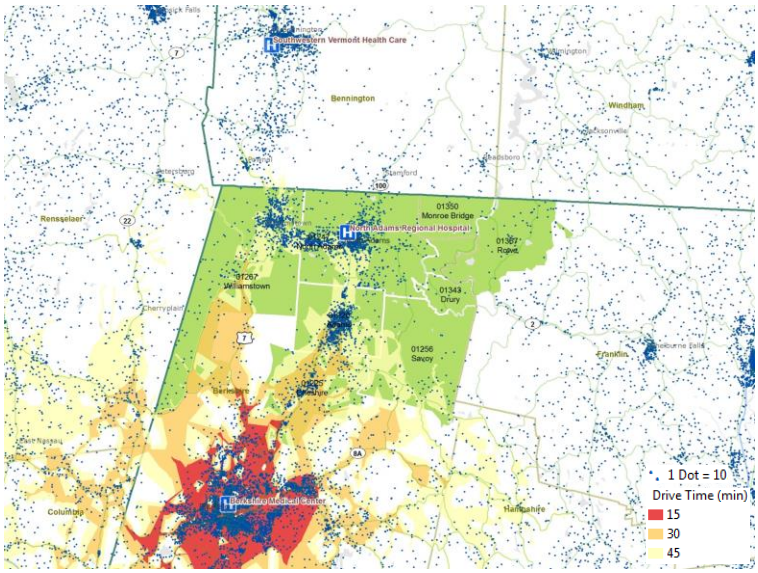


The graphic at right overlays a drive time map with the population, showing that the 82% of people living within the North County area are within 30 minute drives from the BMC North site. As is evident from the graphic, population density drops very significantly outside the Williamstown, North Adams, and Adams corridor.



[4] Details on this analysis are located in the appendix.

The graphic below shows the same drive times, using BMC in Pittsfield as the starting location.



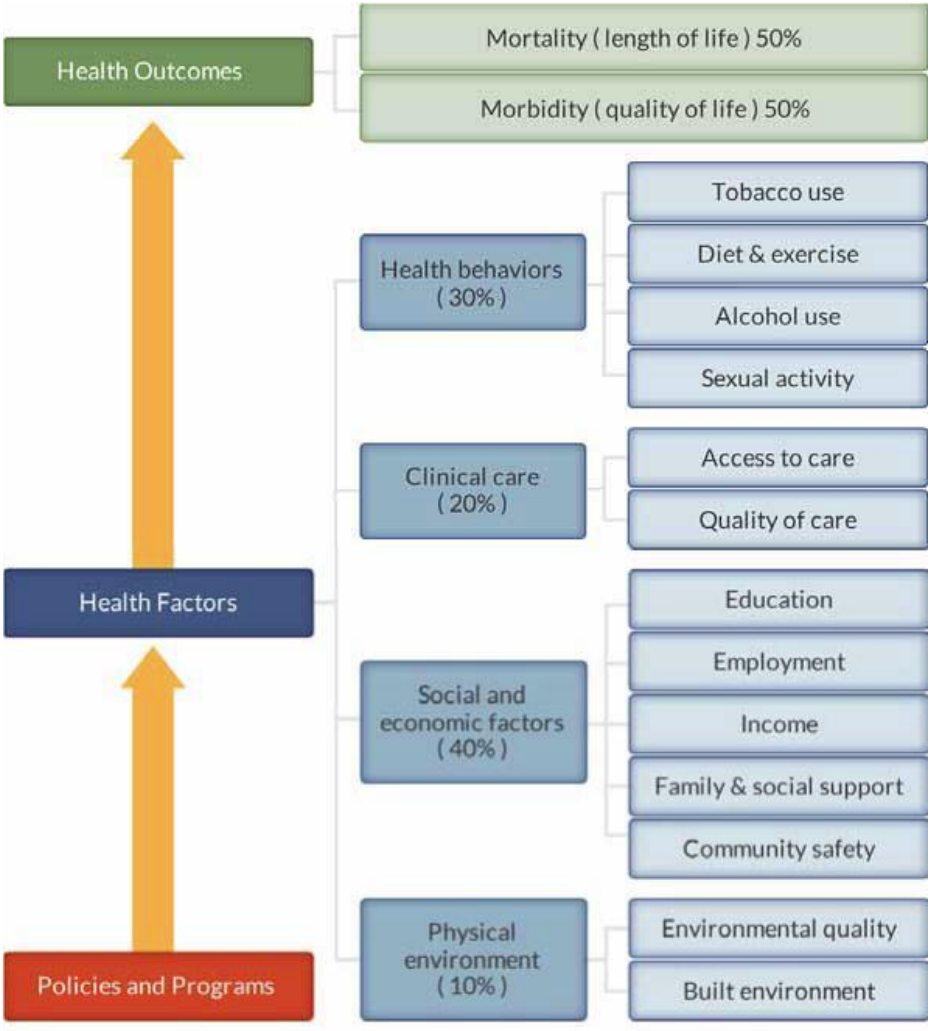
Data/Findings for Selected Health State Variables

Stroudwater's evaluation of the overall health status of the North County community showed major health disparity among residents. The CDC defines health disparities as "preventable differences in the burden of disease, injury, violence, or opportunities to achieve optimal health that are experienced by socially disadvantaged populations." With respect to health status and healthcare services, disparity can result from such factors as economic status, level of education, financial access to health care, transportation issues in rural areas, and language and cultural barriers—all of which are present in North County. The connection between education and income can be a significant determinant in health status, as it can relate to food security, housing, behavioral health choices, and general feeling of well-being.

Given the age and economic demographic of the county, Berkshire residents are heavily reliant on public sources of financing for access to health care. This, in turn, makes the providers of that care dependent on government-reimbursed services, and can directly influence what services are available locally.

Community Health Needs Assessment – County Health Rankings

Community Health Needs Assessments[5] were completed in 2012 and 2013 for North County and identified several themes and data points regarding the overall health of the community and how it compared to other communities throughout the Commonwealth and the nation. The health of a community depends on many factors, including environment, education and jobs, access to and quality of healthcare, and individual behavioral choices. We know that much of what influences our health happens outside of the doctor's office—in our schools, workplaces, and neighborhoods.



County Health Rankings model ©2012 UWPHI

[5] Study was completed as part of a Community Benefits Report for NARH.

The figure below depicts the ranking of county health outcomes; those having high rankings (with 1 being highest) are estimated to be the "healthiest."

Berkshire County has a health outcome ranking of 11 and a health factor ranking of 9. Health factor rankings were best in the quality of the clinical care and the physical environment, and worst in the health behaviors and social and economic factors. Alcohol use was the worst among the risk factors, followed by low-income levels, diet and exercise, sexual activity, and family and social support.

Summary Health Outcomes & Health Factors Rankings

County Rankings 2013	OUTCOMES		FACTORS			
	Mortality	**Morbidity**	**Health Behaviors**	**Clinical Care**	**Social & Economic Factors**	**Physical Environment**
County	Rank	Rank	Rank	Rank	Rank	Rank
Barnstable	10	6	4	2	8	13
Berkshire	11	11	11	4	11	6
Bristol	12	12	14	11	12	12
Dukes	1	2	5	13	5	1
Essex	5	8	7	8	9	7
Franklin	6	7	9	6	7	8
Hampden	14	13	13	12	13	11
Hampshire	4	3	2	1	3	4
Middlesex	2	4	3	5	2	2
Nantucket	7	1	6	14	4	5
Norfolk	3	5	1	3	1	9
Plymouth	9	10	10	10	6	14
Suffolk	13	14	8	7	14	3
Worcester	8	9	12	9	10	10

Factor Focus Area Ranks 2013	Tobacco Use	Diet and Exercise	Alcohol Use	Sexual Activity	Access to Care	Quality of Care	Education	Employment	Income	Family and Social Support	Community Safety	Environmental Quality	Built Environment
County													
Barnstable	4	1	9	5	9	1	6	12	7	3	10	12	7
Berkshire	9	11	13	11	6	3	10	7	12	11	7	6	6
Bristol	14	14	11	10	12	10	12	14	9	12	12	9	10
Dukes	5	2	14	2	13	5	3	7	6	9	2	10	1
Essex	6	9	5	12	10	8	9	9	11	8	5	2	11
Franklin	11	10	6	6	7	4	11	4	10	10	6	3	12
Hampden	10	13	7	14	11	11	14	13	13	13	13	5	14
Hampshire	2	4	3	3	3	2	4	1	5	5	3	1	8
Middlesex	1	8	1	4	2	7	2	1	2	2	4	4	5
Nantucket	7	6	8	9	14	6	5	5	3	4	11	14	2
Norfolk	2	3	4	1	1	9	1	3	1	1	1	11	4
Plymouth	12	7	12	7	8	13	7	9	4	6	8	13	9
Suffolk	8	5	2	13	4	12	13	6	14	14	14	8	3
Worcester	12	12	10	8	5	14	8	11	8	7	9	7	13

Data/Findings for Selected Health State Variables

	Custom Area Estimates*	MA	US	HP 2020 Target
Asthma Prevalence				
Percent Adults with Asthma	16.8%	15.4%	13.4%	
Breast Cancer				
Annual Incidence Rate (Per 100,000 Pop.)	123.8	134.2	119.7	
Colon and Rectum Cancer				
Annual Incidence Rate (Per 100,000 Pop.)	48.9	43.7	43.9	<= 38.6
Lung Cancer				
Annual Incidence Rate (Per 100,000 Pop.)	76.5	69.7	64.9	
Prostate Cancer				
Annual Incidence Rate (Per 100,000 Pop.)	163.9	153.6	143.7	
Adult Diabetes				
Age-Adjusted Rate	7.0	8.2	9.0	
Heart Disease (Adult)				
Percent Adults with Heart Disease	3.9%	3.9%	4.4%	
High Cholesterol				
Percent Adults with High Cholesterol	30.6%	34.4%	38.5%	
HIV Prevalence				
Rate (Per 100,000 Pop.)	101.8	314.6	340.4	
Low Birth Weight				
Percent of Total	8.0%	7.8%	8.2%	<=7.8%
Overweight				
Percent Adults	36.7%	36.2%	35.8%	
Poor General Health				
Age-Adjusted Percentage	12.1%	11.6%	15.7%	
Population with Any Disability				
Percent Population	15.7%	11.2%	12.0%	
Alcohol Consumption				
Age-Adjusted Percentage	23.3%	20.3%	16.9%	
Tobacco Usage - Former of Current				
Percent Adults Ever Smoking 100+ Cigarettes	53.7%	45.4%	44.2%	

Asthma, most cancers, and heart disease incidences in the North County are all higher than the state average. Higher percentages of residents are overweight, report poor general health, and have a disability, creating a vulnerable population for healthcare services. Additionally, the North County has higher percentages of adults who are heavy consumers of alcohol and/or are current or former smokers.

Major Findings Observed in Community Health Needs Assessments

Community Health Needs Assessments provide information vital to evaluating a community's particular health needs and challenges, and recent assessments highlighted some of the existing conditions and roadblocks to wellness for Northern Berkshire residents.[6]

The top 5 leading causes of death in Berkshire County are as follows:

- Cardiovascular Disease
- Cancer
- Respiratory Disease
- Nervous System Disease (Alzheimer's)
- Genitourinary System Disease (nephritis, renal failure)

The top 5 leading causes of hospitalizations are:

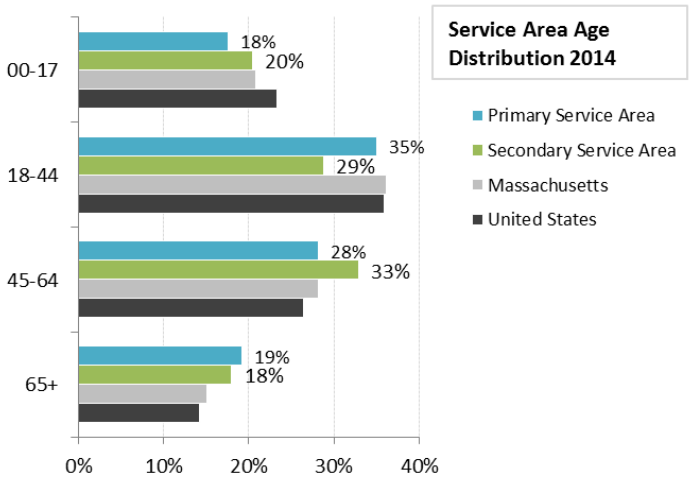
- Cardiovascular Disease
- Mental Disorder
- Digestive System Disease
- Respiratory System Disease
- Injury (falls, hip fractures)

2012 and 2013 Needs Assessment Survey results for the residents/consumers group showed that the vast majority of Northern Berkshire County residents report "good" or "very good" health and are able to obtain regular physical exams and checkups. Although most residents indicated that they were able to see the doctor for routine physical exams, one-third of respondents said that, "there are times when they cannot go to the doctor when they are sick or need a checkup." When asked why, half of those respondents indicated the need for transportation as the major obstacle; cost and availability of appointments were also barriers for a significant number of people.

Alcohol, substance abuse, overweight and obesity, smoking, and mental health are the disease and health risks of greatest concern among members of Northern Berkshire County. Data from the community health status assessments are from 2010-2012, which predates the closure of the hospital and supports the conclusion that hospital-based services do not guarantee a high community health status.

[6] Additional data and results from the community health needs assessments are provided in the appendix.

Service Area Population Estimates by Age



Current year (2014) North County service area population is estimated to be 36,698 and has a higher percentage of residents aged 45-64 and 65+, compared to the state and U.S. Additional information on U.S. population trends may be found in the appendix.

2014 Population Estimates

Primary Service Area	Name	00-17	18-44	45-64	65+	Total	%of PSA
01220	ADAMS	1,579	2,599	2,549	1,704	8,431	23%
01225	CHESHIRE	554	898	1,149	595	3,196	9%
01247	NORTH ADAMS	2,979	5,652	4,225	2,741	15,597	43%
01256	SAVOY	125	178	273	115	691	2%
01267	WILLIAMSTOWN	1,047	3,302	1,861	1,743	7,953	22%
01343	DRURY	29	42	48	23	142	0%
01350	MONROE BRIDGE	23	32	37	26	118	0%
01367	ROWE	112	154	188	116	570	2%
	PSA Total	*6,448*	*12,857*	*10,330*	*7,063*	*36,698*	*100%*
	Total Service Area	18%	34%	29%	19%	100%	
	Massachusetts	21%	36%	28%	15%	100%	
	United States	23%	36%	26%	14%	100%	

Source: Truven Health Analytics

Service Area Population Projections

The North County service area is projected to lose 1% population, or 637 residents, by 2019. In contrast, both the state and U.S. are expected to see increases in population.

2014-2019 Change

Primary Service Area	Name	2014 Estimate	2019 Projection	2014-2019 % Change	2014-2019 Ab. Change
01220	ADAMS	8,431	8,431	0%	0
01225	CHESHIRE	3,196	3,168	-1%	-28
01247	NORTH ADAMS	15,597	15,338	-2%	-259
01256	SAVOY	691	672	-3%	-19
01267	WILLIAMSTOWN	7,953	7,712	-3%	-241
01343	DRURY	142	143	1%	1
01350	MONROE BRIDGE	118	120	2%	2
01367	ROWE	570	577	1%	7
	PSA Total	*36,698*	36,161	*-1%*	*-537*
	Massachusetts	7	7	3%	
	United States	317	328	4%	

State and US in Millions

Source: Truven Health Analytics

Service Area Population Projections by Age Cohort

All growth in the North County service area is expected to be in the 65+ age group, a cohort that typically uses healthcare services at higher rates than their younger counterparts. The North County service area can expect an increase of 666 residents in this range, while the overall population is expected to decline by 537 residents.

2014-2019 Change

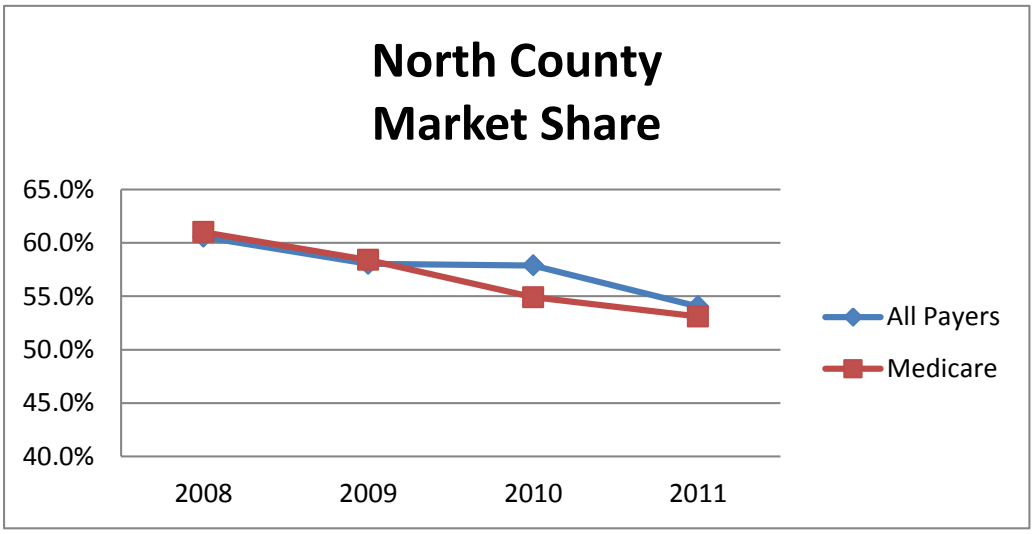
Primary Service Area	Name	00-17	18-44	45-64	65+	Total
01220	ADAMS	(116)	21	(99)	194	0
01225	CHESHIRE	(52)	(19)	(53)	96	(28)
01247	NORTH ADAMS	(87)	(159)	(250)	237	(259)
01256	SAVOY	(25)	(1)	(14)	21	(19)
01267	WILLIAMSTOWN	(58)	(100)	(168)	85	(241)
01343	DRURY	(2)	(12)	4	11	1
01350	MONROE BRIDGE	(5)	0	1	6	2
01367	ROWE	(9)	5	(5)	16	7
PSA Total		*(354)*	*(265)*	*(584)*	*666*	*(537)*

Source: Truven Health Analytics

Market Share Trends – North County

Historical market share at North Adams Regional Hospital had been steadily declining in the North County. The trends were consistent for both the Medicare population and for the total patient population. In the past, approximately one of every two hospitalizations of North County residents occurred outside of the North County area. A portion of the services leaving the community would likely be for accessing specialty care that was not available. Patient choice and preferences are likely the other major contributing factors.[7]

	Discharges				
	2008	2009	2010	2011	2012 ann
TOTAL NARH North County Volume	3,010	2,628	2,667	2,449	2,509
TOTAL North County Volume	4,971	4,529	4,607	4,531	5,009
TOTAL NARH North County All Payer Share	60.6%	58.0%	57.9%	54.0%	50.1%
TOTAL NARH North County Medicare Share	61.0%	58.4%	54.9%	53.1%	49.1%



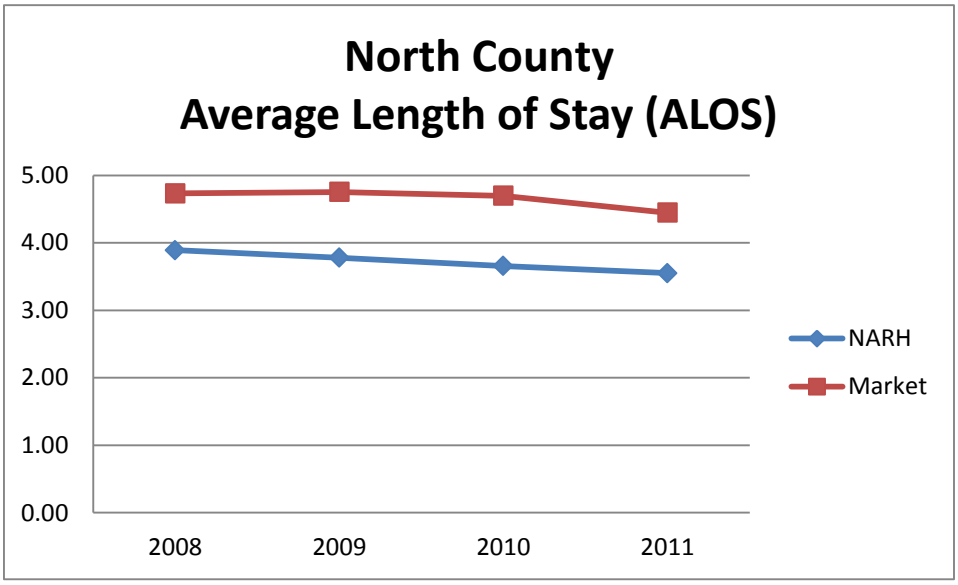
(Source: Truven Health Analytics)

[7] Additional information on market share trends is included in the appendix.

Average Length of Stay (ALOS) Trends – North County

Historically, North Adams Regional Hospital had a substantially lower average length of stay than North County overall.[8] This means that residents who received care outside of the community tended to be hospitalized for longer and for more complex conditions. This shows that patients admitted to NARH were less sick or had lower "acuity."

	Days				
	2008	2009	2010	2011	2012 ann
NARH North County Days	11,714	9,936	9,754	8,695	8,439
TOTAL North County Days	23,528	21,534	21,641	20,150	21,719
NARH North County Average Length of Stay (ALOS)	3.89	3.78	3.66	3.55	3.36
TOTAL North County Average Length of Stay (ALOS)	4.73	4.75	4.70	4.45	4.34



(Source: Truven Health Analytics)

[8] Additional information on average length of stay trends nationally can be found in the appendix.

Market Assessment Summary

The increases in healthcare costs, high deductible health insurance plans, and public/private incentives to improve quality have combined to exert downward pressure on utilization—particularly on elective, inpatient, and high-cost procedural and diagnostic services. Prior to its closure, NARH had seen substantial declines in inpatient market share within the primary service area since 2008.

A number of health status indicators for the North County Service Area are worse than the state and national health indicators. Asthma, most cancers, and heart disease incidences are all higher than the state average. Higher percentages of the community are overweight, report poor general health, and have a disability. Additionally, the region has higher percentages of adults who are heavy consumers of alcohol and/or are current or former smokers. These factors combine to make North County a medically vulnerable population. Data on health status is from 2010-2012, indicating that the problems are persistent and existed when NARH was in full operation.

Given the socioeconomic status and average age of county residents, the Berkshire community relies heavily on public sources of financing for access to, and provision of, health care. This makes the providers of health care services dependent on government-reimbursed services and can have a direct influence on what services are available locally.

QUALITATIVE ANALYSIS

Introduction

Stroudwater received input from over 100 stakeholders over the course of three visits to the community throughout the summer. The interview schedule was organized by the Massachusetts Department of Public Health, State Office of Rural Health. A broad spectrum of stakeholders—including consumers, leaders of local organizations, social service agencies, and healthcare professionals formerly practicing at North Adams Regional Hospital—participated in the process. The stakeholders interviewed were comprised of the following:

- Social service agency leaders
- Consumer focus group
- Local and statewide representatives of the MNA and SEIU
- Regional healthcare providers, including physicians, BMC hospital leadership, mental health, and VNA
- Labor-organized community meeting, at which 32 people spoke publically, and 15 additional people provided follow-up written comments
- Over 20 community and business leaders
- Local and state elected officials

Participants commonly cited social and environmental needs in discussions about the community. These comments referred to issues such as substance abuse, mental health, and obesity, plus other general economic problems such as low income and poor transportation systems within Berkshire County. Transportation within the North County region itself was also stated as a barrier to accessing services.

The most frequent needs cited for local healthcare services were the emergency room and improved access to primary care. A number of stakeholders expressed appreciation for Berkshire Medical Center's (BMC) role in re-establishing emergency services and further developing supporting diagnostic imaging services. Obstetrics services were the most commonly cited needs for hospitalization. Stakeholder interviews indicated a wide diversity of opinion regarding the need for acute inpatient services to treat medical conditions. An active part of the community, led by labor unions and former hospital employees, advocates strongly for re-establishing inpatient care. Other stakeholders cited the need for technology and access to specialists as examples supporting the consolidation of acute care inpatient services at BMC, where these resources are already available.

Identifying Community Needs

Physicians practicing in the community recommended evaluating the determination of needs from the 'patient point of view,' focusing on making care accessible to the population by

delivering services locally only when it can be done safely, affordably, and with adequate availability of physicians. A number of the interviewees noted trends in the industry around the growth of healthcare systems, and expressed that services needed to be integrated across the 'entire service continuum.' This is an industry trend supporting the perspective that specialized care and more acute (and periodic) needs should be regionalized, while access to primary care and ambulatory services are highly distributed.

A number of consumers also indicated that health care "needs to move away from the medical model" and support more prevention and wellness. They indicated health needs within the region that are primarily prevention and lifestyle issues, such as high smoking rates, drug abuse, obesity, and teen pregnancy. They also noted that the costs of healthcare can be prohibitive for many in the region, and that challenges exist in following through on care plans put in place by their providers. Consumer advocates asserted that the models for North County need to facilitate access to insurance and ensure that enough healthcare providers are available to the population. Common roadblocks to accessing existing programs included lack of awareness, uncertainty about eligibility, administrative complexity, and/or the stigma associated with seeking some types of care. There was also an expressed desire to maintain other community services, like the dental clinic, on site at the BMC North campus.

Community leaders advocated for developing a sustainable model by providing locally those services that "make sense." Leaders recognize that healthcare promotes positive economic development and that access to quality local resources is a key issue to employers. Interviews indicated that the community's development of the arts culture—an asset that it is known for widely—represents a strength, and may suggest a model for how health problems can be overcome through collaboration and partnership.

The stakeholder groups providing medical services to the community also frequently cited needs to partner and improve coordination with what is already available throughout Berkshire County. They recognized that, despite regular efforts to promote the availability of services in the North County area, local social services are commonly misunderstood or unknown. Many recognized the work of the Northern Berkshire Community Coalition in helping to improve inter-agency communication. Other perceived assets of the community included:

- Great place to raise a family
- Colleges
- Workforce readiness
- Loyalty
- People willing to help each other
- Leadership and involvement in the community

Stakeholders brainstormed aspects of a vision for a healthy Northern Berkshire County that included the following elements:

- A culture of health and wellness that supports individual motivation to change and adopt healthy habits
- Access to good choices in living healthy lifestyles
- Medical partnerships with BMC and among social services agencies
- Community outreach to engage people in health improvement
- Improved transportation

Perceived Needs for North County Access

The following perceived local needs were most commonly cited by consumers:

- Emergency services – almost always cited as the most important
- More primary care – commonly cited as being difficult to access; need "more doctors"
- Satellite offices of specialists for checkups – to minimize travel time to Pittsfield
- Women's health services – including prenatal care, obstetrics, mammography
- Urgent care center – after-hours access, but cheaper than an Emergency Room visit
- Minor surgery
- Home care
- Treatment for substance abuse
- Support for transitioning troubled youth into adulthood
- Fitness/medical wellness – for people who don't feel comfortable in a "typical" gym
- After hours pharmacy
- Cardiology and cardiac rehab
- Oncology
- Wound care
- Gastroenterology

Stakeholders that were involved with providing medical services to the community supported consumers in ranking emergency services as the highest priority, and underscored that local EMS provided exceptional service to the community following the closure of NARH. EMS leaders indicated that the increased time to transport patients has led to increased operating costs. Stakeholders also recognized the involvement of BMC, specifically in its efforts to operate the satellite emergency facility (SEF), as being important to the community, and suggested that the capacity to hold patients in the SEF for longer periods could reduce the number of transfers out of the community.

Access to physicians was also a top concern raised by the consumers in the focus group. Participants cited a wait of up to six months to see a primary care provider, regardless of insurance provider; stakeholders with a wide variety of insurance plans reported this problem,

from Mass Health to commercial plans. Participants noted that accessing physicians has long been a problem, even when NARH was open, and hoped that resources could be invested to attract more doctors to live and work locally.

Physicians interviewed noted the difficulties in attracting other physicians to practice in Northern Berkshire County, and strongly recommended considering this factor in the study. For example, one physician noted that the inpatient surgical programs in the past have been highly dependent on one or two physicians, and that future care should include only the service offerings that are large enough to be supported by multiple physicians, including sub-specialty physician backup. A number of the physicians noted the importance of offering diagnostic services (imaging, lab, and other procedures that are referred to by primary care physicians) in North County. Some physicians reported that patients are forgoing low-acuity and routine care because they cannot access those services locally. The consumer focus group supported this observation, and commonly cited transportation as a major barrier to accessing services. This was true for both North Adams (consumers reported difficulty in getting "up the hill" to the BMC North site) and for Pittsfield, which lacks a regular public transportation option for North County residents seeking care there.

Other stakeholders advocated for developing "alternative delivery models" that involve others in supporting primary care. These models included expansion of home health services, increased visiting nurse services, community health workers, and "community paramedicine,"[9] which involves EMS in supporting primary care. A number of stakeholders acknowledged the industry trend of fewer physicians operating independently, while North County physicians still practice largely in small groups. Community Health Programs (CHP), a Federally Qualified Health Center operating in Berkshire County, is making plans to submit a federal grant request to expand access to primary care in North County.

In addition, local stakeholders advocated for psychological and behavioral health services. Stakeholders expressed that the community needs to expand on currently available services, and some advocated for local inpatient care for both behavioral health and substance abuse cases. In addition, some interviewees reported that availability of behavioral health space in the SEF could be improved. The Brien Center was commonly cited as an important community resource and lead. Other stakeholders advocated for building a Veteran's Health program in conjunction with the behavioral health offerings.

The need for inpatient hospital services was most commonly expressed in the meetings organized by the MNA and SEIU Local 1199. The former hospital employees interviewed perceived that mismanagement was to blame for declining volumes at the BMC North site, and that services should be restored in the community. The public meeting organized to provide input into the needs study involved 32 people, including former employees, former patients,

[9] More information on Community Paramedicine is provided in the Appendix.

and other consumers, who provided personal stories and their perspectives on the community needs. In addition, a number of local residents gave follow-up input via letters and emails.

Many of those speaking indicated difficulties with transportation and the importance of having services at the "closest possible access." People noted that travel difficulties were even more burdensome in the winter. The increased travel and lack of local services was also described as increasing the burden on families.

In addition to comments advocating for "restoration of a full-service hospital," specific services mentioned included the following:

- Wound care
- Dialysis and infusion services
- Maternity services
- Substance abuse
- Mental health and rehabilitation
- "Healthcare drop-in center" / urgent care
- Prevention

While the majority of people attending the meeting organized by the MNA and SEIU Local 1199 advocated for the full complement of hospital services, a few people noted the importance of "looking at the business side" and determining how services could be "better coordinated" with providers outside of North County.

In the separate physician interviews, physicians expressed that expecting primary care physicians to admit and care for hospital inpatients is not realistic. Most of the physicians explained that their focus is on their outpatient practice, and that they would not admit patients to a North County site. This means that inpatient services in North County would require a separate contract with hospitalists—physicians that focus on managing inpatient care. Multiple physicians noted patient safety concerns about caring for high-acuity patients in North County without specialty physician backup. Physicians and medical providers in the community also cited concerns about providing obstetrical deliveries in North County due to low volumes[10].

Finally, a number of stakeholders referenced the need for models that could help inform the approaches to improving community health and the healthcare system, concurrently. These questions are best addressed in a recent study sponsored by the Commonwealth Fund, where researchers examined communities that had overcome poverty and achieved positive health outcomes and a high-performing health system. The authors report on three of these communities: Southern Arizona, a region that encompasses Tucson; West Central Michigan, which centers around Grand Rapids; and Western New York, including Buffalo and Niagara Falls.

[10] Further data on the correlation between low volumes and obstetrical delivery complications is provided in the Appendix.

Findings included:

- *All of the communities had significant poverty but nonetheless perform in the top tier on a composite measure of health care access, quality, efficiency, and outcomes;*
- *Community leaders in each area set ambitious goals for improving population health and health system efficiency, and viewed achieving those goals as key to revitalizing their local economies and attracting new residents, as well as new businesses;*
- *Community leaders also placed high value on social capital and social ties, and relied on the latter to bring providers, payers, and community organizations, among many others, together;*
- *A commitment to careful stewardship of health care resources was another common theme, likely contributing to below-average health care spending in all three regions;*
- *These communities also placed a heavy emphasis on identifying and addressing the needs of the underserved, reflecting both a sense of social responsibility and a pragmatic awareness that this could lead to savings downstream;*
- *Payment models: in each of these communities, managed care contracting and performance incentive programs were common, providing significant support for primary care physicians to adopt best practices and improve the quality of care; and*
- *Each displayed openness to innovation involving social change, which put them at the forefront of the nation in introducing models of care that change the way patients interact with the health system.*

The proactive, grassroots approach to improving health within these communities may serve as an example to motivate and empower North County in its efforts toward wellness.[11]

[11] The full Commonwealth Fund study can be found at http://www.commonwealthfund.org/all-health-care-is-local.

RECOMMENDATIONS - COMMUNITY COORDINATION

Stroudwater recommends that stakeholders in the North Adams region develop a shared vision of improving the community's health status by aligning medical services available to the community with social services and other community assets in support of health status improvement. Our interviews revealed that community stakeholders share a goal of improved health, but lack a unified vision, plan, or allocation of resources to achieve that goal.

Trends in the healthcare industry indicate an increased emphasis on population health and health status improvement, while also reducing costs and improving quality in the delivery of healthcare. This is best accomplished by all parts of the system working together effectively and in alignment toward a shared goal.

Stroudwater recommends improved coordination between existing groups representing healthcare providers, state programs, payers, and consumers. Interviews demonstrated strong community pride, committed leaders, and dedicated elected officials and citizens, augmented by a variety of special interest coalitions; however, efforts have not accomplished the goal of a clear vision, set of strategies, and plan that span multiple stakeholders. The community must work comprehensively on systematically leveraging its assets to make the vision of improved health, enhanced communication, and coordination of resources a reality.[12] The efforts of existing coalitions, such as the Northern Berkshire Community Coalition, are acknowledged, and provide strong stepping stones toward these aims.

Stroudwater recommends that the Massachusetts Department of Public Health and other elected officials help to secure funding to support community leaders in pursuing the vision of a healthier North County and in the efforts to improve coordination between existing groups.

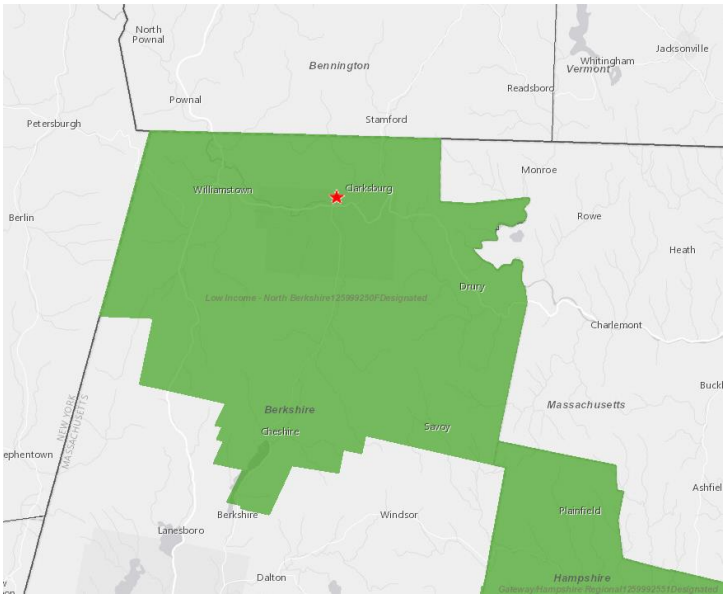
Stroudwater recommends that BMC leadership remain involved in North County activities and continue its efforts to engage stakeholders from North County.

[12] Additional information on asset-based community development and recent research on model communities is included in the appendix.

NORTH COUNTY DEMAND FOR HEALTHCARE SERVICES

Need for Physicians – Primary Care

Northern Berkshire County had been designated as a Special Population Primary Care Health Professional Shortage Area (HPSA) even before the closure of NARH. A recent update application for this designation found a total of 0.5 provider FTEs for a low-income population of over 10,400, which exceeds the acceptable ratio.



One standard approach to evaluating the need for primary care coverage is to apply a ratio of providers to the population of the service area, allowing an incremental percentage to account for in-migration. Using this methodology, Stroudwater identified a need for 33.2 primary care physicians, including family practice, internal medicine, OB/GYN, and pediatrics. A list of providers in the community provided by the MA Department of Public Health[13] shows that the community needs at least an additional six physicians to meet its needs, based on industry benchmarks. Of that total, the community is particularly underserved in general and family medicine.

Provider:Population Ratio		'14 Service Area & Inmigration 42,203	
Provider Full Time Equivalents	Area Total[1]	Area Need[2]	Surplus (Shortage)
Primary care			
Family practice	2.9	13.9	-11.0
General internal medicine	15.3	9.9	5.3
Obstetrics/gynecology	3.0	3.9	-0.9
General pediatrics	5.4	5.5	-0.1
Primary care total	26.6	33.2	**-6.6**

[1] Supply from MA Department of Public Health based on Medicaid billing records, prior to NARH closure. Note: 2 of the 3 reported OB/GYN do not perform deliveries.

[2] Based on average provider to population ratio data from three prepaid group practices that serve over eight million consumers and two staff model HMOs. Sources: Weiner JP, Prepaid Group Practice Staffing and U.S. Physician Supply: Lessons for Workforce Policy, *Health Affairs, 2004 and Hart G, Physician Staffing Ratios in Staff Model HMOs, Health Affairs, 2007*.

[13] The list of physicians practicing in the area is included in the appendix.

An effective way to improve access to primary care is through partnerships with other community resources and primary care providers. Berkshire County's Community Health Programs (CHP) is designated as a Federally Qualified Health Center that supports increased access to primary care services. BMC has historically partnered with CHP in expanding access to primary care in Southern Berkshire County. CHP's mission is to measurably improve the health of Berkshire County, Massachusetts's residents. *Kaiser Health News/USA Today* studied 2011 data from 1,200 Community Health Centers nationally, and found that CHP had some of the best patient outcomes of all health centers in Massachusetts. Eighty-eight percent of expectant mothers received timely prenatal care, in contrast with 68% nationally, and 71% had cervical cancer screenings—nationally, only 75% did. CHP's patients also showed progress with hypertension—93% were controlling it successfully, compared to just half nationally.

CHP is currently pursuing federal support for expanding services to North County; this would include at least two new primary care providers. The community coalition should strongly advocate and support CHP's applications for grants to improve access to primary care. In addition, the community may explore additional models to support better primary care in partnership with other professionals.[14]

RECOMMENDATIONS

North County stakeholders regularly cited the lack of primary care and delays in access to routine care, and the market analysis shows a shortage of providers to meet the population's needs. Stroudwater recommends the following immediate efforts to improve the availability of primary care resources in the region.

Stroudwater recommends full support of Community Health Programs' grant to expand primary care services and recruit additional providers to the North County's existing BMC North campus site in a Federally Qualified Health Center. BMC's existing partnership with CHP in South Berkshire County can be leveraged to support this. State and elected officials, community members, and other stakeholders should actively support and advocate for this grant award.

The Massachusetts Department of Public Health (MDPH) should work with federal officials to designate the North County as a Health Professional Shortage Area. The goal is to replace the current, more limited, Special Population Primary Care Health Professional Shortage Area designation with a "geographic" designation that would improve the availability of federal and state funding for primary care recruitment and retention. The MDPH should also continue to prioritize the Northern Berkshires area for use of state and federal resources, such as the State

[14] A Massachusetts pilot program in community paramedicine is included in the appendix as a case study in one effort to improve primary care access.

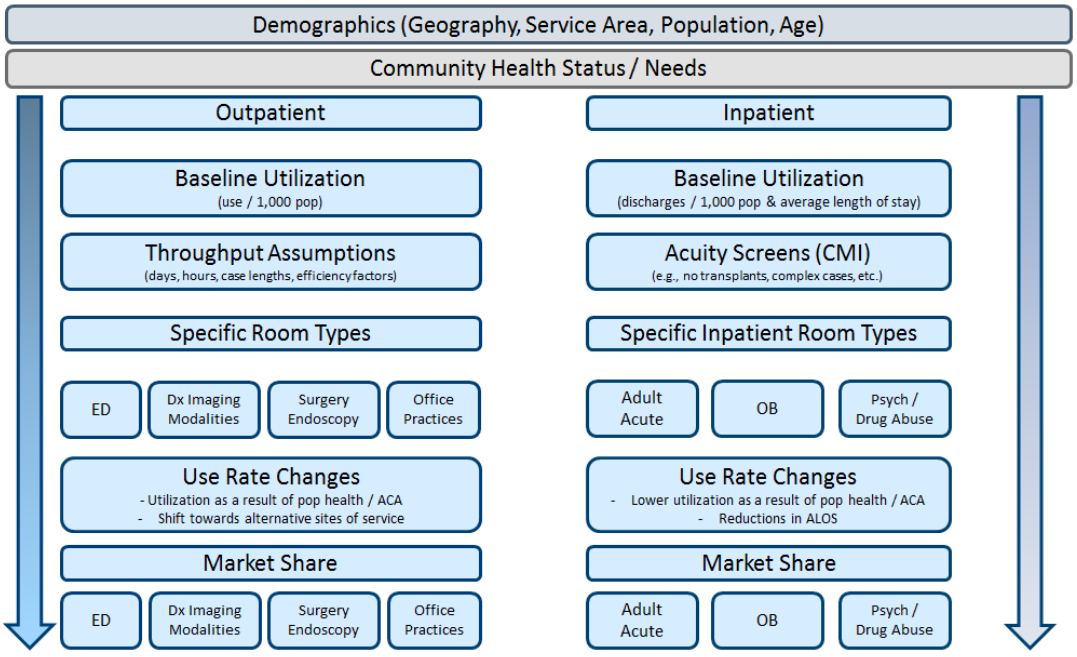
Loan Repayment Program, to provide incentives for recruitment and retention to those willing to provide primary care in the North Berkshires area.

Stroudwater recommends that state resources be directed to assist North County primary care providers in the transition to a medical home approach, considering the geographic and economic challenges faced by the area. The goal of this initiative is to move beyond episodic care and focus on improved population health, disease management and prevention, as well as access to behavioral health, social work, and nutrition services. All of these services have been shown to be significant needs in the North County area.

Stroudwater recommends the development of urgent care or walk-in primary care services to expand access to low acuity services. Emergent medical needs that are less acute should be provided in non-ED, more appropriate settings, yet the emergency department often is the only source of care open after-hours. Providing these services in an ER setting makes them unnecessarily costly, as compared to providing them in an appropriate primary care or clinic context.

Quantitative Methodology

Demand for healthcare services combines the demographic characteristics of a market (geography, service area, population, age, etc.) with overall community health status indicators to generate a baseline use rate of a particular service. To this baseline utilization, we apply throughput assumptions for each different room type, and then evaluate potential changes in utilization due to population health initiatives, the Affordable Care Act, or even shifts in technology or the locations in which services will be provided in the future.



Emergency Services Demand Summary

From 2010 through 2013, NARH saw a historical emergency department volume of between 20,700 and 19,500 per year, against a projected total North County demand of 26,000 visits.[15] Truven Health Analytics projects that emergency department demand in the area will grow slightly, between 1% and 2% annually.[16]

Emergency department visits have five principal CPT codes. Analysis of the frequency with which these codes are used allows us to determine the level of acuity for each patient visit to the ED. Codes 99281 & 99282 are considered urgent, with 99283, 99284 & 99285 considered emergent. The emergency volume in the North County is anticipated by Truven to be distributed 58% urgent versus 42% emergent.

The market analysis shows that emergency services will continue to be in demand for the North County area, but that the distribution of both space and function should skew towards urgent care services, with appropriate policies and procedures in place for transferring or redirecting more acute visits to other regional providers.

Need for Healthcare Services – Emergency

		PSA				PSA	
SA Grouping	Procedure group	Current year adjusted procedures	Forecast year 5 adjusted procedures	Forecast year 5 adjusted and trended procedures	Annual Use Rate Growth Adj	Annual Use Rate Growth A&T	AVG of Adj and A&T
ED Visits SA	Emergency department visit, emergent	10,958	10,860	12,836	0.1%	3.8%	1.9%
	Emergency department visit, urgent	15,088	14,740	16,416	-0.2%	2.1%	1.0%
	Total	26,046	25,601	29,252	-0.1%	2.8%	1.4%

Truven Health Analytics estimates the entire North County market demand for ED visits at just over 26,000 in 2013, with five-year growth projections up to as much as 29,000.

Below are the CPT® codes for the five levels of presenting problems:

Low Acuity (Urgent) Group

- ER Level 1 – 99281 – The presenting problems are self-limited or minor severity
- ER Level 2 – 99282 – The presenting problems are of low to moderate severity
- ER Level 3 – 99283 – The presenting problems are of moderate severity

High Acuity (Emergent) Group

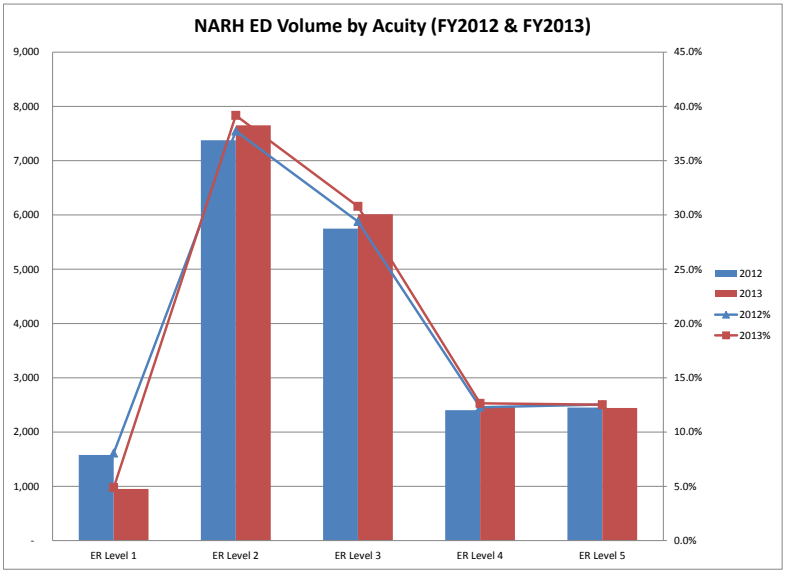
- ER Level 4 – 99284 – The presenting problems are of high severity, but do not pose an immediate significant threat to life
- ER Level 5 – 99285 – The presenting problems are of high severity and pose an immediate threat to life

[15] Additional information historic NARH volume trends can be found in the appendix.
[16] Additional information on national trends in emergency department use can be found in the appendix.

Historical Distribution of ED Acuity at NARH

	2012	2013
ER Level 1	1,577	952
ER Level 2	7,377	7,650
ER Level 3	5,749	6,013
ER Level 4	2,403	2,470
ER Level 5	2,451	2,445
	19,557	19,530

NARH ED volume has historically been around 19,500 annual visits, with approximately 75% levels 1-3 (urgent) and only 25% levels 4 & 5 (emergent). This highlights that the overall acuity of patients being cared for at the BMC North ED is lower than expected, indicating that much of the care being delivered in the NARH ED could perhaps be better accommodated in less costly urgent care or primary care settings.



Ancillary Services Demand Summary

The operation of the freestanding emergency room, the support of primary care, and the provision of accessible, low-acuity services to patients are all factors in assessing ancillary and diagnostic service demand. Stroudwater's approach to evaluating the North County market demand was to reflect only those volumes expected to be done at a hospital, hospital outpatient, or emergency department site of service. This excludes procedures and diagnostic services typically provided within the physician's office.

Sufficient North County need exists to justify providing laboratory, x-ray, computed tomography (CT), and ultrasound at the BMC-North site. There is also significant market demand for other

diagnostic imaging modalities, including magnetic resonance imaging (MRI) and mammography. CT, MRI, and ultrasound are anticipated to have minimal annual utilization growth (+/- 1%).

From this analysis, nuclear medicine does not appear to have sufficient market volume from which to generate a viable program, nor is growth in utilization projected.

Demand for Healthcare Services - Ancillaries

While population is anticipated to decline, the aging of the existing population and increased need for outpatient services yields some outpatient utilization growth in most ancillary modalities, with the exception of mammography and nuclear medicine.

	NARH Total (2013)	IP %	OP %	Truven OP Value Hosp. Site of Svc. (2013)	OP Market Share	Projected Annual Population Growth	Projected Annual Utilization Growth
Laboratory	270,470	18.0%	82.0%	289,782	76.5%	-0.3%	0.7%
Echo	1,444	26.0%	74.0%	2,150	49.7%	-0.3%	0.4%
Diagnostic Imaging							
Radiology General	21,635	11.9%	88.1%	22,091	86.3%	-0.3%	0.1%
Radiology Mammo	5,200	0.0%	100.0%	7,982	65.1%	-0.3%	-0.4%
Radiology Nuc Med	220	1.8%	98.2%	693	31.2%	-0.3%	-1.1%
Radiology Ultrasound	4,261	8.2%	91.8%	7,542	51.9%	-0.3%	0.4%
Radiology CT	6,152	17.9%	82.1%	7,235	69.8%	-0.3%	0.9%
MRI	2,092	3.1%	96.9%	2,513	80.7%	-0.3%	0.9%

	Conceptual Operating Parameters						
	Hours	Days	Procedure	Efficiency	Procedures/ Room/ Yr	Baseline (2013) Room Need (Raw)	Baseline (2013) Room Need (Rounded)
Laboratory							
Echo	8	250	45	70%	1,867	0.77	1
Diagnostic Imaging							
Radiology General	12	300	20	75%	8,100	2.67	3
Radiology Mammo	10	300	30	75%	4,500	1.16	2
Radiology Nuc Med	10	300	120	75%	1,125	0.20	1
Radiology Ultrasound	10	300	45	75%	3,000	1.42	2
Radiology CT	10	300	20	75%	6,750	0.91	1
MRI	10	300	45	75%	3,000	0.70	1

Using 2013 NARH volumes and the throughput assumptions above, Stroudwater projected the baseline room demand for each modality type.[17] Adjustments to future market share and overall utilization will impact the total volumes to be served at BMC North Campus, but

[17] Additional information on historical NARH volumes is included in the appendix.

adjustments to the conservative throughput assumptions above may mitigate any required growth in room count.

Gastroenterology Services Demand Summary

Truven anticipates just over 3,000 gastroenterology procedures (anoscopy, colonoscopy, esophogastroscopy, proctosigmoidoscopy, sigmoidoscopy, and upper GI endoscopy) in 2014, with approximately 70% estimated to occur in hospital outpatient settings.[18] Summary data provided from NARH shows the number of outpatient endoscopies completed historically between 2010 and 2013 ranging from 3,800 to 3,400, indicating a very large market share, as well as potentially significant in-migration. Truven projects annual declines in gastroenterology volumes, which could further erode market potential.

Stroudwater Procedure Group	Current PSA Hospital-based	Current PSA Other	Current PSA All Sites	% Hospital-based	Annual Adj Use Growth	Hospital Only Annual A&T Use Growth	Hospital Only Annual Average Growth
General Gastroenterology SA	2,088	942	3,029	68.9%	0.4%	-4.9%	-2.2%

Surgical Services Demand Summary

Ambulatory surgery demand from the primary service area supports the consideration of a surgical program in the North Adams area. The specifics of the program will hinge on the viability of physician recruitment as driven by sufficient procedural volumes to keep physicians practicing efficiently. Minimal market growth is projected for most specialties.

Stroudwater Procedure Group	Current PSA Hospital-based	Current PSA Other	Current PSA All Sites	% Hospital-based	Annual Adj Use Growth	Hospital Only Annual A&T Use Growth	Hospital Only Annual Average Growth
Acne Surgery SA	0	102	102	0.3%	0.6%	0.6%	0.6%
Cardiac Surgery SA	21	3	24	88.6%	0.3%	2.0%	1.1%
Neurosurgery SA	120	33	153	78.2%	0.2%	5.0%	2.6%
Ophthal Surgery SA	237	1,354	1,592	14.9%	1.0%	0.5%	0.8%
Oral Surgery SA	100	39	140	71.9%	-1.3%	-1.1%	-1.2%
Orthopedics SA	841	442	1,283	65.6%	-0.3%	-0.1%	-0.2%
Otolaryngology Surgery SA	849	781	1,630	52.1%	-0.6%	-3.3%	-1.9%
Pain Management SA	141	680	821	17.1%	-0.1%	3.9%	1.9%
Plastic Surgery SA	268	255	523	51.3%	0.0%	1.6%	0.8%
Podiatry SA	1,113	5,142	6,255	17.8%	0.1%	1.1%	0.6%
Surgery SA	1,425	1,232	2,658	53.6%	0.1%	0.1%	0.1%
Ambulatory Surgery Aggregate	5,117	10,064	15,181	33.7%	-0.1%	0.0%	0.0%

[18] Additional information on historical NARH volumes is included in the appendix.

RECOMMENDATIONS

Stroudwater recommends continuing to provide emergency care and associated diagnostic services, as well as expansion of outpatient services, ambulatory procedures, disease management, and prevention/wellness services that can be provided safely and sustainably in North County.

Stakeholder interviews indicated the highest priority for the community was access to emergency care in the area to supplement what is provided by local Emergency Medical Services (EMS) personnel. **Stroudwater recommends maintaining access to emergency services in the North County, as well as diagnostic imaging services in support of both the ER and local ambulatory care access, including x-ray/fluoroscopy, computed tomography (CT), magnetic resonance imaging (MRI), ultrasound, and screening mammography.**

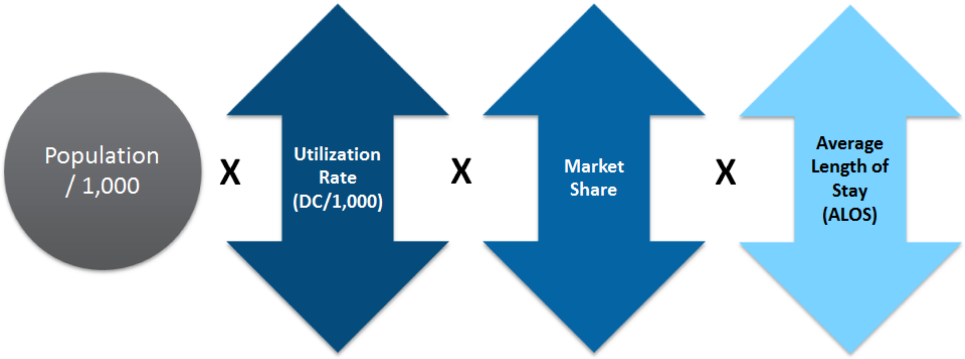
Stroudwater recommends maintaining access to laboratory services in a manner convenient to the patients and providers in the service area. This specifically relates to the provision of phlebotomy services, as the testing components of lab services may be performed remotely from the actual collection sites. Some testing will likely need to be performed in an urgent (STAT) manner, whereas other, less time-sensitive tests could be performed at an off-site reference lab using a reliable network of courier vehicles.

The market need for gastroenterology, particularly colonoscopies and upper GI endoscopy, supports re-establishment of services at the BMC North campus. Stakeholder interviews revealed that, though these screening procedures are recognized as critical to the early detection of disease and cancer, the population would defer care without a local point of access.

Redeveloping ambulatory surgery is also indicated by market need. While BHS has been able to meet the demand for surgeries within its existing facilities, ambulatory surgery can safely and routinely be performed in the North County region at the BHS North Campus, provided that physicians can be recruited and retained to practice in the area. Expanding other outpatient services would also help to minimize travel issues for patients in the North County area.

Demand – Inpatient Methodology

Demand for inpatient services is a function of population, utilization within the population, market share, and the average length of stay.



Medical / Surgical Inpatient Demand Summary

In the North County service area, the current inpatient utilization equals a rate of 144 discharges per 1,000 population, which is substantially higher than both Massachusetts and the US as a whole (121 discharges / 1,000 population).

One goal of the Affordable Care Act (ACA) is to improve the health of communities so that demand for inpatient hospitalizations will decrease over time. In fact, the well-respected actuarial firm Milliman has projected that, whereas the United States inpatient utilization is currently about 121 discharges per 1,000 population, the 2021 rate will be only 93 discharges per 1,000. Other projections by Milliman, for well-coordinated, highly managed markets, estimate utilization at between 70 and 42 discharges per 1,000.

In addition to understanding the overall utilization of services within a market, it is also important to understand what services have historically been provided in a community, so as not to overstate the potential demand. In the examples above, all discharges for all acuity levels and service types have been included. For example, in the North County service area, the value of 144 discharges per 1,000 includes not only common ailments requiring hospitalization (such as pneumonia and chest pain), but also cardiac surgery, neurosurgery, transplants, and neonatal care. As a small community hospital, NARH did not historically provide many of these acute services. In fact, 80% of the patients for which NARH historically provided inpatient services had a case mix index (CMI) of less than 1.8. A further indication of the lower acuity experienced at NARH is the fact that the average length of stay at NARH was historically 3.36 days, versus 4.34 days in the market as a whole.

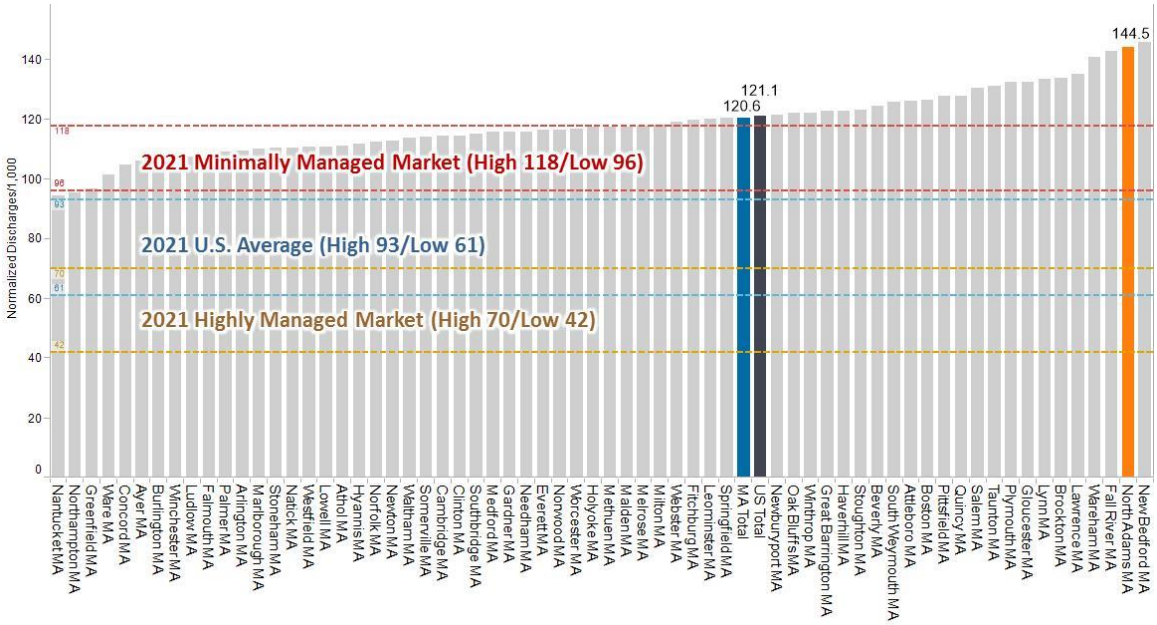
To estimate bed demand that might be accommodated locally, Stroudwater evaluated each category of beds separately. The three primary areas that were evaluated for the North County

service area were 1) Medical/Surgical; 2) Obstetrics/Newborn; and 3) Behavioral Health/Drug Abuse. In this section, Stroudwater is focusing on the medical / surgical demand.

Working from the original overall market utilization of 144 discharges per 1,000 population, Stroudwater extracted the discharges for obstetrics, neonatology, normal newborns, and behavioral health/drug abuse. Next, we further distilled this remaining volume to account for a screen on lower acuity cases, resulting in the number of medical/surgical discharges remaining in the market, and showing a utilization rate of approximately 69 discharges per 1,000 population. Using the historical average length of stay, the number of medical / surgical beds to meet 100% of this market demand, plus 15% in-migration, is 35 beds. This assumes 100% market share and no reductions to utilization as a result of federal, state, or local population health initiatives.

Historical market share for NARH has ranged between 50% and 60%, and as such, any projection of achieving 100% market share is unrealistic. At 60% market share, the demand for medical/ surgical beds at the current, significantly higher, utilization rate is 21 beds. Reductions in overall inpatient utilization as projected by Milliman would translate to a demand of between 14 and 17 medical/surgical beds.

Age Normalized Use Rate Comparisons – Discharges/1,000



Current use rates based on Truven Healthcare Analytics population and discharge estimates by Dartmouth Hospital Service Area (HSA).
2021 use rates based on Milliman Governance Institute Presentation (2/2012).
Use rates are normalized to the United States average.

Readmission Comparison

Metric	North Adams Regional	U.S.
Rate of unplanned readmission for heart attack patients	No Different than U.S. National Rate	18.3%
Rate of unplanned readmission for heart failure patients	No Different than U.S. National Rate	23.0%
Rate of unplanned readmission for pneumonia patients	No Different than U.S. National Rate	17.6%
Rate of unplanned readmission after hip/knee surgery	No Different than U.S. National Rate	5.4%
Rate of unplanned readmission after discharge from hospital (hospital-wide)	No Different than U.S. National Rate	16.0%

Source: Hospital Compare, accessed July 24, 2014

Concerted efforts (and pressures) are being made in all facilities and markets to avoid the need for readmissions within 30 days of discharge.[19] Reductions to this readmission rate are being pushed by reimbursement penalties, which have encouraged greater care coordination and follow up. Recent work had been undertaken in the North Adams market between providers and the hospital to reduce readmissions. These efforts should continue in conjunction with BMC.

As a specific example, using annualized 2012 volumes, approximately 50% of the total NARH discharges (1,265 of 2,578) were from Medicare patients. Assuming that NARH had the same rate of readmissions as noted above for the US (16%), this would account for an 8% reduction in total discharges. The results of fewer readmissions will include fewer discharges, and therefore fewer patient days and a corresponding reduction to the number of beds required to meet market demand.

North County Discharges by Acuity (Truven) – All Services / All Discharges

		% of Total Discharges		# of Discharges		
	Discharge Year	< 1.8	> 1.8	< 1.8	> 1.8	Total
NORTH ADAMS REGIONAL HOSPITAL	2008	87.7%	12.3%	2,641	369	3,010
	2009	80.8%	19.2%	2,123	505	2,628
	2010	79.9%	20.1%	2,131	536	2,667
	2011	80.2%	19.8%	1,963	486	2,449
	2012 ann	79.8%	20.2%	2,001	508	2,509
Other Facilities	2008	73.1%	26.9%	1,434	527	1,961
	2009	71.5%	28.5%	1,359	542	1,901
	2010	68.6%	31.4%	1,331	609	1,940
	2011	72.4%	27.6%	1,508	574	2,082
	2012 ann	73.9%	26.1%	1,848	652	2,500

Source: Truven Health Analytics

In small community hospitals, it is not clinically appropriate to care for all patient acuities. For example, community hospitals such as NARH do not perform neurosurgery, transplants, or

[19] Additional information on readmissions and the cost of common chronic diseases is included in the appendix.

complex cardiac procedures.[20] These complex procedures have a high Case Mix Index (CMI), which measures the acuity of the service provided. Historically, approximately 80% of North Adams Regional Hospital discharges have had CMI lower than 1.8.

North County Discharges – All Services / All Levels of Acuity

Service Area Acuity Custom Service Line	Discharges North County Total Current	Discharges North County % of Total Current	D/1,000 North County Total Current
Cardiology	520	9.8%	14.2
Dentistry	4	0.1%	0.1
Dermatology	93	1.8%	2.5
Drug Abuse	317	6.0%	8.6
Endocrine	95	1.8%	2.6
Gastroenterology	360	6.8%	9.8
General Medicine	400	7.5%	10.9
General Surgery	353	6.7%	9.6
Gynecology	48	0.9%	1.3
Hematology	33	0.6%	0.9
HIV	4	0.1%	0.1
Neonatology	137	2.6%	3.7
Nephrology	161	3.0%	4.4
Neurology	210	4.0%	5.7
Neurosurgery	35	0.7%	0.9
Normal Newborns	207	3.9%	5.6
OB/Delivery	462	8.7%	12.6
Oncology Medical	85	1.6%	2.3
Open Heart	34	0.6%	0.9
Ophthalmology	6	0.1%	0.2
Orthopedics	457	8.6%	12.4
Other	37	0.7%	1.0
Other OB	27	0.5%	0.7
Otolaryngology	39	0.7%	1.1
Psych	535	10.1%	14.6
Pulmonary	401	7.6%	10.9
Rheumatology	12	0.2%	0.3
Thoracic Surgery	53	1.0%	1.4
Trauma	24	0.4%	0.6
Urology	77	1.5%	2.1
Vascular Surgery	76	1.4%	2.1
Grand Total	5,301	100%	144

Source: Truven Health Analytics.

The North County accounts for approximately 5,300 inpatient discharges across all service lines and levels of acuity. Using a population of 36,698, this represents a utilization rate (discharges / 1,000 population) of 144.

[20] Additional information on historical discharges is included in the appendix.

Total Inpatient Demand – All Discharges

Total Market Inpatient Demand

36,161 **Total 2019 Population**

75% **Occupancy Level**

4.34 **Average Length of Stay (ALOS)**

75% **Occupancy Level**

	discharges/ 1,000	100% Market Share beds required: North County Share 100%	In Migration 15%	Total Need @ Market
2014 Service Area	144	83	12	95
2021 US Average (Milliman)	93	53	8	61
2021 Highly Managed (Milliman)	70	40	6	46
2021 Highly Managed Low (Milliman)	40	23	3	26
Scenario 1 - 10% reduction	130	75	11	86
Scenario 2 - 20% reduction	116	66	10	76

Using a discharge rate of 144 and assuming a 4.34 day ALOS and a 75% occupancy level, the North County would project an inpatient bed need (assuming 100% market share) of 83 beds. Using an in-migration rate of 15%, the total demand for inpatient beds would equal 95 beds. Reductions to inpatient utilization rates projected by Milliman show a range of need between 26 beds at the most aggressive reductions to use and 61 at the estimated US average use rate. Again, this is to accommodate 100% of North County discharges and additional in-migration.

Current North County Discharges (Truven) – All Services, Acuity Adjusted

Service Area	Discharges North County	Discharges North County	D/1,000 North County
Acuity	**< 1.8**	**% of Total**	**< 1.8**
Custom Service Line	**Current**	**Current**	**Current**
Cardiology	388	9.3%	10.6
Dentistry	4	0.1%	0.1
Dermatology	91	2.2%	2.5
Drug Abuse	317	7.6%	8.6
Endocrine	93	2.2%	2.5
Gastroenterology	325	7.8%	8.9
General Medicine	261	6.2%	7.1
General Surgery	179	4.3%	4.9
Gynecology	46	1.1%	1.2
Hematology	32	0.8%	0.9
HIV	3	0.1%	0.1
Neonatology	98	2.3%	2.7
Nephrology	161	3.9%	4.4
Neurology	175	4.2%	4.8
Neurosurgery	5	0.1%	0.1
Normal Newborns	207	5.0%	5.6
OB/Delivery	462	11.0%	12.6
Oncology Medical	66	1.6%	1.8
Open Heart		0.0%	0.0
Ophthalmology	6	0.1%	0.2
Orthopedics	173	4.1%	4.7
Other	37	0.9%	1.0
Other OB	25	0.6%	0.7
Otolaryngology	38	0.9%	1.0
Psych	535	12.8%	14.6
Pulmonary	339	8.1%	9.2
Rheumatology	12	0.3%	0.3
Thoracic Surgery	1	0.0%	0.0
Trauma	15	0.3%	0.4
Urology	52	1.2%	1.4
Vascular Surgery	33	0.8%	0.9
Grand Total	4,182	100%	114

Inpatient care in a rural area does not provide for the entire spectrum of medical and surgical inpatient services, particularly those of high acuity. To determine need for inpatient services that may potentially be delivered locally, Stroudwater eliminated the more complex cases with case mix indices (CMI) above 1.8. Following this adjustment, the current North County discharges account for approximately 4,200 inpatient discharges across all service lines. Against the population of 36,698, this represents an acuity-adjusted utilization rate (discharges / 1,000 population) of 114.

Current North County Discharges (Truven) – Acuity Adjusted (Med/Surg/ICU Only)

Service Area Acuity Custom Service Line	Discharges North County < 1.8 Current	Discharges North County % of Total Current	D/1,000 North County < 1.8 Current
Cardiology	388	15.3%	10.6
Dentistry	4	0.2%	0.1
Dermatology	91	3.6%	2.5
Drug Abuse	0	0.0%	0.0
Endocrine	93	3.7%	2.5
Gastroenterology	325	12.8%	8.9
General Medicine	261	10.3%	7.1
General Surgery	179	7.0%	4.9
Gynecology	46	1.8%	1.2
Hematology	32	1.2%	0.9
HIV	3	0.1%	0.1
Neonatology	0	0.0%	0.0
Nephrology	161	6.4%	4.4
Neurology	175	6.9%	4.8
Neurosurgery	5	0.2%	0.1
Normal Newborns	0	0.0%	0.0
OB/Delivery	0	0.0%	0.0
Oncology Medical	66	2.6%	1.8
Open Heart		0.0%	0.0
Ophthalmology	6	0.2%	0.2
Orthopedics	173	6.8%	4.7
Other	37	1.5%	1.0
Other OB	0	0.0%	0.0
Otolaryngology	38	1.5%	1.0
Psych	0	0.0%	0.0
Pulmonary	339	13.4%	9.2
Rheumatology	12	0.5%	0.3
Thoracic Surgery	1	0.0%	0.0
Trauma	15	0.6%	0.4
Urology	52	2.1%	1.4
Vascular Surgery	33	1.3%	0.9
Grand Total	2,536	100%	69

A further refinement is to focus on those patients who occupy only medical / surgical or intensive care. So, as highlighted in blue, specialty bed utilization for neonatology, normal newborns, OB/Delivery and other OB are excluded. In red highlighting, drug abuse and psych are excluded. While still only counting the acuity-adjusted discharges, the current North County demand is approximately 2,536 inpatient discharges. Against the same population of 36,698, this represents a utilization rate (discharges / 1,000 population) excluding OB, neonatology, normal newborns, drug abuse, and psych for acuity-adjusted cases of 69. Compared to the total North County utilization of 144, these remaining services account for 48% of the discharges.

Total Inpatient Demand – Acuity-Adjusted (Med/Surg/ICU Only)

Total Market Inpatient Demand

36,161 **Total 2019 Population** 75% **Occupancy Level**

3.36 **Average Length of Stay (ALOS)**

75% **Occupancy Level**

	discharges/ 1,000	North County Share 100%	**100% Market Share** beds required In Migration 15%	Total Need @ Market
2014 North County Area	69	31	5	35
2021 US Average (Milliman)	44	20	3	23
2021 Highly Managed (Milliman)	33	15	2	17
2021 Highly Managed Low (Milliman)	19	8	1	10
Scenario 1 - 10% reduction	62	28	4	32
Scenario 2 - 20% reduction	55	25	4	28

Using the adjusted discharge rate of 69 and assuming a 3.36-day ALOS and a 75% occupancy level, the volumes generated in the North County would project an inpatient medical / surgical bed need (assuming 100% market share) of 31 beds. Using an in-migration rate of 15%, the total demand for inpatient beds would equal 35 beds. Reductions to inpatient utilization projected by Milliman show a range of need between 23 and 10 medical/surgical beds for patients with a CMI less than 1.8. Again, this is to accommodate 100% of North County discharges and additional in-migration.

Market Share vs. Utilization- Acuity-Adjusted (Med/Surg/ICU Only)

The chart below shows the number of beds required given various market share assumptions (horizontal axis) and various utilization rate assumptions (vertical axis). If 2008 market share of approximately 60% were to be recaptured, the number of acute (Med Surg / ICU) beds to accommodate acuity-adjusted discharges would range between 21 beds at current utilization rates and six beds at the most aggressive projected reductions. These projected numbers of inpatient beds would be very challenging to operate efficiently, particularly with any reductions to overall market utilization as a result of ACA, increased wellness and prevention activities, or other population health initiatives.

Population	36,161
In Migration %	15%
Average Length of Stay	4.34
Occupancy Level	75%

		Market Share									
	Utilization	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
2014 US Average	121	80	72	64	56	48	40	32	24	16	8
2014 North County	144	95	86	76	67	57	48	38	29	19	10
2021 US Average (Milliman)	93	61	55	49	43	37	31	25	18	12	6
2021 Highly Managed (Milliman)	70	46	42	37	32	28	23	18	14	9	5
2021 Highly Managed Low (Milliman)	40	26	24	21	18	16	13	11	8	5	3
Scenario 1 - 10% reduction	130	86	77	69	60	51	43	34	26	17	9
Scenario 2 - 20% reduction	116	76	69	61	53	46	38	30	23	15	8

BEDS REQUIRED (incl. inmigration)

BMC North – Projected Inpatient Acute Medical Care Costs

	Projected Startup Costs
Clinical Staffing Costs	
Direct Med/Surg Staffing Costs	**$2,327,000**
Benefits Costs on Staffing	**652,000**
Hospitalist Costs	**1,270,000**
	$4,249,000
Additional Support Staffing Costs	
Nursing Administration	**$224,000**
Pharmacy	**260,000**
Dietary	**327,000**
	$811,000
Total Staffing Costs	**$5,060,000**
Variable Costs/Day	**$250**
Total Projected Days	**5,475**
Total Variable Costs	**$1,369,000**
Estimated BMC Costs	**$4,348,000**
Estimated BMC North Costs	**6,429,000**
Difference (increased costs)	**($2,081,000)**

Stroudwater estimates an annual net increase in costs of $2.1M under a model of providing inpatient medical-surgical care at the BMC North Site. The analysis includes an estimated $5M in staffing costs and $1.4M in variable costs (e.g., supplies, meals, etc.) to care for an average of 15 patients/day.

When comparing the total increase of $6.4M to the estimated BMC increased costs of $4.3M for direct clinical staffing costs, benefits, and variable costs, the difference is $2.1M. This reflects an increased cost to healthcare and is inconsistent with the market changes driving hospitals to lower costs. As expenses increase in the future, this gap is projected to increase by $400,000 over the next five years.[21]

The higher costs of operating the medical-surgical services are not sustainable without the subsidies provided through the Critical Access Hospital program. Critical Access Hospital status is a federal designation for rural facilities that are necessary to maintain access for Medicare beneficiaries. Recognition as a Critical Access Hospital provides reimbursement of full costs to

[21] Additional information on the financial analysis is included in the appendix.

offer inpatient and outpatient services Medicare beneficiaries as calculated in an annual Medicare cost report. A 2011 analysis completed by Stroudwater indicated NARH was paid $1.5M below costs by Medicare. Since that time, costs have inflated at a higher rate than payments, likely increasing the underfunded amounts. Historically, costs were shifted to third-party payers; however, payers are reducing reimbursements and providing incentives for decreased use in today's market. The result is that Critical Access Hospitals, like general acute care hospitals, face financial risk.

RECOMMENDATIONS – INPATIENT SERVICES

Stroudwater recommends developing a clinically integrated delivery system with BMC, to include limited inpatient services provided at BMC North only if designated as a Critical Access Hospital. Designation as a Critical Access Hospital is the only option to cover the additional costs required for providing inpatient services at BMC North. Without this designation, the community need for inpatient services should be provided at BMC to increase efficiency and lower costs.

Market demand showed an existing need for 18-21 beds for acute inpatient medical services and 11-12 beds for inpatient behavioral health and substance abuse services. Lower utilization rates and increased use of outpatient services indicate that future demand will decrease to 14-17 beds for medical and 10-11 beds for behavioral health and substance abuse. Notably, BMC has accommodated the market need for inpatient services within their existing system capacity since the closure of NARH. Furthermore, it is important to recognize that while the projected inpatient volumes are from the North County, this does not translate to a need to provide all services locally.

Stroudwater acknowledges that stakeholder interviews revealed a wide range of opinion on the best site for meeting acute inpatient care needs, including the active sector of the community that has advocated strongly for re-establishing inpatient care at the BMC North site in North Adams.

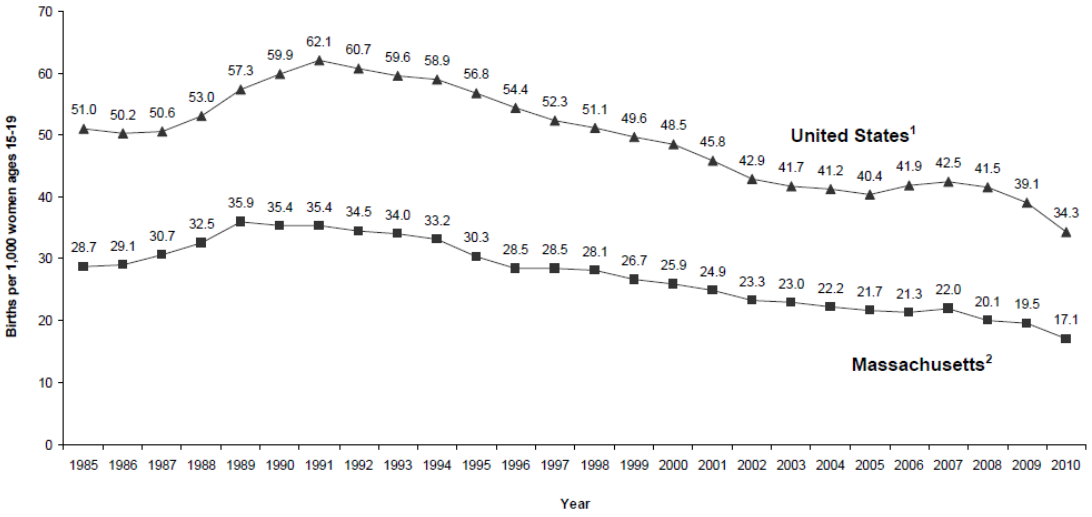
Interviews with primary care physicians indicate focus on their clinic practice and no interest in managing inpatient care; recruiting primary care physicians to the community with an expectation of managing inpatient care is unlikely. Therefore, the costs analysis for operating an inpatient facility includes the cost of "hospitalists," full-time doctors that manage inpatient care.

Stroudwater's analysis of the cost of providing inpatient acute care services at BMC North estimates a total additional cost of $2.1M, based on $6.4M in staffing, variable costs, and other support services for providing the service at BMC North versus the estimated $4.3M in annual costs for treating inpatients at BMC.

Obstetrical Inpatient Demand Summary

Birth rates have been falling both nationally and in Massachusetts. Truven Health Analytics estimates 462 deliveries for the eight-town North County service area, whereas between 2008 and 2012, North Adams Regional Hospital delivered between 223 and 237 babies. Well before its closure, two of the three OB/GYN physicians in the area stopped providing delivery services at NARH.

Figure 15. Trend in Birth Rates among Females ages 15-19, Massachusetts and the United States: 1985-2010



Teen birth rate is the number of births to females ages 15-19 per 1,000 females ages 15-19
Data sources: 1) U.S. annual natality data (NCHS) and 1990 U.S. Census data (population data used in denominators); 2) Massachusetts: annual birth data files, decennial Census counts (1990) and intercensal population estimates based on MISER (Massachusetts Institute for Social and Economic Research) population estimates for 1991 through 1998. 1999 rates are calculated using the 1999 DPH Massachusetts population estimates and Massachusetts (Department of Public Health) Modified Age, Race/Ethnicity, & Sex Estimates 2000-2005, released October 2006. 2009 birth rates are based on the 2009 population estimates from the National Center for Health Statistics. PLEASE NOTE: DIFFERENCES BETWEEN THESE RATES AND PREVIOUSLY PUBLISHED DATA REFLECT UPDATES IN POPULATION ESTIMATES.

For the total market, with traditional assumptions regarding C-section rate, average length of stay, and duration of delivery, the total need for inpatient obstetric services would be three LDR (combined labor, delivery, & recovery) rooms and between 6 and 8 postpartum rooms.[22] Patient choice and referrals of high-risk pregnancies result in less than 100% of this need being served locally; historical market share ranged between 78% and 66%. This reduces the actual demand for obstetric rooms to serve North County residents to approximately two LDR rooms per day and between four and 6 postpartum rooms.

Some local practitioners identified operational barriers and quality concerns with providing inpatient obstetrics services in North County. The operational issues included the need to have a minimum of three obstetricians committed to doing deliveries and sharing after-hours coverage, and recognizing that this level of coverage does not currently exist; the recruitment challenges

[22] See appendix for calculation details.

and costs of accomplishing this were cited as obstacles. Costs and coverage issues for pediatric, neonatal care, and anesthesia personnel to cover call were also cited.

Published studies have indicated that hospitals providing lower volumes of deliveries have poorer outcomes on average when compared to high-volume delivery units. According to a 2012 study published in the American Journal of Obstetrics & Gynecology, prevalence of asphyxia increased with decreasing hospital volume overall and among term, non-low-birth-weight infants, from 9 per 10,000 live births at highest-volume hospitals to 18 per 10,000 live births at the lowest-volume hospitals. Similar trends were observed in rural hospitals, with rates increasing from 7 to 34 per 10,000 live births in low-volume rural hospitals.

In addition to the quality research, the American Society of Anesthesiologists and the American College of Obstetricians and Gynecologists have concluded that when evaluating the goals for obstetrics care, "deficiencies were most evident in smaller delivery units." Their findings indicate that 34% of hospitals have fewer than 500 deliveries per year and that "providing comprehensive care for obstetric patients in these small units is extremely inefficient, not cost-effective, and frequently impossible."

Access to the spectrum of OB-GYN services, particularly for prenatal and postnatal care, is of deep concern to community members. These outpatient services include a broad range of initiatives addressing behaviors such as drinking and smoking during pregnancy, as well as special population needs, such as those of expectant teenagers. These programs and resources can be pursued in partnership with other area providers, including school-based clinics, visiting nurses, and primary care providers. Specific services that might be considered include women's primary care, reproductive health services, prenatal care, and perhaps even home visits for high-risk families.

The integration among the range of community programs, outpatient services, and the delivery location is an important consideration for developing an integrated system of care. The protocols must also include contingency plans for women who are unable to travel to their chosen birth location and experience complications prior to admission. A set of best practices, developed in partnership with community providers, EMS, and other stakeholders, offers the best care possible when faced with obstetric emergencies.

RECOMMENDATIONS – OBSTETRICS

Stroudwater recommends the development of a coordinated effort for providing locally accessible prenatal care and education, together with a plan for appropriate transportation assistance to other nearby facilities for childbirth and a comprehensive protocol for addressing emergencies. It will be important to provide coordinated access throughout the region for a comprehensive range of services needed during pre-conception, prenatal, pregnancy, postpartum and newborn periods for the health of the mother and baby.

Behavioral Health Demand Summary

Improving the behavioral health of a vulnerable population is a unique challenge faced by rural communities across the US. Accommodating the behavioral health needs of the North County service area, as reported in the June 2014 Statewide Mental Health Advisory Committee Report, will require a combined effort of community and outpatient services, as well as traditional inpatient services. A behavioral health and addiction services trust was recommended for funding community-level care and the development of a statewide plan to strengthen outpatient behavioral health services.

Findings from the Community Health Needs Assessment related to behavioral health include:

- *Mental health disorders are the seventh leading cause of death for the North County service area, but are lower than the state's percentage rate for overall cause of death.*
- *Mental health disorders and alcohol abuse are the second and eighth leading causes related to hospital discharges for the North County service area.*
- *Both mental health and alcohol abuse exceed the state's percentage rate for hospital discharges.*
- *In the Berkshires Community Health Network Area, the rate of people ages 35-54 who reported more than 15 days of poor mental health exceeded the state rate by 62%.*
- *Outpatient care availability lags behind demand.*
    - *Currently, in 2013, there is a 7 to 10 week waiting period for new patients or patients needing medication monitoring.*
    - *Efforts are underway, in collaboration with the Brien Center, to increase the outpatient services and to provide skilled support for those emergency department patients presenting with co-morbidities related to behavioral health.*

From an inpatient perspective, the North County service area is projected to have inpatient drug abuse utilization of 8.6 discharges per 1,000 and 14.6 discharges per 1,000 for behavioral health—a total of 23.2 discharges per 1,000. Assuming NARH's historical average length of stay for behavioral health patients, for 100% North County market share and 15% additional in-migration, the combined inpatient bed demand for behavioral health and drug abuse is 19 beds. Decreasing utilization by 10% or increasing by 10% would produce a range of 17-21 beds, again to accommodate 100% market share.

Total Psych / Drug Abuse Inpatient Demand

Total Psych/Drug Abuse Inpatient Demand

36,161 **PSA Population 2019**

36,161 **Total 2019 Population** 75% **Occupancy Level**

5.47 **Average Length of Stay (ALOS)**

75% **Occupancy Level**

	discharges/ 1,000	PSA Share 100%	100% Market Share beds required In Migration 15%	Total Need @ Market
Psych+Drug Abuse - 2014 Utilization	23	17	3	19
Psych+Drug Abuse - +10% Utilization	26	18	3	21
Psych+Drug Abuse - -10% Utilization	21	15	2	17

Using the current psych / drug abuse discharge rate of 23/1,000 and assuming the 2012 NARH psych ALOS of 5.47 days and a 75% occupancy level, the North County population inpatient psych / drug abuse bed need is 17 beds assuming 100% market share. Using an in-migration rate 15%, the total demand for inpatient beds would be 19.

A 10% increase or decrease in inpatient utilization would drive total psych / drug abuse bed need to between 17 and 21 beds. Again, this is to accommodate 100% of North County needs **and** additional in-migration for these service lines.

RECOMMENDATIONS – Behavioral Health / Drug Abuse

Stroudwater recommends the further development of behavioral health and substance abuse services with targeted outreach to at-risk populations, building on the existing capacity of the Brien center services. A more detailed analysis of community mental health and drug abuse resources, including those already provided by state and local social service agencies, should be considered. Community Health Needs Assessments, as well as stakeholder discussions summarized previously in the qualitative analysis of this report, further support the belief that the North County suffers from gaps in the access to mental health services, particularly outpatient and medication monitoring services, with significant wait times for appointments. Alcohol abuse education and treatment have also been identified as areas of concern where treatment should be provided to improve overall community health and wellness.

APPENDIX

Distribution of Employer-sponsored Health Insurance Enrollment by Type of Plan, 1988 – 2013

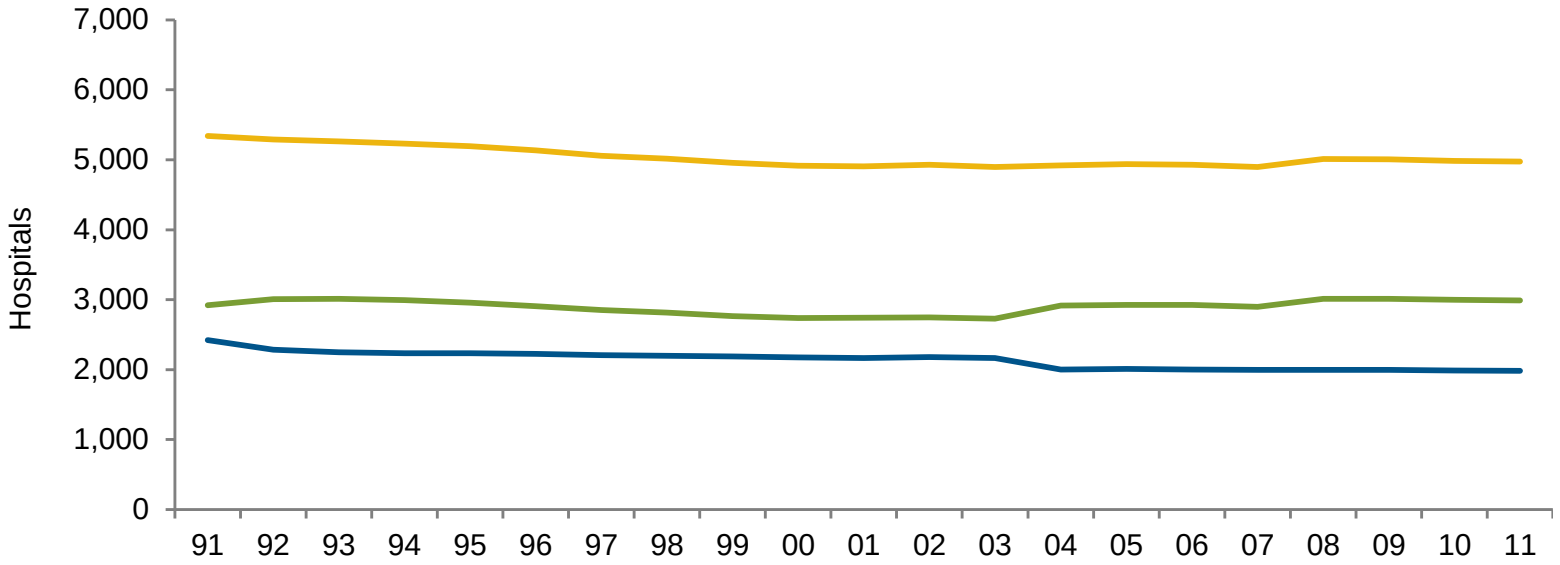
Source: The Kaiser Family Foundation and Health Research and Educational Trust. Data Released 2013. Employer Health Benefits: 1999, 2002, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013. Link: http://ehbs.kff.org/pdf/2013/8345.pdf. KPMG Survey of Employer-Sponsored Health Benefits: 1988, 1996.

(1) Conventional plans refer to traditional indemnity plans.

(2) Point-of-service plans not separately identified in 1988.

(3) In 2006, the survey began asking about HDHP/SO, high deductible health plans with a savings option.

Number of Community Hospitals (1) 1991 – 2011

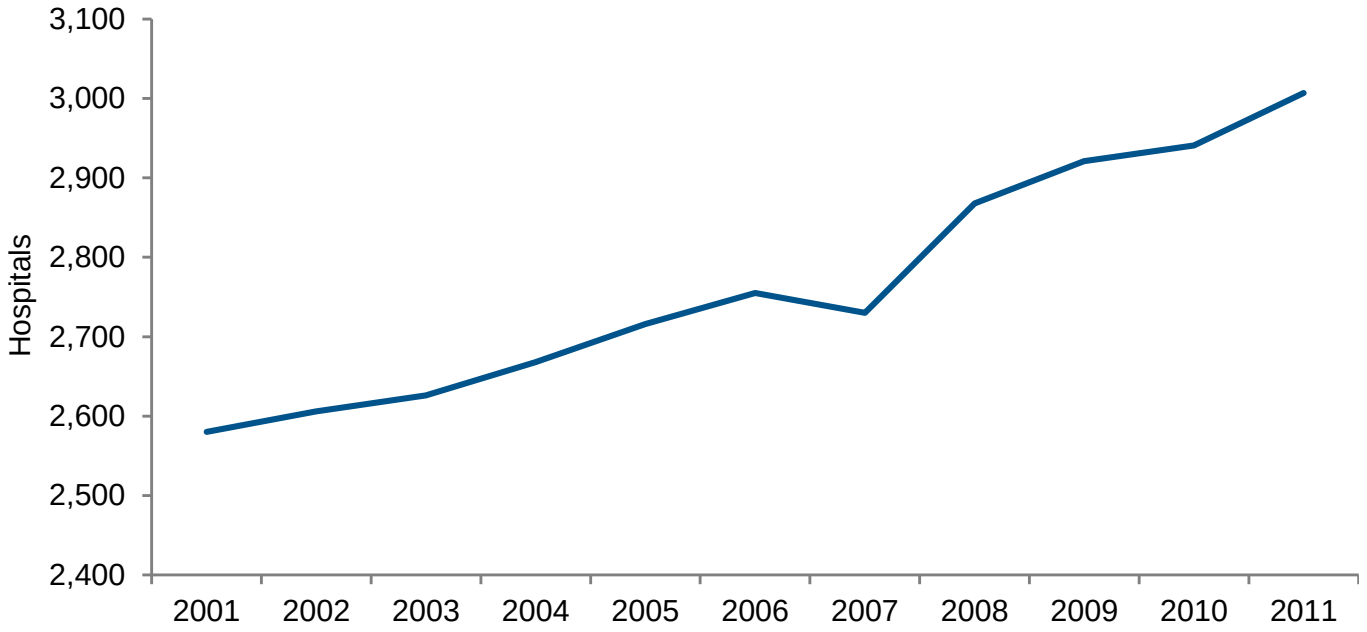


Source: Avalere Health analysis of American Hospital Association Annual Survey data, 2011, for community hospitals.

(1) All nonfederal, short-term general and specialty hospitals whose facilities and services are available to the public.

(2) Data on the number of urban and rural hospitals in 2004 and beyond were collected using coding different from previous years to reflect new Centers for Medicare & Medicaid Services wage area designations.

Number of Hospitals in Health Systems, (1) 2001 – 2011



Source: Avalere Health analysis of American Hospital Association Annual Survey data, 2011, for community hospitals.

(1) Hospitals that are part of a corporate body that may own and/or manage health provider facilities or health-related subsidiaries as well as non-health-related facilities including freestanding and/or subsidiary corporations.

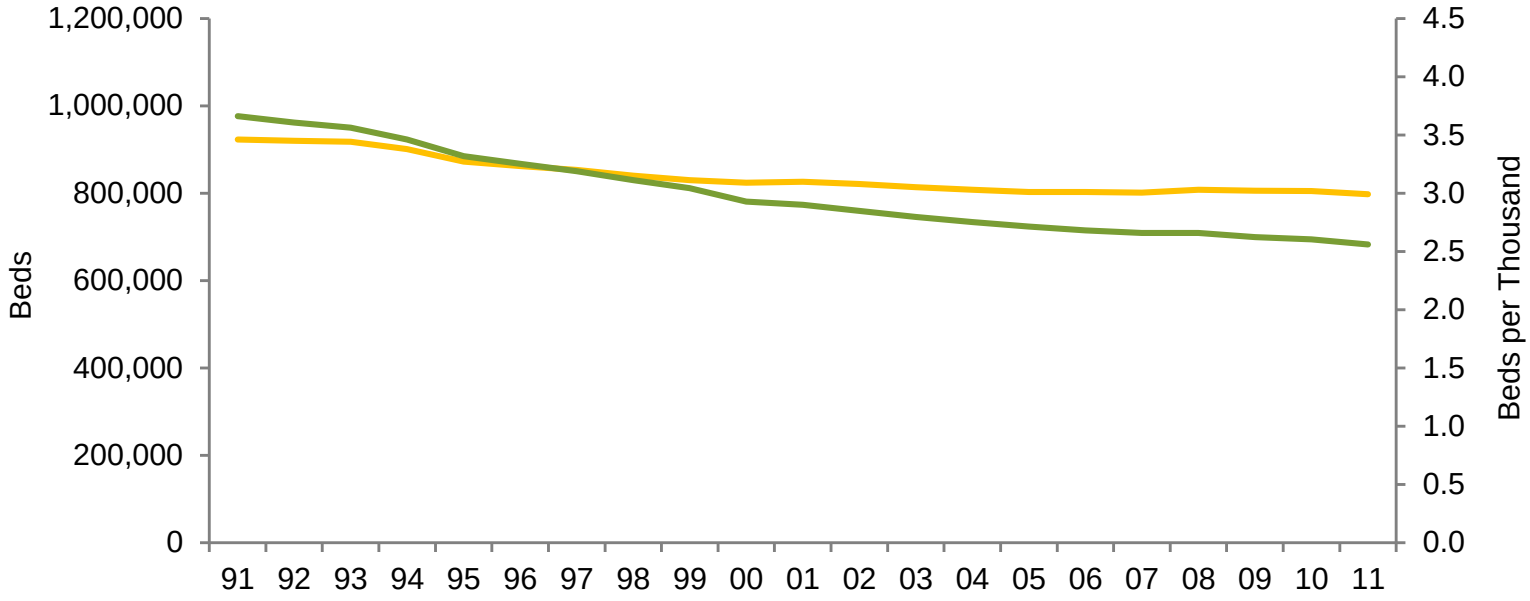
Recently Closed Hospitals (2013-2014)

Hospital Closures 2013-14

Hospital Name	City	State	Census Designation	Closed Date	Notes
Anaheim General Hospital	Anaheim	CA	Urban	April, 2013	
Bellflower Medical Center	Bellflower	CA	Urban	April, 2013	
Calhoun Memorial Hospital	Arlington	GA	Rural	Feb., 2014	
Central Texas Hospital	Cameron	TX	Urban	Jul., 2013	Brownsville MSA
Charlton Memorial Hospital	Folkston	GA	Rural	Aug., 2013	
Chilton Medical center	Clanton	AL	Rural	Mar. 2013	
Christus Schumpert St. Mary Medical Center	Shreveport	LA	Urban	Sep., 2013	
Corcoran District Hospital	Corcoran	CA	Urban	Oct. 2013	
Cozby-Germany Hospital	Grand Saline	TX	Rural	Aug., 2013	
Earl K. Long Medical Center	Baton Rouge	LA	Urban	Apr., 2013	
Elba Hospital	Elba	AL	Rural	Jan. 2013	
Flint River Hospital	Montezuma	GA	Rural	Sep., 2013	ED Only Closed, hospital open
Florala Memorial Hospital	Florala	AL	Rural	Dec. 2013	
Gibson General Hospital	Trenton	TN	Rural	Jan. 2013	
Haywood Park Hospital	Brownsville	TN	Rural	Apr., 2014	Ending inpatient acute and E.D.
Humboldt General Hospital	Humboldt	TN	Rural	Jan. 2013	
Humphreys County Hospital	Belzoni	MS	Rural	2013	
Lake Whitney Medical	Whitney	TX	Rural	Apr. 2014	
Lakeside Memorial Hospital	Brockport	NY	Urban	Apr., 2014	Rochester, NY MSA
Lee Regional Medical Center	Pennington Gap	VA	Rural	Oct. 2013	
Linden Municipal Hospital	Linden	TX	Rural	Apr., 2014	
Los Angeles Metropolitan Medical Center	Los Angeles	CA	Urban	April, 2013	
Mid-Valley Hospital	Peckville	PA	Rural	Jul. 2014	Closing inpatient and E.D.
Newport Specialty Hospital	Newport	CA	Urban	April, 2013	
Nicholas County Hospital	Carlisle	KY	Rural	May, 2014	
North Adams Regional Hospital	North Adams	MA	Urban	Mar. 2014	Pittsfield, MA MSA
Renaissance Hospital Terrell	Terrell	TX	Urban	Feb., 2014	DFW MSA
Sacred Heart Hospital	Chicago	IL	Urban	Jul., 2013	
Shelby Regional Medical Center	Center	TX	Rural	Jul., 2013	
Stewart-Webster Hospital	Richland	GA	Rural	Mar., 2014	
Tilden Community Hospital	Tilden	NE	Rural	Jun. 2014	
Vidant Pugno Hospital	Belhaven	NC	Rural	Apr., 2014	
W.O. Moss Regional Medical Center	Lake Charles	LA	Urban	Jun. 2013	

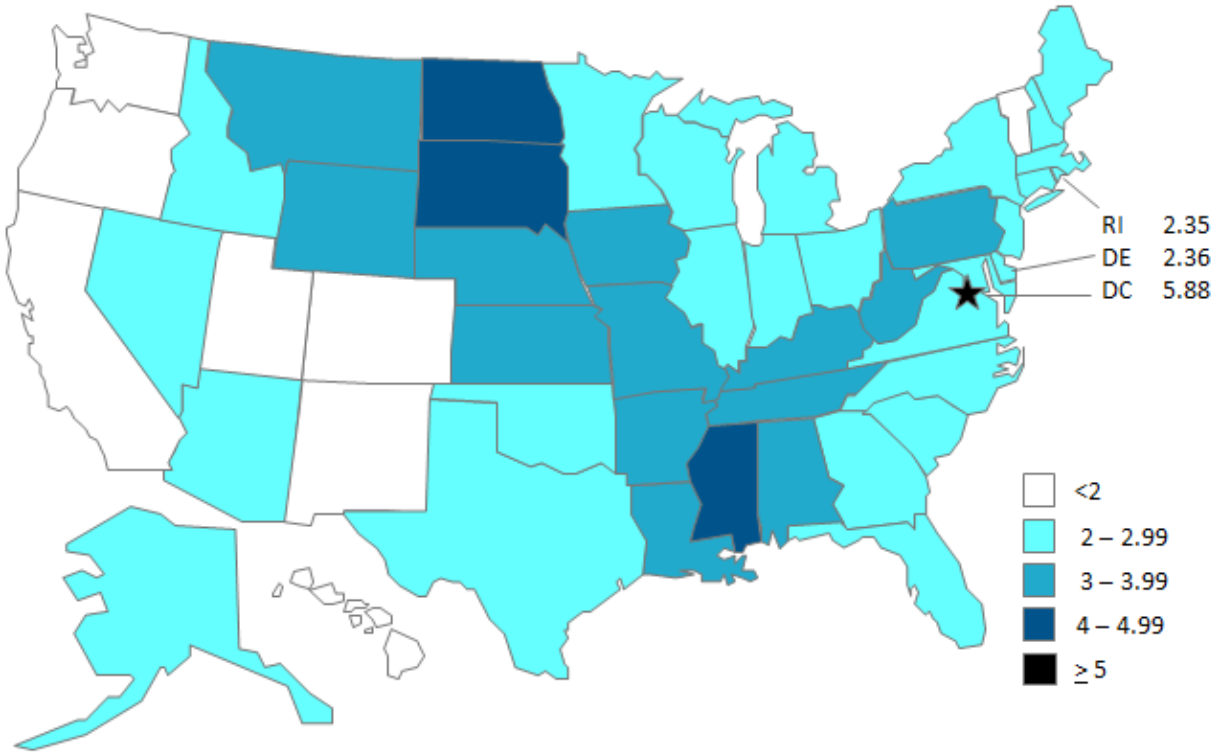
Sources: National Rural Health Association; Becker's Hospital Review

Number of Beds and Number of Beds per 1,000 Persons, 1991 - 2011



Source: Avalere Health analysis of American Hospital Association Annual Survey data, 2011, for community hospitals.

Beds per 1,000 Persons by State, 2011

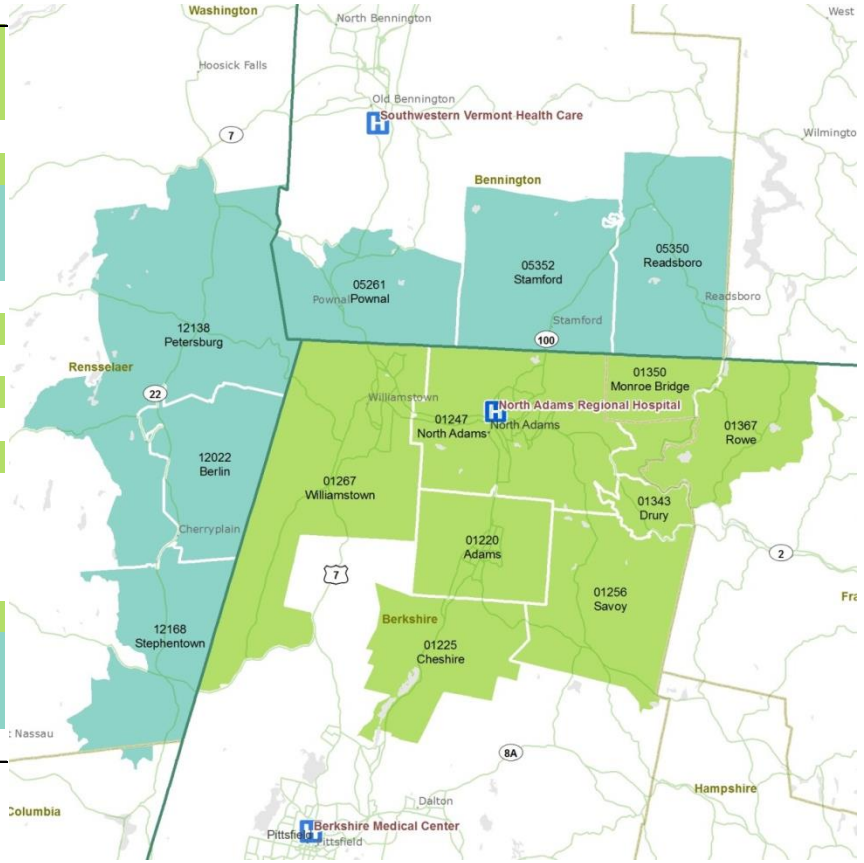


Source: Avalere Health analysis of American Hospital Association Annual Survey data, 2011, for community hospitals. US Census Bureau: National and State Population Estimates, July 1, 2011.
Link: http://www.census.gov/popest/data/state/totals/2011/index.html.

ZIP Code	Post Office Name	Cases	Percent	Cumulative	Market Share
01247	NORTH ADAMS	3,517	46.1%	46.1%	64.1%
01220	ADAMS	1,560	20.4%	66.5%	54.0%
01267	WILLIAMSTOWN	1,181	15.5%	82.0%	53.2%
01201	PITTSFIELD	385	5.0%		2.1%
01225	CHESHIRE	183	2.4%	84.4%	20.3%
05352	STAMFORD, VT	100	1.3%	85.7%	58.5%
05350	READSBORO, VT	79	1.0%	86.7%	28.2%
05261	POWNAL, VT	74	1.0%	87.7%	9.5%
05201	BENNINGTON	51	0.7%		0.9%
01256	SAVOY	40	0.5%	88.2%	32.3%
01237	LANESBORO	21	0.3%		2.9%
01350	MONROE BRIDGE	17	0.2%	88.5%	68.0%
01301	GREENFIELD	16	0.2%		0.3%
01367	ROWE	15	0.2%	88.7%	10.6%
01240	LENOX	14	0.2%		0.6%
01226	DALTON	11	0.1%		0.5%
01339	CHARLEMONT	11	0.1%		3.0%
05257	NORTH BENNINGTON	10	0.1%		1.4%
01343	DRURY	8	0.1%	88.8%	42.1%
12022	BERLIN, NY	6	0.1%	88.8%	1.8%
12168	STEPHENTOWN, NY	6	0.1%	88.9%	1.1%
12138	PETERSBURG, NY	5	0.1%	89.0%	0.7%
	All other ZIPs	322	4.2%		
Grand Total		**7,632**			

Source: CMS

Cases are for combined years 2008-2012



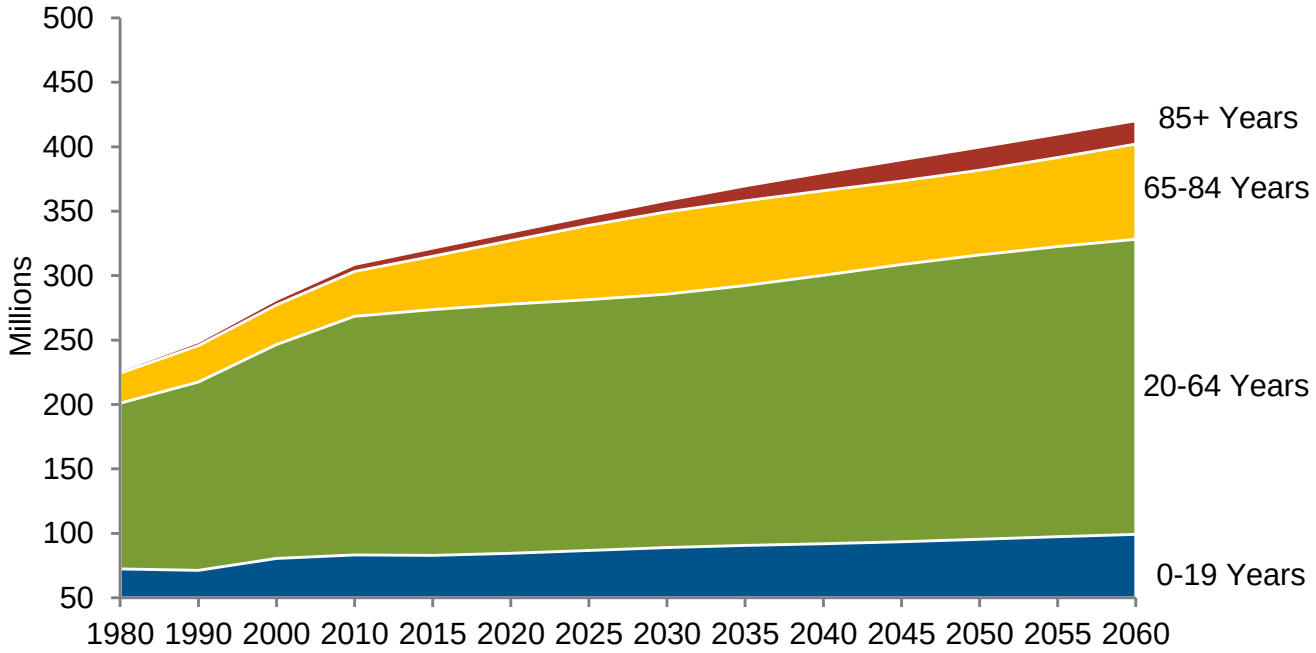
Service Area

Primary

Secondary

North County Service Area includes Massachusetts ZIP Codes where North Adams Regional Hospital (NARH) had at least 10% Medicare market share for the years 2008-2012. The Secondary Service Area includes Vermont and New York ZIP Codes where NARH had either notable market share and/or historically where defined as part of the service area. The selected ZIP Codes represent 89% of all Medicare cases seen at North Adams Regional between 2008-2012.

U.S. Population Trends and Projections by Age, 1980 – 2060(1)



Source: U.S. Department of Commerce, Bureau of the Census. *Projections of the Population by Age and Sex for the United States: 2010 - 2060.*

(1) Years 2015 through 2060 are projections.

Community Needs Assessment Survey

Source: NARH, Community Needs Assessment, September 2013

- *A total of 175 people participated in the survey. Data was collected within the North County region and included Adams, North Adams, Florida, Clarksburg, and Williamstown.*
    - *This work was performed by Kamal Shah, a UMass Medical student, under the direction of Polly Macpherson, MS, Director of REACH for Community Health*

- *The Resident/Consumer Group data was gathered from 91 respondents in the following locations:*
    - *Neighborhoods: Mohawk Forest, Brayton Hill, St. Joseph's Court*
    - *Community centers: Williamstown and Adams senior centers*
    - *Public places: Walmart*
    - *Survey link on the NARH Facebook page*
    - *"Clients" of community organizations providing services in health, wellness, and social support, including Berkshire North WIC, Childcare of the Berkshires (Healthy Families and Family Resource Center), Berkshire Food Project, Tapestry Health, NAMI*
    - *A small number of health advocates and health care providers may be included in this group*

- *The Provider/Health Advocate Group data was gathered from 84 respondents, including:*
    - *Physicians, nurses, and ancillary service providers*
    - *Other NARH staff*
    - *NBH corporators*
    - *Administrators, directors, and staff of other community organizations such as senior centers, youth centers, the Northern Berkshire Community Coalition, Berkshire North WIC, Childcare of the Berkshires, the Berkshire Food Project, Tapestry Health, NAMI, the Brien Center, and BFAIR*

- *Major Findings in the Resident/Consumer Group:*
    - *69.3% of respondents described their health as "good" or "very good"*
    - *89.9% of respondents reported going to the doctor both for checkups and acute problems*
    - *2.2% said that they never go to the doctor.*

Community Needs Assessment Survey (continued)

Source: NARH, Community Needs Assessment, September 2013

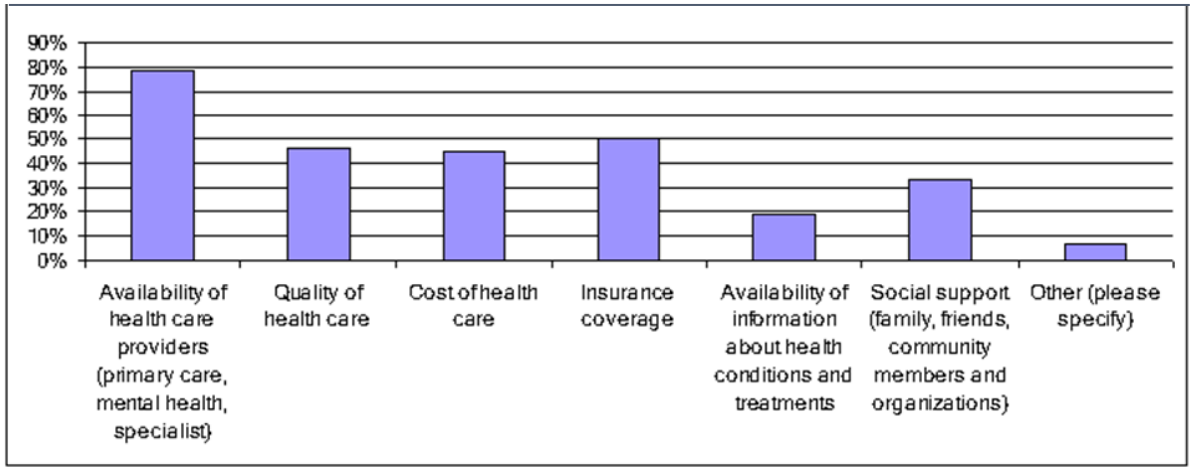
- *86.8% of respondents reported having a routine physical or checkup within the last year*
  - *However, only 54.5% reported having a routine dental checkup within the last 6 months.*
- *32.2% of respondents agreed that there are times when they cannot go to the doctor when they are sick or need a checkup. When asked why, 50% marked "need transportation." 17.9% marked "too expensive" and 21.4% marked "can't get an appointment."*
- *Alcohol and substance abuse, overweight and obesity, and mental health were the top 3 diseases and health risks reported as being most important in Northern Berkshire County.*
- *Availability of health care providers and insurance coverage were reported as the health care issues of most concern in Northern Berkshire County.*

- *ABOUT YOU (Residents/Consumer Group):*
  - *What are 1 or 2 things that you need in your community to improve your health and quality of life?*
    - *Responses to the question above were categorized based on the health need they addressed.*
    - *The needs most often discussed fell into the categories of health care access and nutrition and exercise.*
    - *A large number of respondents expressed a desire for increased availability of health care providers, with several noting the need for more primary care physicians and a few noting the need for specialists.*
    - *Several respondents also expressed the need for more affordable and accessible care, suggesting a walk-in clinic that provides free or reduced cost care.*
    - *In terms of preventative health, many people expressed a need for opportunities and support for maintaining a nutritious diet and active lifestyle.*
    - *Among the other health needs addressed were smoking cessation and smoke-free environments, affordable and accessible transportation, mental health support, and substance abuse counseling.*
    - *Several people also conveyed a desire for better listening and communication from health care providers.*
  - *What are 1 or 2 things that you need in your community to improve the health and quality of life of your children?*
    - *The most common responses focused on safe, healthy activities and nutrition and exercise.*
    - *Several respondents called for more outdoor activities and other recreational activities for children.*
    - *Others expressed a need for improved nutrition and more opportunities for exercise.*

Community Needs Assessment Survey (continued)

Source: NARH, Community Needs Assessment, September 2013

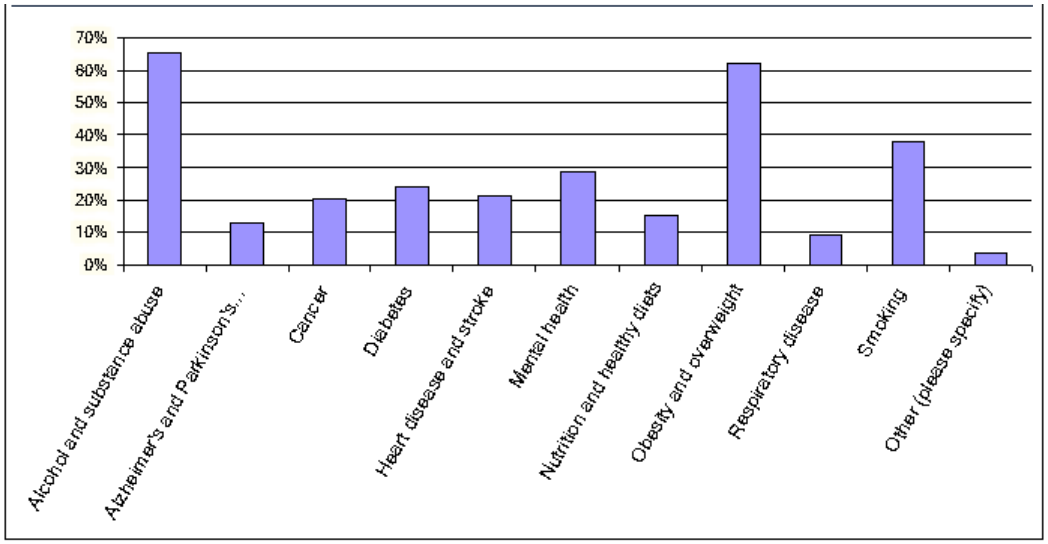
- *ABOUT YOUR COMMUNITY (Residents/Consumer Group):*
  - *Many factors contribute to the health and wellbeing of individuals and communities. The following revealed what most think about Northern Berkshire County.*



Community Needs Assessment Survey (continued)

Source: NARH, Community Needs Assessment, September 2013

- *ABOUT THE COMMUNITY (Provider/Health Advocate Group):*
  - *The following diseases and health risks affect a significant number of people in Northern Berkshire County. The following revealed what most think about Northern Berkshire County.*



Community Needs Assessment Survey (continued)

Source: NARH, Community Needs Assessment, September 2013

- *Berkshire County*
    - *The residents of Berkshire County are generally better educated in terms of high school educational attainment, when compared to the country as a whole, but lag behind (using Massachusetts as a benchmark) in the percentage of persons 25 yrs.+ who have attained a bachelor's degree or higher*
    - *Possible explanations include:*
        - *Lower economic capability of residents to attain higher education*
        - *Fewer young families*
        - *Outmigration of young adults once they have attained higher education*
    - *Degree of education attainment varies by regions in the county, with South county having a high level of education attainment compared to the county as a whole*

- *North County Service Area*
    - *For the North County towns, education achievement lags behind the County and State, according to MassChip data, as detailed in the chart below*
        - *Note that Williamstown, home of Williams College and heavily populated by its faculty and staff, skews the average with its high educational achievement scores*

Education	Adams	Clarksburg	Florida	N. Adams	Williamstown	5 town avg.	MA Statewide
% less than HS	22.60	19.90	19.60	26.80	11.20	20.02	15.20
% HS Grad	42.00	42.50	45.80	39.10	20.50	37.98	27.30
% Some College	19.80	22.40	19.60	20.10	14.80	19.34	24.30
% College Grad +	15.60	15.20	15.00	14.00	53.60	22.68	33.20

Community Needs Assessment Survey (continued)

Source: NARH, Community Needs Assessment, September 2013

- *North County Service Area*
  - *Using MassChip data, the households in the North County experience an average overall lower income level than the county as a whole, with the exception of Williamstown, where the % per capital income is $26,039*
    - *Higher per capital income primarily due in large part to the high number of Williamstown residents employed in faculty and upper administrative positions at Williams College*

Household Income	Adams	Clarksburg	Florida	N. Adams	Williamstown	5 town avg.	MA Statewide
Per capita	$18,572	$19,389	$16,979	$16,381	$26,039	$19,472	$25,952
% Household less than $10k	14.50	6.10	5.40	16.30	10.20	10.50	0.09
% Household greater than $50k	30.50	42.40	42.60	23.00	52.50	38.20	0.51

Community Needs Assessment Survey (continued)

Source: NARH, Community Needs Assessment, September 2013

- *Socio-Economic Vulnerability*
  - *Key Findings are:*
    - *The effects of socioeconomic status are substantial. They are not limited to the effects of poverty but occur at all levels. Premature death is more than twice as likely for middle income Americans as for those who are the best off, and more than three times as likely for those who live near or in poverty compared to the most privileged.*
    - *Throughout life, from birth onward, our access to socioeconomic resources affects our chances for living a healthy life. The conditions we live in during childhood affect our health throughout our lives.*
    - *Health care is important when we are ill but accounts for only a small portion of health disparities. More important are factors that determine if we fall ill in the first place.*
    - *Each step up the social ladder provides greater access to social and physical environments that enable individuals to engage in health-protective behaviors, (e.g., safe places to walk and access to healthier foods).*
    - *Conditions at work can contribute to health and health disparities. Jobs held by those lower on the ladder are more likely to involve shift work and physical hazards, low control over how and when tasks are done, job insecurity, and conflicts between family obligations and work requirements.*
    - *Exposure to extreme and prolonged stress ("toxic stress") is more common lower on the social ladder. Stressors that last a long time, like financial insecurity, interpersonal disputes, work-induced exhaustion, or chronic conflict are recorded in the body.*
    - *The biological consequences of exposure to stress are not transitory; they are cumulative. The normal functioning of the cardiovascular, immune, metabolic and nervous systems is disrupted. This disruption is made worse by poor health habits molded by social and physical environments lacking health-promoting alternatives.*

- *Morbidity and Mortality Rates*
  - *The top ten diseases (based upon percent of all causes) that the North County service area population is dying from:*
    - *cardiovascular (heart disease, major cardiovascular disease, myocardial infarction)*
    - *cancer (bladder, lung, pancreas, prostate)*
    - *respiratory (chronic lower respiratory disease CLRD, emphysema, pneumonia/influenza)*

Community Needs Assessment Survey (continued)

Source: NARH, Community Needs Assessment, September 2013

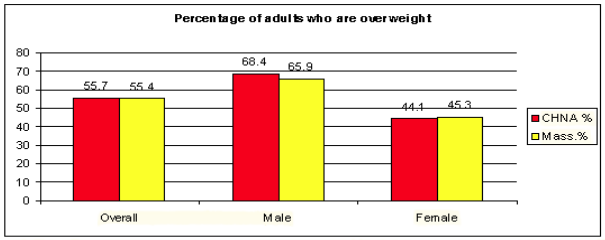
- *nervous system (Alzheimer's)*
- *genitourinary system (nephritis, renal failure)*
- *digestive system (chronic liver disease)*
- *injuries (work related)*
- *mental disorders, endocrine/metabolic (diabetes)*
- *Infectious (septicemia)*

Only three diseases/systems (cancer, injuries and mental disorders) have percentages that are lower than the state percentage. Those specific diseases listed within the parentheses all have higher percentages than the state.

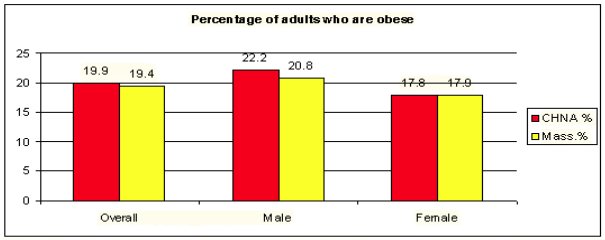
Chronic Illness

- *In The State of Aging and Health in America 2007, the CDC reported that three behaviors — smoking, poor diet, and a lack of physical activity — were the root causes of almost 35 percent of U.S. deaths in the year 2000 because these behaviors are risk factors for heart disease, cancer, stroke, and diabetes.*

- *Obesity*
  - *BRFSS respondents reported height and weight and the surveyors categorized them based on Body Mass Index.*
  - *All adults with a BMI between 25.0 and 29.9 were classified as being overweight.*
  - *Adults with a BMI of 30.0 or more were classified as obese.*
    - *For example, a person who is 5'6" tall would be considered overweight at 155 pounds and obese at 186 pounds.*
  - *This overweight chart includes all adults classified as overweight OR obese.*



The rate of males in the Berkshires being overweight is 4% more than the state rate and the rate for 18-34 year-olds is 11% higher than for Massachusetts.



While the obesity rates appear to be similar to the state rate, the 18-34 population in the Berkshires rate is 36% above the Mass. rate.

Community Needs Assessment Survey (continued)

Source: NARH, Community Needs Assessment, September 2013

- *Cancer*
  - *Although cancer is the second leading cause of death for the North County service area, the percentage of all cancer deaths is less than the state. However, bladder, lung, pancreas and prostate rates are higher than the state.*
  - *Priority Cancers*

    The chart (below) from the National Cancer Institute tells us that, for Berkshire County compared to Massachusetts, there is one priority 1 cancer and two priority 2 cancers

Death Rate/Trend Comparison by State/County, death years through 2005
Berkshire County, Massachusetts versus Massachusetts

All Races, Both Sexes

	Above State Rate	Similar to State Rate	Below State Rate
Rising Trend	Priority 1: rising ↑ and above ↑ Pancreas (Males)	Priority 2: rising ↑ and similar = Lung & Bronchus (Females) Non-Hodgkin Lymphoma (Females)	Priority 3: rising ↑ and below ↓ [none]
Stable Trend	Priority 4: stable → and above ↑ [none]	Priority 6: stable → and similar = Bladder (Males) Esophagus (Males) Kidney & Renal Pelvis (Males) Leukemia (Females) Leukemia (Males) Non-Hodgkin Lymphoma (Males) Ovary (Females) Pancreas (Females) Prostate (Males) Uterus (Females)	Priority 7: stable → and below ↓ [none]
Falling Trend	Priority 5: falling ↓ and above ↑ [none]	Priority 8: falling ↓ and similar = Breast (Females) Colon & Rectum (Females) Colon & Rectum (Males) Lung & Bronchus (Males)	Priority 9: falling ↓ and below ↓ [none]

Created by statecancerprofiles.cancer.gov on 09/03/2009 1:33 pm.

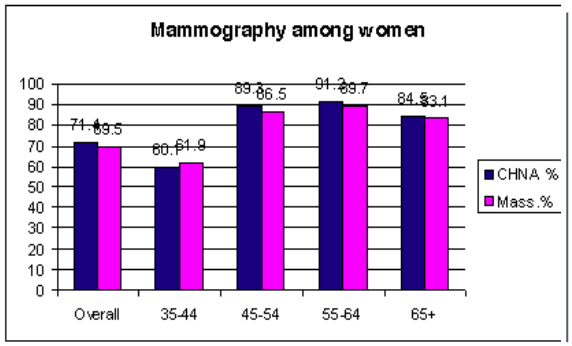
Trend[2]
- Rising ↑ when 95% confidence interval of annual percent change is above 0.
- Stable → when 95% confidence interval of annual percent change includes 0.
- Falling ↓ when 95% confidence interval of annual percent change is below 0.

Rate Comparison
- Above ↑ when 95% confident the rate is above and Rate Ratio[3] > 1.10
- Similar = when unable to conclude above or below with confidence.
- Below ↓ when 95% confident the rate is below and Rate Ratio[3] < 0.90

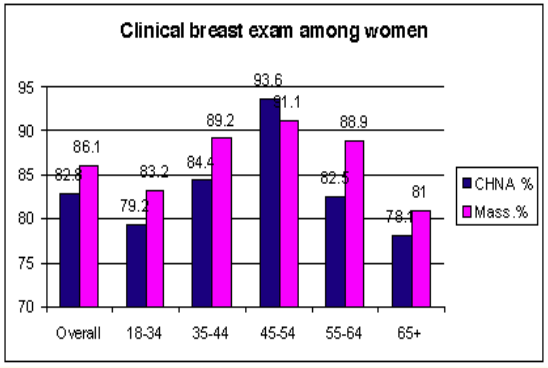
Community Needs Assessment Survey (continued)

Source: NARH, Community Needs Assessment, September 2013

- *Compliance with Cancer Screenings*
  - *The chart below shows that, except for the 35–44 age group, Berkshires women have higher mammography rates than the state.*



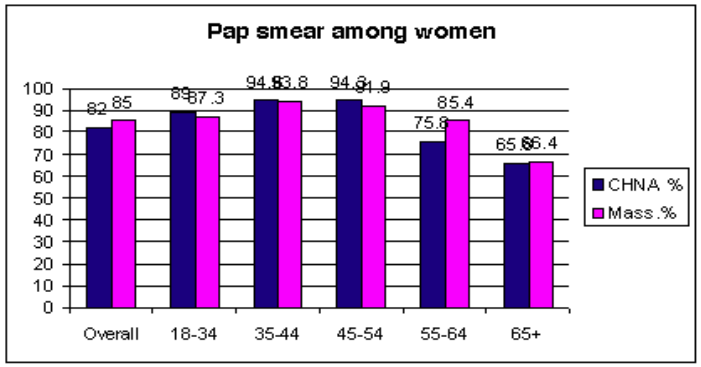
- *In all but the 45–54 age group, the rate for women in the Berkshires is below the Massachusetts rate.*



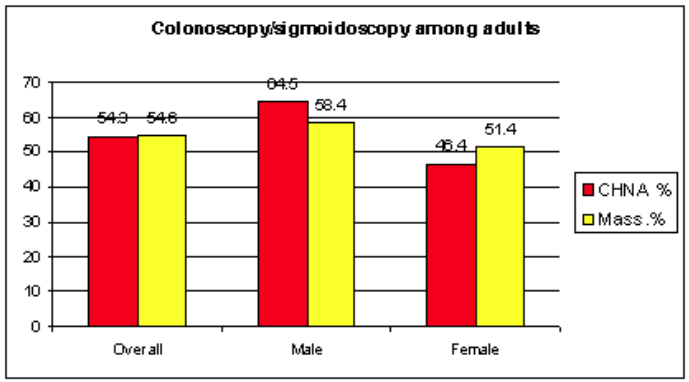
Community Needs Assessment Survey (continued)

Source: NARH, Community Needs Assessment, September 2013

- *Compliance with Cancer Screenings*
  - *The Healthy People 2010 goal is that 97% of women 18 and older have a Pap test.*
  - *The chart below shows that no age groups in the Berkshires or Massachusetts have achieved that goal.*



- *The chart below indicates males in the Berkshire Community Health Network Area are more likely than Massachusetts residents to have ever had Colonoscopy/sigmoidoscopy test, while the rate of females being screened was 10% less than the state rate.*



Community Needs Assessment Survey (continued)

Source: NARH, Community Needs Assessment, September 2013

- *Respiratory*
  - *Respiratory diseases are the third leading cause of death in the North County service area and exceeds the state's percentage rate in overall respiratory disease as does chronic lower respiratory disease, emphysema and pneumonia/influenza.*
  - *Respiratory diseases are the fourth leading cause related to hospital discharges, which also exceeds the state's percentage rate as does bacterial pneumonia, chronic bronchitis, chronic obstructive pulmonary disease, and pneumonia/influenza.*
  - *Given the strong connection between smoking and respiratory disease, this chart is repeated from the Cardiovascular Fact Sheet.*
    - *The table below provides additional detail about the smoking population in the Berkshires.*
    - *Note that only the 55-64 age group has a smoking rate lower than the state's.*

Current smokers among adults	CHNA %	Mass.%	Difference	% difference
18-34	28.5	23.4	5.1	21.79%
35-44	22.1	19.6	2.5	12.76%
45-54	24.1	19.4	4.7	24.23%
55-64	15.1	16.3	-1.2	-7.36%
65+	11.2	8.1	3.1	38.27%
high school or less	25.6	27	-1.4	-5.19%
some college	24	21.5	2.5	11.63%
college or more	10.9	9.5	1.4	14.74%
< $50k	25.9	24.4	1.5	6.15%
$50k+	17.2	13.6	3.6	26.47%

- *Diabetes, Digestive and Kidney Disease*
  - *Rates of people told they had diabetes were higher in the Berkshires Community Health Network Area than for the state of Massachusetts.*
  - *The rate among people age 18–34 in the Berkshires is 150% higher than that for Massachusetts; for people 35–54, it is 35% higher in the Berkshires.*

Community Needs Assessment Survey (continued)

Source: NARH, Community Needs Assessment, September 2013

- *Mental Health and Substance Abuse*
  - *Mental health disorders are the seventh leading cause of death for the North County service area but are less than the state's percentage rate for overall cause of death.*
  - *Mental health disorders and alcohol abuse are the second and eight leading causes related to hospital discharges for the North County service area.*
  - *Both mental health and alcohol abuse exceed the state's percentage rate for hospital discharges.*
  - *In the Berkshires Community Health Network Area, the rate of people ages 35-54 who reported more than 15 days of poor mental health exceeded the state rate by 62%.*
  - *Outpatient care availability lags behind demand.*
    - *Currently, in 2013, there is a 7 to 10 week waiting period for new patients or patients needing medication monitoring.*
    - *Efforts are underway, in collaboration with the Brien Center, to increase the outpatient services and to provide skilled support for those emergency department patients presenting with co-morbidities related to behavioral health.*

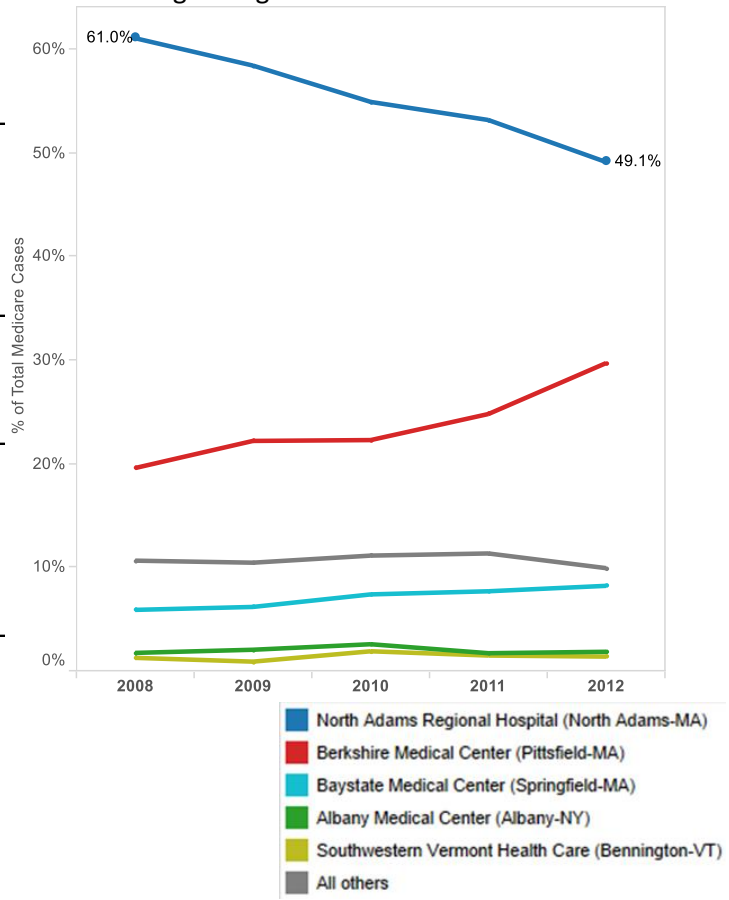
Medicare Market Share Trends – North County

When looking at Medicare market share in the North County, NARH's market share declined from 61.0% in 2008 to 49.1% in 2012. An increasing number of North County cases went to Berkshire Medical Center over this time with market share growing from 19.6% to 29.7%.

	Cases				
Facility Name	**2008**	**2009**	**2010**	**2011**	**2012**
North Adams Regional Hospital (North Adams-MA)	1,529	1,272	1,290	1,165	1,265
Berkshire Medical Center (Pittsfield-MA)	490	483	523	543	765
Baystate Medical Center (Springfield-MA)	147	134	173	168	211
Southwestern Vermont Health Care (Bennington-VT)	31	19	44	32	35
Albany Medical Center (Albany-NY)	43	44	60	37	47
All others	266	227	261	248	255
Grand Total	2,506	2,179	2,351	2,193	2,578

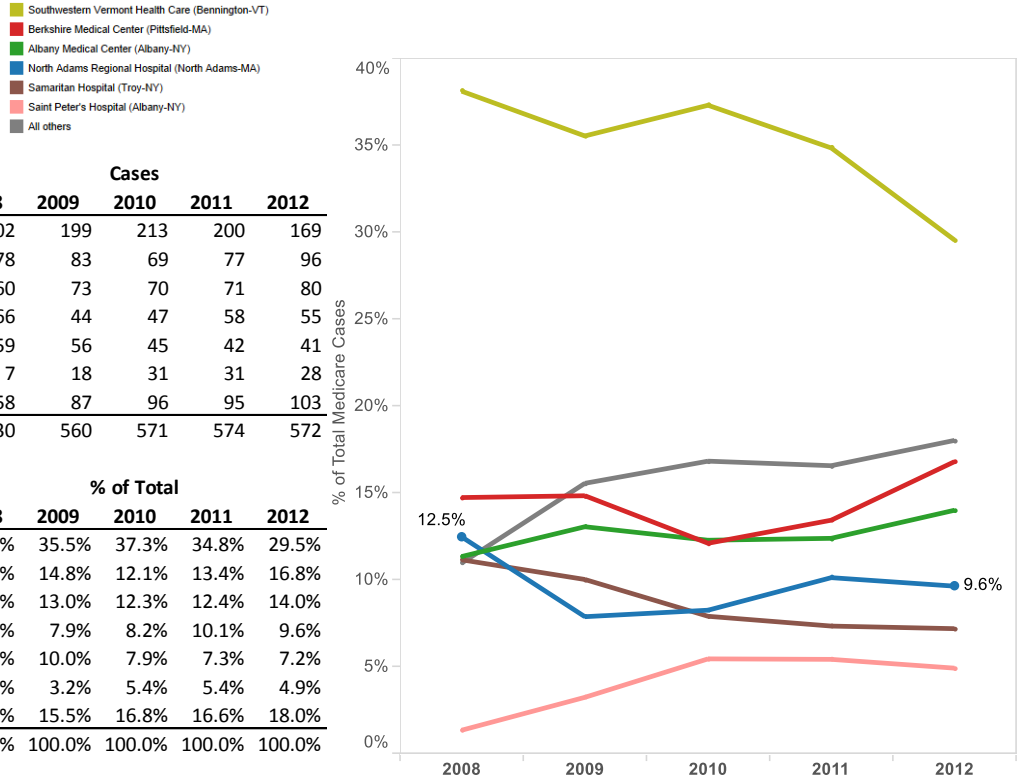
	% of Total				
Facility Name	**2008**	**2009**	**2010**	**2011**	**2012**
North Adams Regional Hospital (North Adams-MA)	61.0%	58.4%	54.9%	53.1%	49.1%
Berkshire Medical Center (Pittsfield-MA)	19.6%	22.2%	22.2%	24.8%	29.7%
Baystate Medical Center (Springfield-MA)	5.9%	6.1%	7.4%	7.7%	8.2%
Southwestern Vermont Health Care (Bennington-VT)	1.2%	0.9%	1.9%	1.5%	1.4%
Albany Medical Center (Albany-NY)	1.7%	2.0%	2.6%	1.7%	1.8%
All others	10.6%	10.4%	11.1%	11.3%	9.9%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%

Source: CMS



Medicare Market Share Trends – Secondary Areas

Medicare market share in the secondary service area for NARH also declined in secondary areas, from 12.5% in 2008 to 9.6% in 2012. Southwestern Vermont lost market share as well, with Berkshire Medical Center and Albany Medical Center gaining share.



Cases

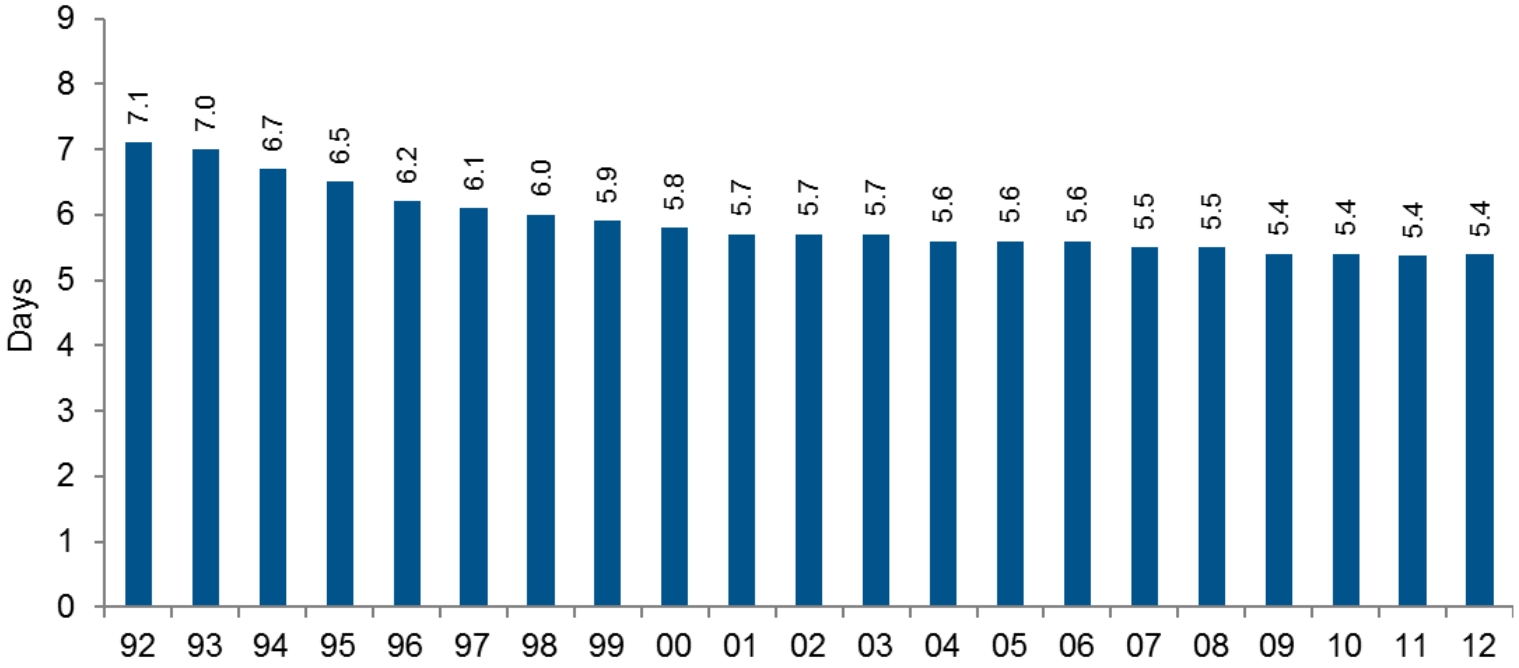
Facility Name	2008	2009	2010	2011	2012
Southwestern Vermont Health Care (Bennington-VT)	202	199	213	200	169
Berkshire Medical Center (Pittsfield-MA)	78	83	69	77	96
Albany Medical Center (Albany-NY)	60	73	70	71	80
North Adams Regional Hospital (North Adams-MA)	66	44	47	58	55
Samaritan Hospital (Troy-NY)	59	56	45	42	41
Saint Peter's Hospital (Albany-NY)	7	18	31	31	28
All others	58	87	96	95	103
Grand Total	530	560	571	574	572

% of Total

Facility Name	2008	2009	2010	2011	2012
Southwestern Vermont Health Care (Bennington-VT)	38.1%	35.5%	37.3%	34.8%	29.5%
Berkshire Medical Center (Pittsfield-MA)	14.7%	14.8%	12.1%	13.4%	16.8%
Albany Medical Center (Albany-NY)	11.3%	13.0%	12.3%	12.4%	14.0%
North Adams Regional Hospital (North Adams-MA)	12.5%	7.9%	8.2%	10.1%	9.6%
Samaritan Hospital (Troy-NY)	11.1%	10.0%	7.9%	7.3%	7.2%
Saint Peter's Hospital (Albany-NY)	1.3%	3.2%	5.4%	5.4%	4.9%
All others	10.9%	15.5%	16.8%	16.6%	18.0%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%

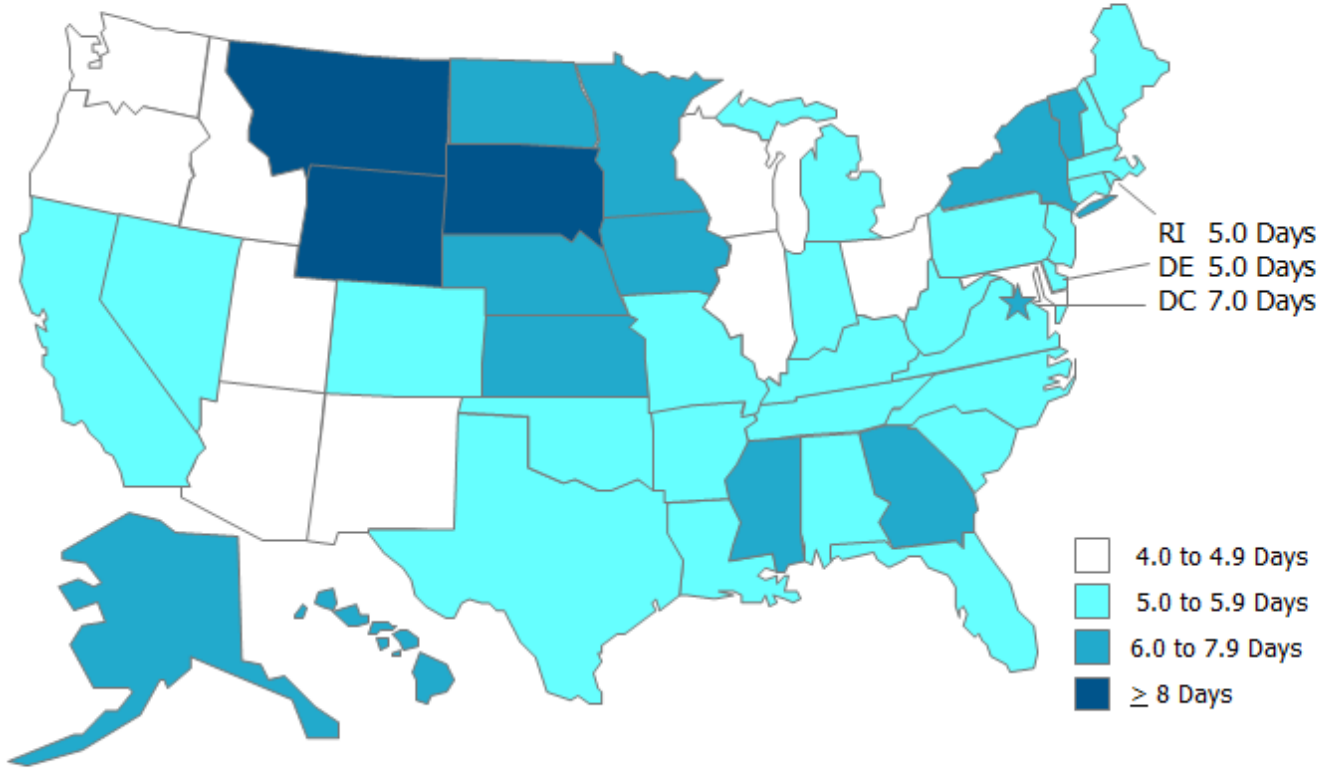
Source: CMS

Average Length of Stay in Community Hospitals, 1992 – 2012



Source: Avalere Health analysis of American Hospital Association Annual Survey data, 2012, for community hospitals.

Average Length of Stay in Community Hospitals by State, 2012



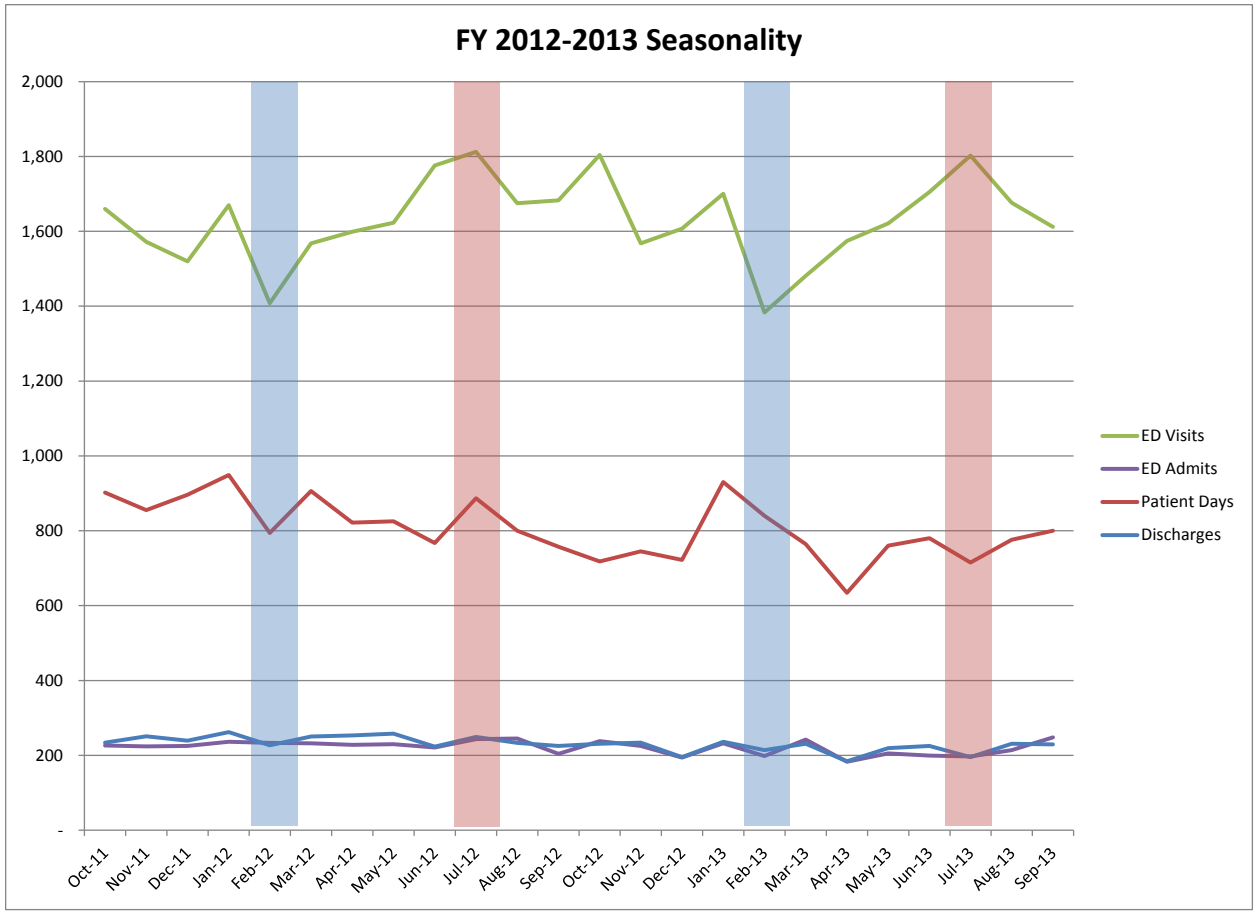
Source: Avalere Health analysis of American Hospital Association Annual Survey data, 2012, for community hospitals.

Average Length of Stay in Community Hospitals by State, 2011 and 2012

State	Average Length of Stay		State	Average Length of Stay	
	11	12		11	12
Alabama	5.2	5.0	Montana	8.7	8.7
Alaska	6.2	6.1	Nebraska	6.5	6.9
Arizona	4.4	4.4	Nevada	5.4	5.2
Arkansas	5.2	5.2	New Hampshire	5.2	5.2
California	5.0	5.1	New Jersey	5.1	5.1
Colorado	5.0	5.1	New Mexico	4.9	4.8
Connecticut	5.2	5.4	New York	6.8	6.9
Delaware	5.8	5.0	North Carolina	5.6	5.6
District of Columbia	7.3	7.0	North Dakota	7.5	7.8
Florida	4.9	5.0	Ohio	4.9	4.9
Georgia	6.4	6.3	Oklahoma	5.3	5.3
Hawaii	6.9	6.8	Oregon	4.3	4.2
Idaho	4.7	4.9	Pennsylvania	5.5	5.5
Illinois	4.9	4.8	Rhode Island	5.1	5.0
Indiana	5.0	5.1	South Carolina	5.7	5.7
Iowa	6.0	6.0	South Dakota	9.4	8.9
Kansas	6.4	6.5	Tennessee	5.5	5.5
Kentucky	5.1	5.1	Texas	5.2	5.2
Louisiana	5.4	5.4	Utah	4.2	4.1
Maine	5.6	5.5	Vermont	6.3	6.3
Maryland	4.6	4.9	Virginia	5.6	5.7
Massachusetts	5.0	5.1	Washington	4.5	4.6
Michigan	5.2	5.1	West Virginia	5.8	5.7
Minnesota	6.0	6.0	Wisconsin	5.0	4.9
Mississippi	6.4	6.5	Wyoming	8.3	8.5
Missouri	5.1	5.2			

Source: Avalere Health analysis of American Hospital Association Annual Survey data, 2012, for community hospitals.
Data for Chart 3.6

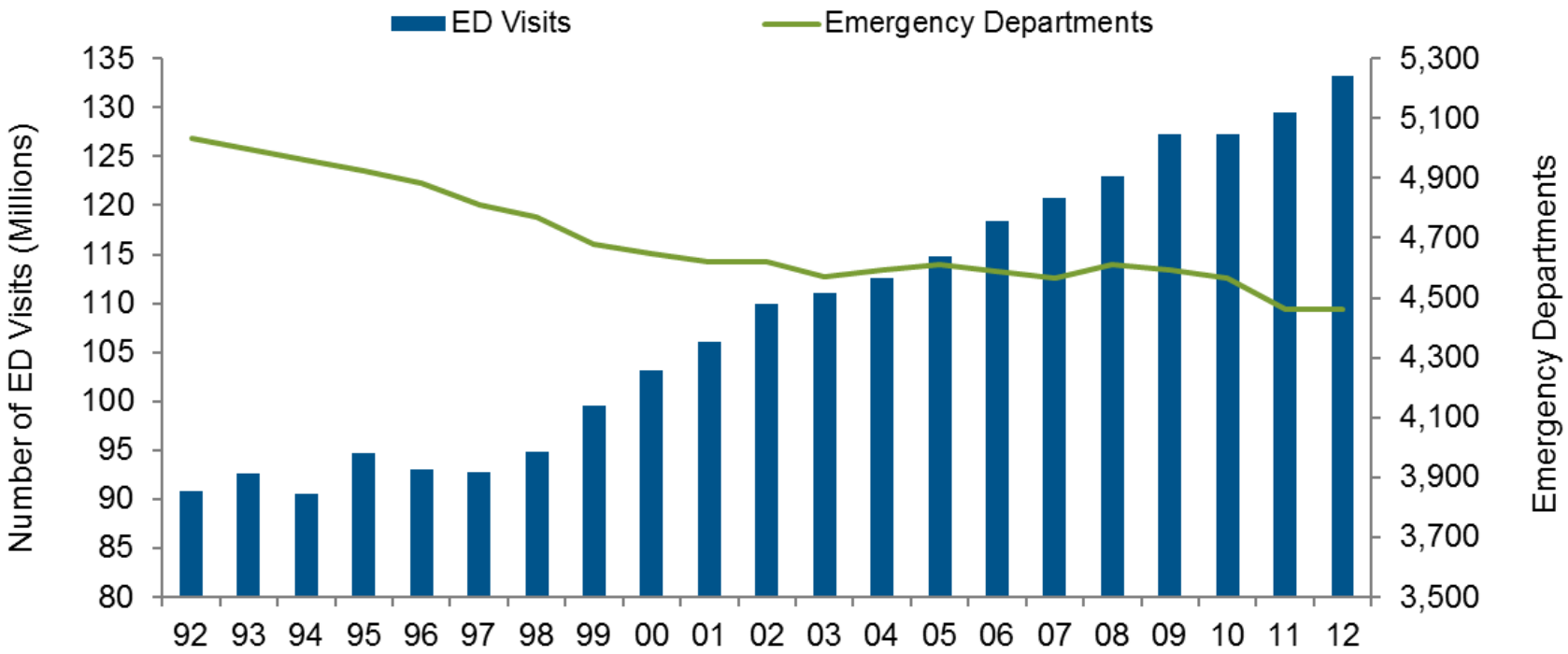
Seasonality of ED Visits and Admissions



Source: NARH Summary Volume.

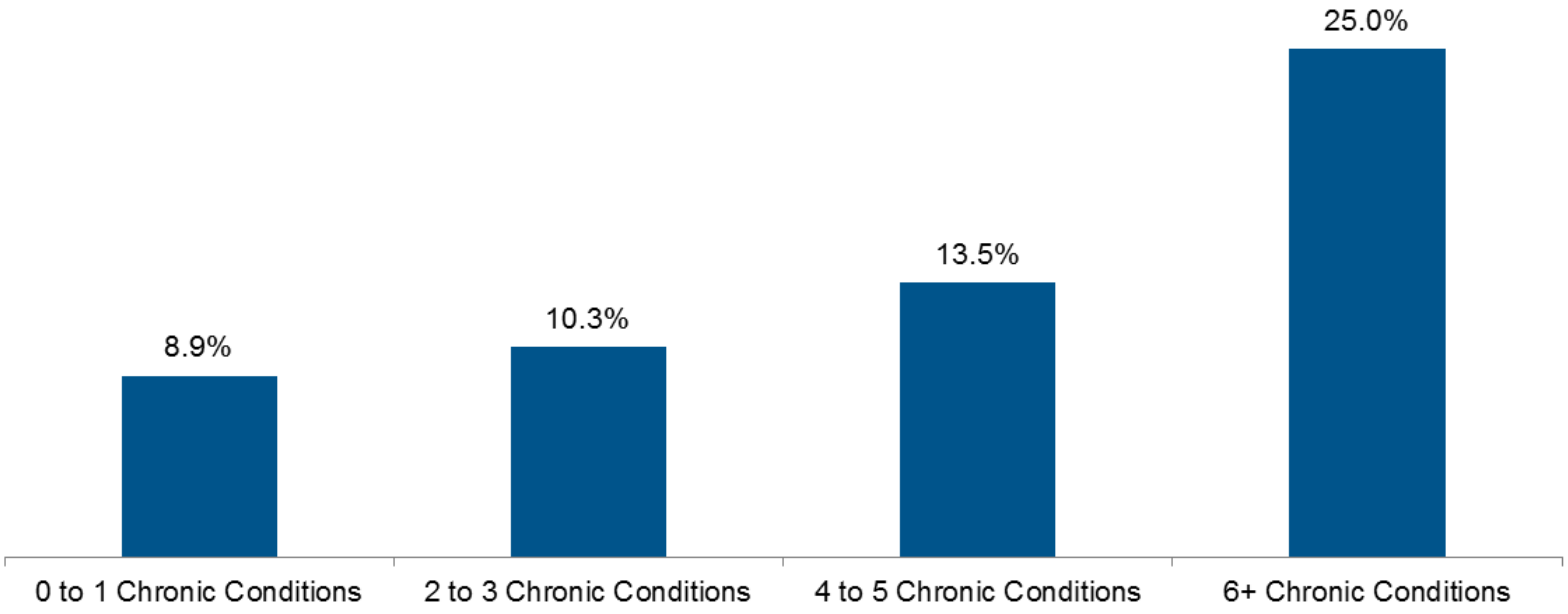
Inpatient discharges have minimal seasonality. Emergency visits do appear to be seasonally influenced, with July and the October foliage seasons representing the peak periods in both 2012 and 2013, with a significant drop-off during February.

Emergency Department Visits and Emergency Departments (1) in Community Hospitals, 1992 - 2012



(1) Source: Avalere Health analysis of American Hospital Association Annual Survey data, 2012, for community hospitals. Defined as hospitals reporting ED visits in the AHA Annual Survey.

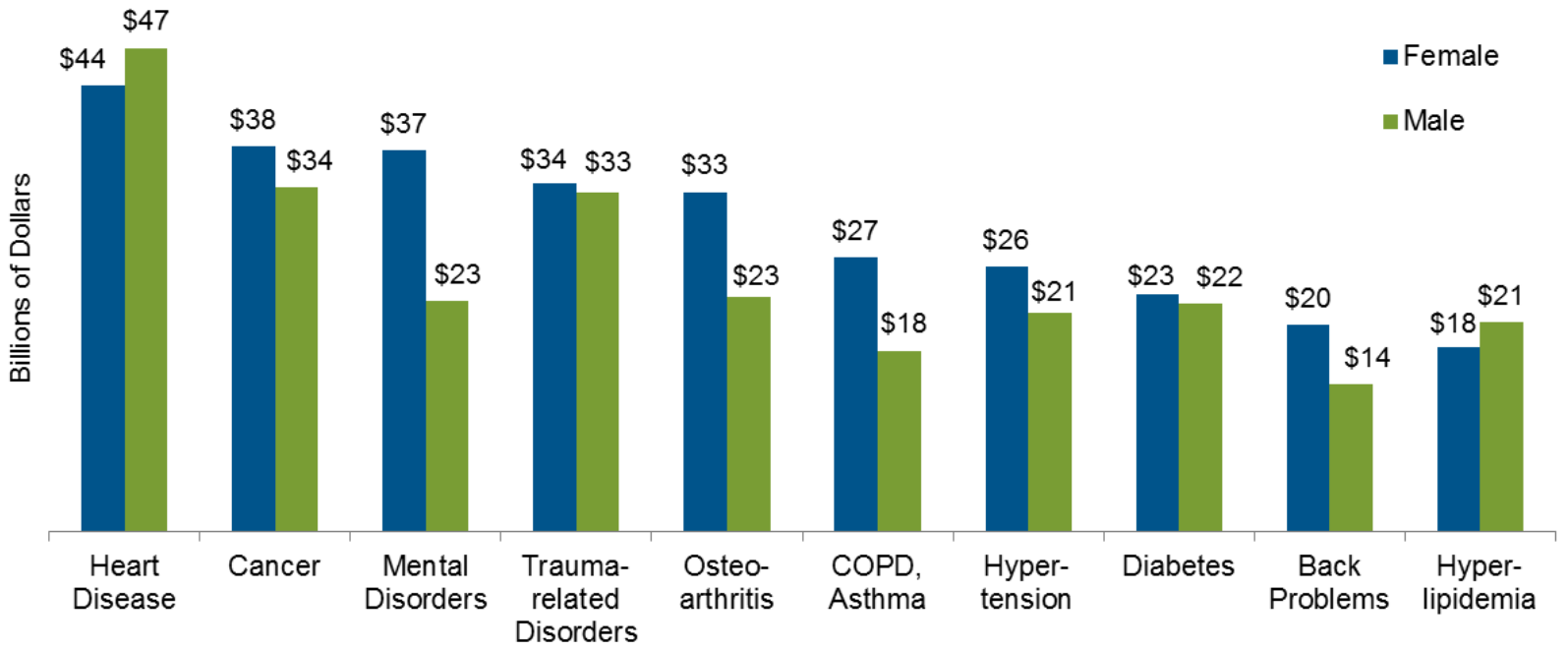
30-Day Readmission Rate for Medicare Fee-for-Service Beneficiaries by Number of Chronic Conditions (1) 2011



Source: Centers for Medicare & Medicaid Services. Medicare Chronic Condition Dashboard. Data released March 28, 2013. Available at: https://www.ccwdata.org/web/guest/interactive-data/chronic-conditions-dashboard.

(1) Includes 15 CMS identified chronic conditions.

Total Expenditures on Top 10 Most Costly Conditions Among Adults by Sex, 2008



Source: American Hospital Association

Local Primary Care Physicians

Name	Specialty	Area FTE
Han, Anping	GP	1
Payne, Stephen	GP	1
Sills, Robert	GP	0.9
Cherry, Steven	IM	1
Cheung, Chi	IM	1
Joslin, Allen	IM	1
Kaegi, Thomas Paul	IM	1
Karrel, Douglas	IM	1
King, Mary	IM	1
Madden, Marian	IM	1
Miller, Patti	IM	1
O'Neill, Douglas	IM	1
Peterson, James	IM	1
Rudin, Benjamin	IM	1
Soe, Thet	IM	1
Wilson, Michael	IM	1

Name	Specialty	Area FTE
Wiseman, Richard	IM	1
Lamontagne, Kristin	IM	0.65
Polifka, Michael	IM	0.3
Stuebner, Erwin	IM	0.25
Salameh, Mohammad	IM	0.05
Lister, Joan	OBG	1
O'Neill, Charles	OBG	1
Yates, Susan	OBG	1
McDermott, Marc	PD	1
Hyde, Thomas	PD	0.925
Griffin, Amy	PD	0.9
Art, Childs	PD	0.8
Wiseman, Kathryn	PD	0.75
Gerrity, Michael	PD	0.55
Sussman, Michael	PD	0.5

Source: Massachusetts Department of Public Health

Community Paramedicine – Potential Adjunct to Primary Care

Community Paramedicine (CP) may be an effective way to supplement a vulnerable population's access to primary care. CP is the provision of outreach to patients at risk for using the emergency medical or in-patient healthcare system for primary care services. CP can increase value and save money by reducing readmissions, unnecessary ambulance rides, and ED trips, and can improve patients' health and experience while allowing them to stay in their community. Examples of CP include using expanded scope of services in rural areas when primary care resources may be hours away; helping frequent users of the emergency care system find primary care resources; and assisting patients at risk for costly hospital readmissions. Implemented effectively, CP can increase value and save money by reducing readmissions, unnecessary ambulance rides, and ED trips. (Source: What Community Paramedicine is and why it's the future of our profession by Matt Zavadsky).

Community Paramedicine (CP) – Case Study

CP Model	Results	Regulations in MA
•Organized system of services, based on local need, provided by emergency medical technicians and paramedics •Integrated into the local or regional health care system and overseen by emergency and primary care physicians •Community care paramedics (CCPs) collaborate with the patient's physician to create and deliver care without transporting to the hospital. •This care model is patient centered, by accessing the patient's medical records to having advanced assessments being performed with lab tests read in their home, technology will meet home care. •The CCPs will also be able to identify any risks missed when transporting to the hospital, like fall hazards and medication non-compliance.	•EasCare's parent company, Medavie, has been internationally recognized as one of the pioneers in this industry, and their work has been documented in academic journals in which the data show clear cost savings and significant improvements in clinical outcomes. •Medavie ran a similar pilot program in Nova Scotia that resulted in a 70% decrease in skilled-nursing facility patients being transported to an emergency room. •Through another rural community paramedic program, there was a 23% reduction in visits to the local emergency room through the provision of home based non-emergency primary care.	•Massachusetts does not have the appropriate state EMS regulations for a CP model currently •State EMS leaders are working with communities to review and approve EMS providing a CP model of services locally under a pilot program if approved by the State EMS office through a wavier process

Asset-Based Community Development

Asset-based community development is an approach for engaging diverse stakeholders around the positive elements of community. Its approach is based on the following principles and practices:

Principles: people-centered, asset-based, locally focused, grassroots

Practices: Identification of different types of local assets (mapping) and organizing stakeholders to leverage assets to address local issues (mobilization)

The practice emphasizes six types of assets that are present in some form in every community, no matter how disadvantaged or disinvested it may appear to be.

Stakeholders:

1. Individuals: the talents and skills of local people.
2. Associations: local informal groups and the network of relationships they represent.
3. Institutions: agencies, professional entities and the resources they hold.

Context:

4. Infrastructure and physical assets: land, property, buildings, equipment.
5. Economic assets: the productive work of individuals, consumer spending power, the local economy, local business assets.
6. Cultural assets: the traditions and ways of knowing and doing of the groups living in the community.

Because asset-based community development is a placed-based and resident-driven, there is no single method or model for practicing this approach. Instead, every community designs and implements its work based on the vision it develops for a healthier future and the assets it identifies as available for mobilizing to action.

Source and for additional information: Asset-Based Community Development Institute (www.abcdinstitute.org)

Summary of Financials

BMC North - Inpatient Acute Medical Care Costs

	Projected Startup Costs	Notes
Staffing Costs		
Direct Med/Surg Staffing Costs	$2,327,000	Staffing at 12 NHPPD; $35/hour wages
Benefits Costs on Staffing	652,000	Benefits totaling 28% of total staffing expense
Hospitalist Costs	1,270,000	$145 per hour for 24X7X365
	$4,249,000	
Additions to Overhead		
Nursing Administration	$224,000	Note: 35% of hx NARH costs
Pharmacy	260,000	Note: 50% of hx NARH costs
Dietary	327,000	Note: 50% of hx NARH costs
	$811,000	
Variable Costs/Day	$250	Assumed variable costs for ancillaries
Total Days	5,475	Assumed ADC of 15
Total Variable Costs	$1,369,000	
Estimated BMC Staffing & Variable Costs	$4,348,000	
Estimated BMC North Acute Care Costs	6,429,000	
Difference (Increased Costs)	$(2,081,000)	

Source: Stroudwater analysis.

BMC North - Inpatient Acute Medical Care Costs – Projected Future Costs

	5 Year Projection	
Staffing Costs		
Direct Med/Surg Staffing Costs	$2,764,000	Maintain staffing levels; expense increase of 3.5% annually
Benefits Costs on Staffing	774,000	Maintain 28% of staffing costs
Hospitalist Costs	1,508,000	Increase of 3.5% annually
	$5,046,000	
Additions to Overhead		
Nursing Administration	$266,000	Increase of 3.5% annually
Pharmacy	309,000	Increase of 3.5% annually
Dietary	388,000	Increase of 3.5% annually
	$963,000	
Variable Costs/Day	$297	Increase of 3.5% annually
Total Days	4,106	Assumed ADC of 11.25; decreased use rates
Total Variable Costs	$1,220,000	
Estimated BMC Staffing & Variable Costs	$4,758,000	
Estimated BMC North Acute Care Costs	7,229,000	
Difference (Increased Costs)	$(2,471,000)	

Source: Stroudwater analysis.

BMC North - OB Model – Projected current costs

	Projected Startup Costs	Notes
Staffing Costs		
Direct Med/Surg Staffing Costs	$1,238,000	Fixed staffing; 17 FTE @ $37/hr
Benefits Costs on Staffing	347,000	28% of total staffing expense
OB Recruitment and Coverage Costs	650,000	Minimum of two recruits, plus one existing
Anesthesia Call	715,000	14 hrs per day of call at $35/hour call
On-Call OR costs	204,000	14 hrs per day of call at $10/hour; 4 OR staff
	$3,154,000	
Additions to Overhead		
Nursing Administration	$106,000	
Variable Costs/Day	$250	Assumed variable costs for ancillaries
Total Days	730	Assumed ADC of 2
Total Variable Costs	$183,000	
BMC Variable Costs	$183,000	No incremental staffing at BMC for OB reported
Total BMC North Costs	3,443,000	
Difference (Increased Costs)	$(3,260,000)	

Source: Stroudwater analysis.

BMC North - OB Model – Projected future costs

	5 Year Projection	
Staffing Costs		
		Maintain staffing levels; expense increase of 3.5%
Direct Med/Surg Staffing Costs	$1,470,000	annually
Benefits Costs on Staffing	412,000	Maintain 28% of staffing costs
OB Recruitment and Coverage Costs	772,000	Increase of 3.5% annually
	849,000	
On-Call OR costs	242,000	Increase of 3.5% annually
	$3,745,000	
Additions to Overhead		
Nursing Administration	$126,000	
Variable Costs/Day	$297	Increase of 3.5% annually
Total Days	730	Assumed ADC of 3.3
Total Variable Costs	$217,000	
BMC Variable Costs	$217,000	
Total BMC North Costs	4,088,000	
Difference (Increased Costs)	$(3,871,000)	

Source: Stroudwater analysis.

North County Discharges (Truven) – All Medicine Excl. OB, Neonatal, Psych, Drug Abuse

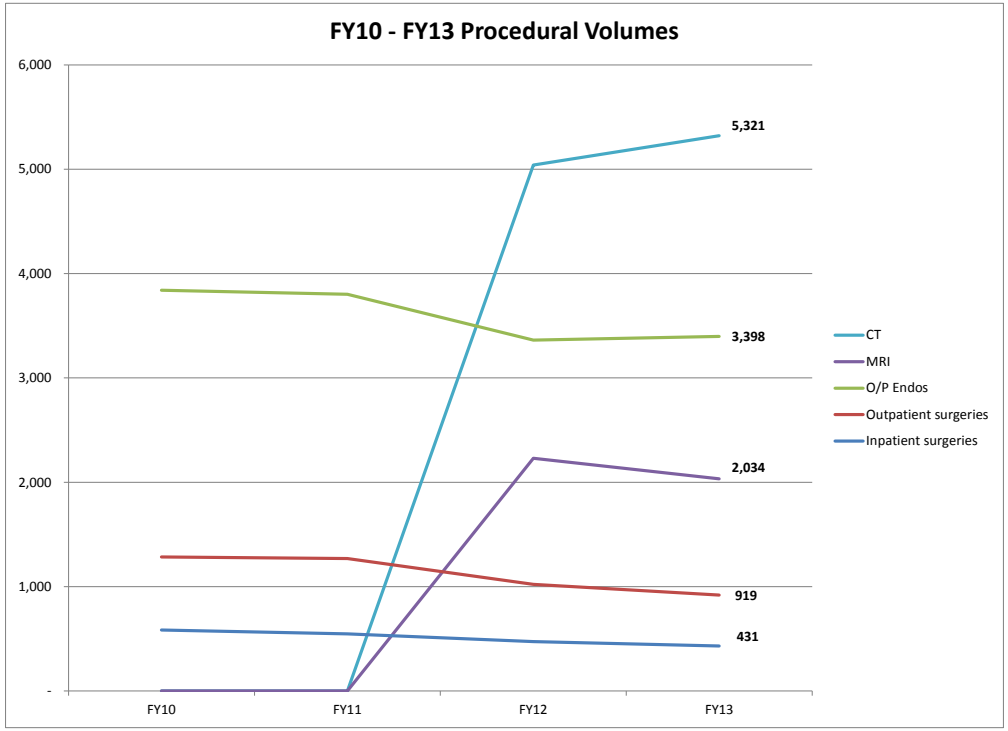
DRG major service	DRG weight	DRG service line	% of Total Medical Discharges (excl. OB, Normal Newborn, Neo, Psych, Drug Abuse) 2008	2009	2010	2011	2012 annualized	Discharges 2008	2009	2010	2011	2012 annualized
MEDICINE	< 1.8	Cardiology	20.30%	17.89%	19.70%	16.92%	14.41%	329	226	253	210	203
		Dermatology	2.59%	2.93%	2.80%	3.14%	3.79%	42	37	36	39	53
		Endocrine	3.82%	4.20%	2.96%	3.46%	4.27%	62	53	38	43	60
		Gastroenterology	14.25%	15.76%	15.81%	15.55%	14.98%	231	199	203	193	211
		General Medicine	12.09%	4.83%	7.40%	11.44%	9.76%	196	61	95	142	137
		General Surgery		0.16%		0.08%	0.09%		2		1	1
		Hematology	1.73%	2.38%	2.26%	2.01%	2.65%	28	30	29	25	37
		Nephrology	4.26%	4.91%	3.50%	3.71%	3.98%	69	62	45	46	56
		Neurology	5.18%	4.04%	5.76%	4.59%	5.59%	84	51	74	57	79
		Neurosurgery			0.08%					1		0
		Oncology Medical	1.60%	0.87%	1.48%	0.89%	0.28%	26	11	19	11	4
		Ophthalmology				0.08%					1	0
		Orthopedics	0.74%	0.16%	0.39%	0.32%	0.66%	12	2	5	4	9
		Other	0.06%		0.08%			1		1		0
		Otolaryngology	0.99%	0.63%	0.16%	0.32%	0.28%	16	8	2	4	4
		Pulmonary	23.69%	20.67%	18.69%	17.73%	18.48%	384	261	240	220	260
		Rheumatology	0.68%	0.24%	0.23%	0.40%	0.38%	11	3	3	5	5
		Vascular Surgery	0.06%	0.08%				1	1			0
		Total	92.04%	79.73%	81.31%	80.66%	79.62%	1,492	1,007	1,044	1,001	1,120
	> 1.8	Cardiology	1.30%	3.25%	1.87%	0.89%	1.90%	21	41	24	11	27
		Dermatology		0.08%			0.09%		1			1
		Endocrine					0.38%					5
		Gastroenterology	0.12%	0.71%	0.86%	0.40%	0.57%	2	9	11	5	8
		General Medicine	3.15%	9.90%	11.99%	14.83%	14.03%	51	125	154	184	197
		General Surgery	0.43%	1.11%	0.47%	0.24%	0.47%	7	14	6	3	7
		Hematology		0.16%	0.23%	0.08%			2	3	1	0
		HIV										0
		Neurology	0.31%	1.58%	0.62%	1.05%	0.76%	5	20	8	13	11
		Neurosurgery	0.19%	0.16%	0.31%	0.08%		3	2	4	1	0
		Oncology Medical	0.06%	0.24%	0.31%	0.24%	0.38%	1	3	4	3	5
		Orthopedics	0.12%				0.09%	2				1
		Pulmonary	2.16%	2.93%	1.95%	1.37%	1.71%	35	37	25	17	24
		Rheumatology										0
		Thoracic Surgery	0.12%	0.16%	0.08%	0.16%		2	2	1	2	0
		Vascular Surgery										0
		Total	7.96%	20.27%	18.69%	19.34%	20.38%	129	256	240	240	287
	Total		100.00%	100.00%	100.00%	100.00%	100.00%	1,621	1,263	1,284	1,241	1,407

Source: Truven Health Analytics.

DRG major service	DRG weight	DRG service line	% of Total Surgical Discharges					Discharges				
			2008	2009	2010	2011	2012 annualized	2008	2009	2010	2011	2012 annualized
SURGERY	< 1.8	Dentistry	0.23%	0.69%		0.51%	0.74%	1	3		2	3
		General Medicine	2.53%	0.46%	0.21%	0.51%	0.74%	11	2	1	2	3
		General Surgery	15.63%	18.89%	17.40%	18.53%	14.71%	68	82	83	73	53
		Gynecology	6.90%	8.53%	8.39%	7.11%	11.03%	30	37	40	28	40
		Nephrology	0.23%			0.51%	0.74%	1			2	3
		Oncology Medical	0.23%	0.23%	0.21%			1	1	1		0
		Ophthalmology	0.23%		0.21%	0.51%	0.74%	1		1	2	3
		Orthopedics	17.01%	11.52%	9.22%	7.87%	10.29%	74	50	44	31	37
		Otolaryngology	2.07%	0.69%	1.26%			9	3	6		0
		Thoracic Surgery		0.23%					1			0
		Trauma	0.46%	0.92%	0.63%	1.02%		2	4	3	4	0
		Urology	4.60%	4.61%	4.19%	3.05%	3.68%	20	20	20	12	13
		Vascular Surgery	1.15%	0.92%	0.84%	1.52%		5	4	4	6	0
		Total	51.26%	47.70%	42.56%	41.12%	42.65%	223	207	203	162	155
	> 1.8	Cardiology										0
		General Medicine		0.46%	0.63%		0.37%		2	3		1
		General Surgery	14.25%	15.44%	15.30%	15.74%	12.87%	62	67	73	62	47
		Gynecology										0
		Neurosurgery										0
		Open Heart										0
		Orthopedics	31.95%	32.72%	38.57%	41.12%	43.01%	139	142	184	162	156
		Otolaryngology			0.21%					1		0
		Thoracic Surgery	1.84%	0.46%	0.21%	0.51%		8	2	1	2	0
		Trauma										0
		Urology	0.46%	2.30%	1.26%	0.76%	0.74%	2	10	6	3	3
		Vascular Surgery	0.23%	0.92%	1.26%	0.76%	0.37%	1	4	6	3	1
		Total	48.74%	52.30%	57.44%	58.88%	57.35%	212	227	274	232	208
	Total		100.00%	100.00%	100.00%	100.00%	100.00%	435	434	477	394	363

Source: Truven Health Analytics.

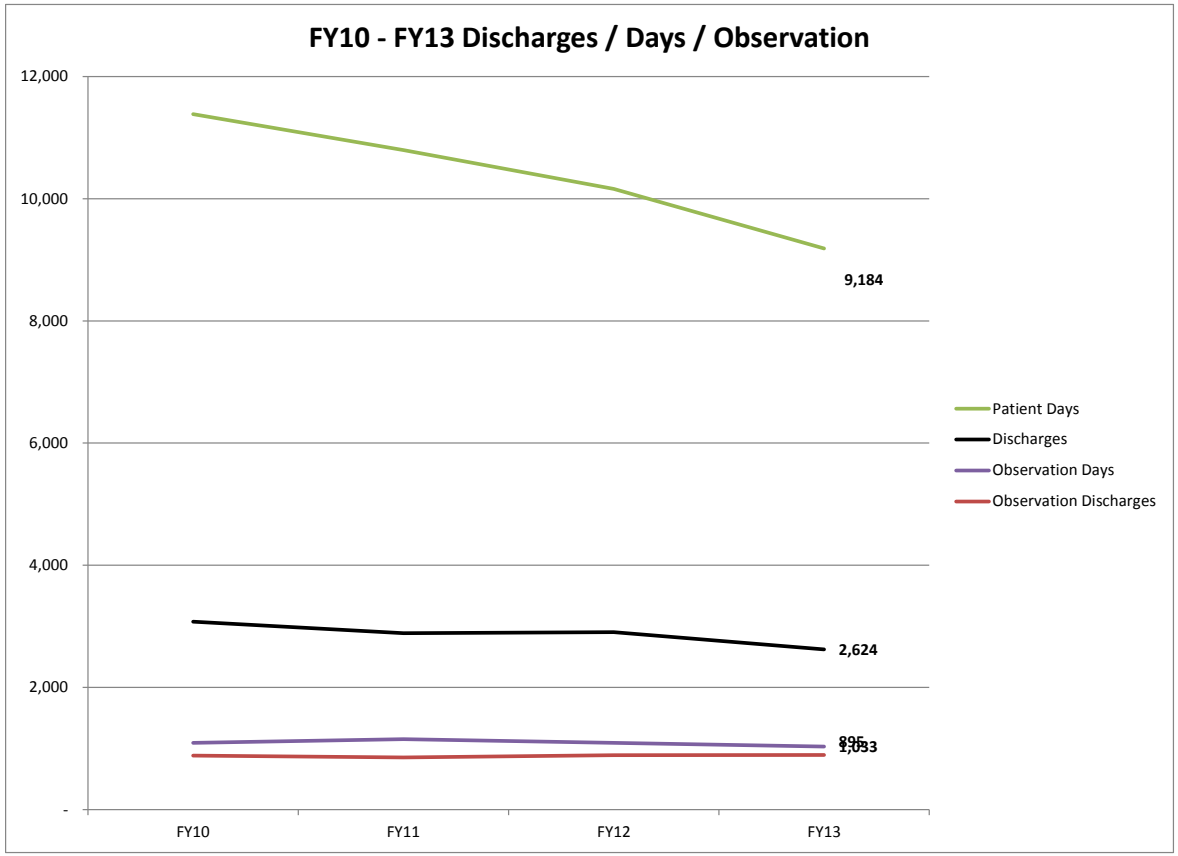
FY2010 to FY2013 – Key Procedural Volumes



Source: NARH Summary Volume

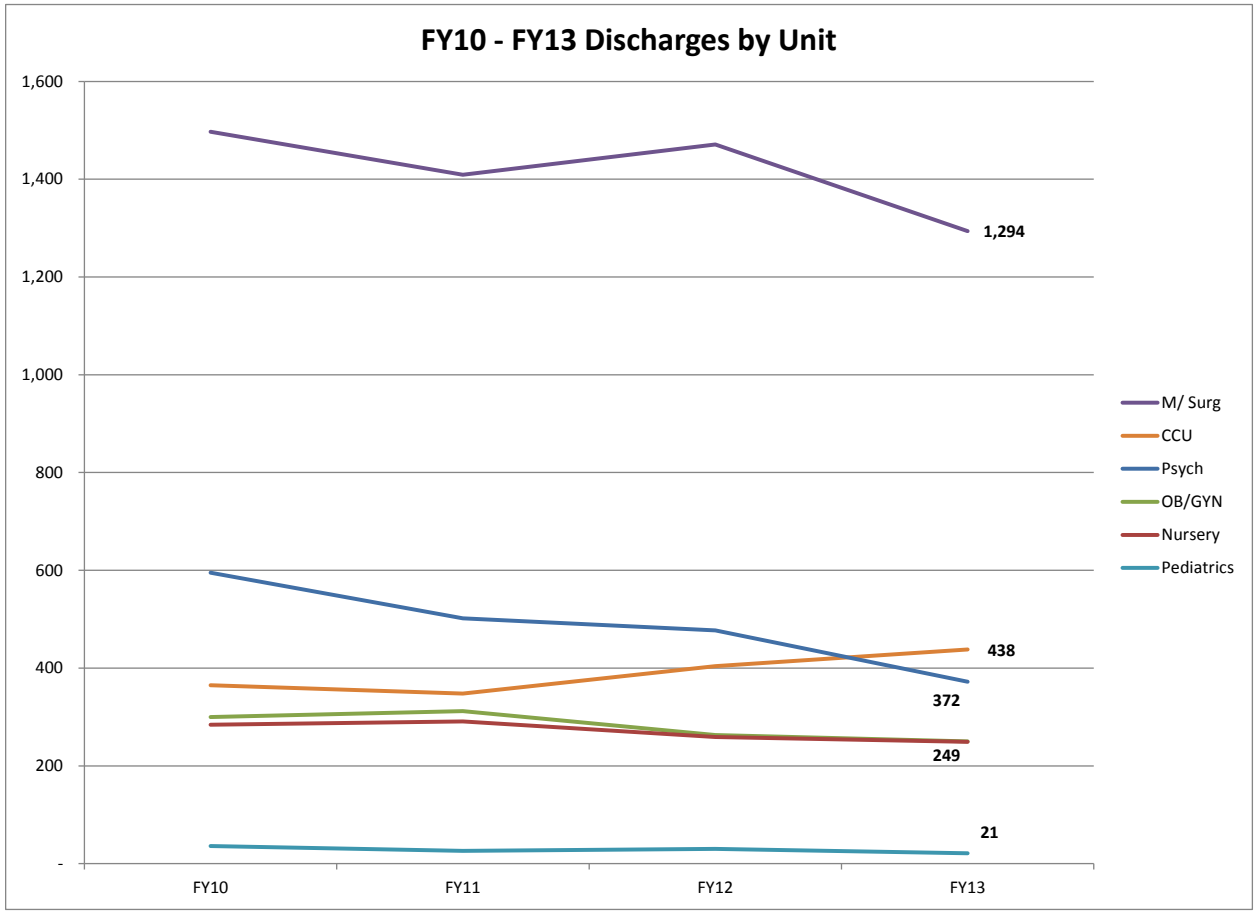
NARH saw declines from 2010 through 2013 in both endoscopy and surgery.
MRI and CT scans appear to have been tracked only from 2012, with CT growing slightly and MRI declining slightly from 2012 to 2013.

FY2010 to FY2014 – Discharges / Days



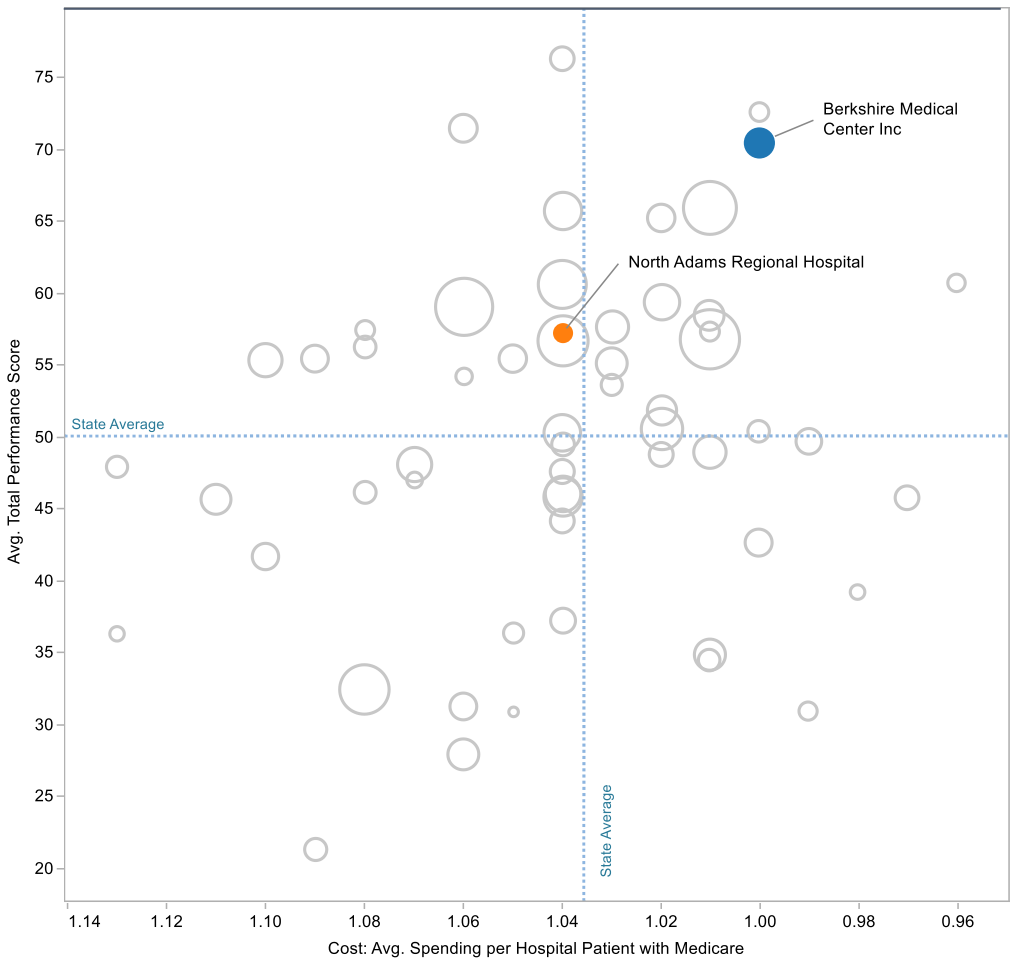
Patient days and discharges declined from 2010 through 2013, whereas observation volume has remained relatively constant over the same period.

FY2010 to FY2013 – Discharges by Unit



While CCU discharges had increased slightly since 2010, all other units of discharge (MS, Psych, and OB/GYN) have declined. Pediatric discharges have been negligible in recent history.

Value Comparisons – CMS Total Performance Score (TPS)



KEY

High Quality/ High Cost	High Quality/ Low Cost
Low Quality/ High Cost	Low Quality/ Low Cost

The value comparison of hospitals is based on CMS Total Performance Score (TPS) and the ratio of Medicare Spending per Patient for each facility. The TPS scores are based on the most recent data available from CMS.

The Medicare Spending per Patient "Efficiency Index" ratio shows whether Medicare spends more, less or about the same per Medicare patient treated in a specific hospital, compared to how much Medicare spends per patient nationally. The source of these data is CMS.

When compared to other Massachusetts hospitals using the CMS total performance score, NARH had a higher score on quality than the state average, but this came at a slightly higher cost than the state average cost.

Note: Only hospitals with both measures are included in the comparison (n=61). The size of the mark is relative to the number of beds at each hospital.

Obstetrics – LDR Need for 100% Market Share

Randomly Occurring Hospital Admissions - LDR Room Need - North Adams Regional Hospital

No. of Beds Available	(Poisson Dist)	Expected days per year this bed meets demanded (Poisson Prediction)	Poisson Prediction Cum	between 0 & x this event occurs Poisson Prediction Cum	Expected % days per year demand is met	Expected No. of Turnaways	Expected Avg Occupancy (Pct)
0	0.4107	149.9	0.4107	149.9	41.1%	272	
1	0.3655	133.4	0.7762	283.3	77.6%	103	89.0
2	0.1626	59.4	0.9388	342.7	93.9%	28	44.5
3	0.0482	17.6	0.9870	360.3	98.7%	6	29.7
4	0.0107	3.9	0.9978	364.2	99.8%	1	22.2
5	0.0019	0.7	0.9997	364.9	100.0%	0	17.8
6	0.0003	0.1	1.0000	365.0	100.0%	0	14.8
7	0.0000	0.0	1.0000	365.0	100.0%	0	12.7
8	0.0000	0.0	1.0000	365.0	100.0%	0	11.1
9	0.0000	0.0	1.0000	365.0	100.0%	0	9.9
10	0.0000	0.0	1.0000	365.0	100.0%	0	8.9
11	0.0000	0.0	1.0000	365.0	100.0%	0	8.1
12	0.0000	0.0	1.0000	365.0	100.0%	0	7.4
13	0.0000	0.0	1.0000	365.0	100.0%	0	6.8
14	0.0000	0.0	1.0000	365.0	100.0%	0	6.4
15	0.0000	0.0	1.0000	365.0	100.0%	0	5.9
16	0.0000	0.0	1.0000	365.0	100.0%	0	5.6

		hours
Annual birth volume	462	
Projected annual volume increase (%)	0.0%	
Years in planning horizon	-	
Projected annual birth volume	462	
Total projected growth (%)	0.0%	
Cesarean delivery rate	30.5%	
Admission rate to non-birth OB patients	15.0%	
Vaginal birth ALOS (in LDR)	0.75	18
Cesarean delivery ALOS (trial labor)	0.50	12
% C-sections scheduled	30.0%	
Non-birth ALOS	0.50	12

Vaginal births	321
Cesarean trial of labor using LDR	99
Direct Cesarean - no LDR use	42
Non-birth admissions	69
Total obstetrical LDR use	489
Vaginal birth days of care	241
Cesarean delivery days of care	49
Non-birth admission days of care	35
Total days of care provided	325
Overall ALOS	0.66
Overall average occupancy	0.89

Assuming 100% of the delivery volumes projected for the Primary Service Area, using traditional assumptions of section rates, non-birth admissions, and lengths of stay in the LDR, the North County volume will require approximately 3 LDR rooms at between 93.9% and 98.7% Poisson confidence intervals.

Obstetrics – PP Need for 100% Market Share

Randomly Occurring Hospital Admissions - AP / PP Room Need - North Adams Regional Hospital

No. of Beds Available	(Poisson Dist)	Expected days per year this bed meets demanded (Poisson Prediction)	Poisson Prediction Cum	between 0 & x this event occurs Poisson Prediction Cum	Expected % days per year demand is met	Expected No. of Turnaways	Expected Avg Occupancy (Pct)
0	0.0251	9.2	0.0251	9.2	2.5%	450	
1	0.0926	33.8	0.1177	43.0	11.8%	408	100.0
2	0.1705	62.2	0.2882	105.2	28.8%	329	100.0
3	0.2094	76.4	0.4976	181.6	49.8%	232	100.0
4	0.1928	70.4	0.6904	252.0	69.0%	143	92.1
5	0.1420	51.8	0.8324	303.8	83.2%	77	73.7
6	0.0872	31.8	0.9196	335.7	92.0%	37	61.4
7	0.0459	16.7	0.9655	352.4	96.6%	16	52.6
8	0.0211	7.7	0.9866	360.1	98.7%	6	46.0
9	0.0086	3.2	0.9953	363.3	99.5%	2	40.9
10	0.0032	1.2	0.9985	364.4	99.8%	1	36.8
11	0.0011	0.4	0.9995	364.8	100.0%	0	33.5
12	0.0003	0.1	0.9999	365.0	100.0%	0	30.7
13	0.0001	0.0	1.0000	365.0	100.0%	0	28.3
14	0.0000	0.0	1.0000	365.0	100.0%	0	26.3

		hours
Annual birth volume	462	
Projected annual volume increase (%)	-	
Years in planning horizon	-	
Projected annual birth volume	462	
Total projected growth (%)	-	
Cesarean delivery rate	30.5%	
Admission rate to non-birth OB patients	15.0%	
Vaginal birth ALOS	2.00	48
Cesarean delivery ALOS	4.00	96
Non-birth ALOS	2.00	48

Vaginal births	321
Cesarean deliveries	141
Non-birth admissions	69
Total obstetrical admission	531
Vaginal birth days of care	642
Cesarean delivery days of care	564
Non-birth admission days of care	139
Total days of care provided	1,344
Overall ALOS	2.53
Overall average occupancy	3.68

Assuming 100% of the delivery volumes projected for the North County, using traditional assumptions of section rates, non-birth admissions, and lengths of stay in the PP room, the North County volume will require approximately 6 to 8 postpartum rooms at between 92.0% and 98.7% Poisson confidence.

Obstetrics – LDRP Need for 100% Market Share

Randomly Occurring Hospital Admissions - LDRP Room Need - North Adams Regional Hospital

No. of Beds Available	(Poisson Dist)	Expected days per year this bed meets demanded (Poisson Prediction)	Poisson Prediction Cum	between 0 & x this event occurs Poisson Prediction Cum	Expected % days per year demand is met	Expected No. of Turnaways	Expected Avg Occupancy (Pct)
0	0.0114	4.1	0.0114	4.1	1.1%	457	
1	0.0508	18.6	0.0622	22.7	6.2%	433	100.0
2	0.1138	41.5	0.1760	64.2	17.6%	381	100.0
3	0.1699	62.0	0.3459	126.3	34.6%	302	100.0
4	0.1903	69.4	0.5362	195.7	53.6%	214	100.0
5	0.1704	62.2	0.7066	257.9	70.7%	136	89.6
6	0.1272	46.4	0.8338	304.3	83.4%	77	74.6
7	0.0814	29.7	0.9152	334.0	91.5%	39	64.0
8	0.0456	16.6	0.9607	350.7	96.1%	18	56.0
9	0.0227	8.3	0.9834	358.9	98.3%	8	49.8
10	0.0102	3.7	0.9936	362.6	99.4%	3	44.8
11	0.0041	1.5	0.9977	364.2	99.8%	1	40.7
12	0.0015	0.6	0.9992	364.7	99.9%	0	37.3
13	0.0005	0.2	0.9998	364.9	100.0%	0	34.4
14	0.0002	0.1	0.9999	365.0	100.0%	0	32.0
15	0.0001	0.0	1.0000	365.0	100.0%	0	29.9
16	0.0000	0.0	1.0000	365.0	100.0%	0	28.0
17	0.0000	0.0	1.0000	365.0	100.0%	0	26.3

		hours
Annual birth volume	462	
Projected annual volume increase (%)	0.0%	
Years in planning horizon	-	
Projected annual birth volume	462	
Total projected growth (%)	0.0%	
Cesarean delivery rate	30.5%	
% of Cesarean's scheduled	30.0%	
Admission rate to non-birth OB patients	15.0%	
Vaginal birth (Labor)	0.75	18
Vaginal Birth (Inpatient Stay)	2.00	48
Cesarean (trial of labor for non scheduled)	0.50	12
Cesarean (Inpatient Stay)	4.00	96
Non-birth ALOS	2.00	48

Vaginal births	321
Cesarean deliveries	141
Non-birth admissions	69
Total obstetrical admission	531
Vaginal birth days of care	883
Cesarean delivery days of care	613
Non-birth admission days of care	139
Total days of care provided	1,635
Overall ALOS	3.08
Overall average occupancy	4.48

Assuming 100% of the delivery volumes projected for the Primary Service Area, using traditional assumptions of section rates, non-birth admissions, and lengths of stay, but instead using an LDRP concept, the North County will require between 7 and 10 LDRP rooms to achieve 91.5% to 99.4% Poisson confidence.

The Association Between Hospital Obstetric Volume and Perinatal Outcomes in California

Published in the American Journal of Obstetrics and Gynecology, December 2012.

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Objective

To analyze the association between hospital obstetric volume and perinatal outcomes in California.

Study Design

This was a retrospective cohort study of births occurring in California in 2006. Hospitals were divided into four obstetric volume categories. Unadjusted rates of neonatal mortality and birth asphyxia were calculated for each category, overall and among term deliveries with birth weight >2500g. Multivariable logistic regression was used to control for confounders. Deliveries in rural hospitals were analyzed separately using different volume categories.

Results

Prevalence of asphyxia increased with decreasing hospital volume overall and among term, non-low-birth weight infants, from 9 per 10,000 live births at highest-volume hospitals to 18/10,000 live births at the lowest-volume hospitals ($p<0.001$). Similar trends were observed in rural hospitals, with rates increasing from 7 to 34 per 10,000 live births in low-volume rural hospitals ($p<0.001$).

Conclusion

These findings provide evidence for an inverse association between hospital obstetric volume and birth asphyxia.

About Stroudwater

Stroudwater designs solutions for healthcare leaders' most pressing challenges. We employ thought leadership and focused analytics in a collaborative process that engages our clients and enables their transformation. Our practice areas are highly focused on the mission-critical strategic, operational, and financial areas where our perspective offers the highest value. Our solutions are client-driven and client-focused. Instead of selling a product or offering a prepackaged solution, we are your trusted advisors on the journey of discovering the unique solution for each client need.

Stroudwater professionals have deep domain expertise. The Stroudwater team is made up of clinicians, managers, corporate officers, investment bankers, financial analysts, and other leaders. Stroudwater is recognized nationally in markets from rural to community hospitals, healthcare systems, and large physician groups. We believe this type of broad understanding and experience with all the elements of the delivery system is critically important for serving clients in an increasingly interconnected and interdependent environment. In this context, our practice areas are focused on:

- Affiliations and partnerships
- Strategic planning and operational improvement
- Population health
- Strategic master facility planning
- Physician-hospital alignment
- Capital planning and access
- Revenue cycle

Founded in 1985, Stroudwater's mission is to improve healthcare provider performance with the highest value advisory services customized to each client's unique needs. Considering the complexity of these problems, we firmly believe that client engagements require leadership by deeply experienced advisors. Our consultants author industry-leading studies on facility investments and regularly publish both white papers and articles on topical healthcare issues, such as the "Affiliations Value Curve" and "Beyond Medicare ACOs: Preparing for Value-Based Payments". As leaders, we recognize the importance of first seeking to understand, then to be understood. We develop bold, independent points of view based upon diverse perspectives and experience. We are passionate about what we do, and we recognize how precious healthcare resources are to the fabric of the communities served by our clients. We approach each assignment with focus, energy, and a drive to get it right.

For more information, please visit us at www.stroudwater.com.