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HEALTHCARE AND HUMAN SERVICES POLICY, RESEARCH, AND CONSULTING—WITH REAL-WORLD PERSPECTIVE.

Rhode Island Coordinated Health Planning Project

Final Report

Prepared for: **Rhode Island Coordinated Health Planning Council**

February 21, 2013

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Executive Summary

In September 2012, The Lewin Group was commissioned by the Rhode Island Executive Office of Health and Human Services and the Department of Health to conduct a gap analysis focused on assessing the current health care system's inpatient capacity, utilization, distribution of services, and the resulting impact on costs. Lewin was also tasked with comparing the results to the population's future needs accounting for the impact of coverage provisions within the Affordable Care Act (ACA). The project has involved building a Bed Need Model for the state that will be used to provide guidance on the ideal number, location, and type of hospital beds; the model will also aid in estimating the cost of excess capacity.

The purpose of the Bed Need Model is to estimate the potential surplus or deficit of hospital inpatient staffed beds in Rhode Island relative to the estimated future demand for hospital inpatient services, as defined by inpatient days, based on changes in population, demographics and health care trends. For this report, we develop six future demand scenarios based on a range of assumptions around trends in utilization for inpatient care in 2017 (5 year estimate).

From November 2012 to January 2013, interviews with stakeholders and experts in the field were conducted to help inform the assumptions used in projecting future inpatient demand in Rhode Island. The primary data sources used in the model include: Department of Health Hospital Discharge Data for 2008 through 2011, which include inpatient discharges for all Rhode Island hospitals within a fiscal year; population projections produced by The Lewin Group and the Graham Center for each city by demographic group using estimates from the U.S. Bureau of the Census for the state of Rhode Island; and data on available and staffed beds for each Rhode Island hospital provided by the Hospital Association of Rhode Island.

As shown in ***Figure ES-1***, the actual number of inpatient days provided by Rhode Island hospitals in 2010 totaled 679,794, which excludes newborn cases. In September 2012, there were 2,420 staffed beds for all hospitals in the state. Under various inpatient utilization projections and target occupancy rates, we estimate that the number of inpatient beds needed in Rhode Island in 2017 would range from 2,082 to 2,482, depending on the assumptions used. Assuming the current number of staffed beds remains constant through 2017, our highest range projection scenario would result in a shortage of 64 beds. However, all other projection scenarios resulted in an estimated surplus of beds ranging from 79 to 338. The cost of this excess capacity would range from $4.9 million to $21.1 million in 2017, based on the marginal fixed cost of an unoccupied bed.

We provide our Bed Need Model to the state to use as a tool in projecting future inpatient demand and bed need under a range of various assumptions; these assumptions are described in the Methodology section of this report. ***Figure ES-2*** provides a dashboard for the assumptions that we use in the six presented scenarios.

Figure ES-1: Summary of Bed Need under Various Projection Assumptions in 2017

	Target Occupancy Rate	Projected Inpatient Days	Projected Bed Need (Demand)	Current Staffed Beds 2012	Statewide Shortage/ Surplus of Beds	Cost of Excess Capacity (millions)
Bed Demand Projection to 2017 Based on Assumption Driven Trends						
Low-Range Estimate	78% (70% Obstetrics)	627,677	2,218	2,420	202	$12.6
High-Range Estimate	78% (70% Obstetrics)	703,332	2,484	2,420	(64)	N/A
Bed Demand Projection to 2017 Based on Recent Observed Trends in Usage and Length of Stay						
Low-Range Estimate	78% (70% Obstetrics)	589,394	2,082	2,420	338	$21.1
High-Range Estimate	78% (70% Obstetrics)	630,483	2,227	2,420	193	$12.1
Bed Demand Projection to 2017 Based on Recent Trends with Target Occupancy of 74%						
Low-Range Estimate	74% (70% Obstetrics)	589,394	2,189	2,420	231	$14.5
High-Range Estimate	74% (70% Obstetrics)	630,483	2,341	2,420	79	$4.9

Figure ES-2: Assumption Dashboard for the Estimates Presented Above

	Bed Demand Projection to 2017 Based on Assumption Driven Trends		Bed Demand Projection to 2017 Based on Recent Observed Trends in Usage and Length of Stay		Bed Demand Projection to 2017 Based on Recent Trends with Target Occupancy of 74%	
Assumption	**Low-Range Estimate**	**High-Range Estimate**	**Low-Range Estimate**	**High-Range Estimate**	**Low-Range Estimate**	**High-Range Estimate**
Population and Demographic Trends	Lewin Projections	Graham Center Projections	Lewin Projections	Graham Center Projections	Lewin Projections	Graham Center Projections
Impact of ACA	2.3% Increase	2.3% Increase	2.3% Increase	2.3% Increase	2.3% Increase	2.3% Increase
Impact of Obesity Prevalence	0.37% annual increase in hospitalizations	0.82% annual increase in hospitalizations	N/A	N/A	N/A	N/A
Impact of Reduced Readmits	50% reduction in readmissions by 2017	25% reduction in readmissions by 2017	N/A	N/A	N/A	N/A
Inpatient to Outpatient Shifts	1.7% annual reduction in inpatient care moved to outpatient	1.1% annual reduction in inpatient care moved to outpatient	N/A	N/A	N/A	N/A

	Bed Demand Projection to 2017 Based on Assumption Driven Trends		Bed Demand Projection to 2017 Based on Recent Observed Trends in Usage and Length of Stay		Bed Demand Projection to 2017 Based on Recent Trends with Target Occupancy of 74%	
Assumption	Low-Range Estimate	High-Range Estimate	Low-Range Estimate	High-Range Estimate	Low-Range Estimate	High-Range Estimate
Impact of Enhanced Primary Care	N/A	N/A	N/A	N/A	N/A	N/A
Observation Stays	Assumes current trend of 8.5% annual increase	Assumes current trend of 8.5% annual increase	Assumes current trend - 10%	Assumes current trend + 10%	Assumes current trend - 10%	Assumes current trend + 10%
Import Patient Days	Assumes current trend of 3.2% annual reduction	Assumes current trend of 3.2% annual reduction	Assumes current trend - 10%	Assumes current trend + 10%	Assumes current trend - 10%	Assumes current trend + 10%
Export Patient Days	Assumes current trend of 1.2% annual increase in patients leaving the state	Assumes current trend of 1.2% annual increase in patients leaving the state	Assumes current trend	Assumes 10% of current patients are retained in state	Assumes current trend	Assumes 10% of current patients are retained in state
Trends in Discharges per 1,000 patients	N/A	N/A	Current trend - 10%	Current trend + 10%	Current trend - 10%	Current trend + 10%
Trends in average length of stay	N/A	N/A	Current trend - 10%	Current trend + 10%	Current trend - 10%	Current trend + 10%
Target Occupancy Rates	78% (70% for obstetrics)	78% (70% for obstetrics)	78% (70% for obstetrics)	78% (70% for obstetrics)	74% (70% for obstetrics)	74% (70% for obstetrics)

Introduction

In September 2012, The Lewin Group was commissioned by the Rhode Island Executive Office of Health and Human Services and the Department of Health to conduct a gap analysis focused on assessing the current health care system's inpatient capacity, utilization, distribution of services, and the resulting impact on costs. Lewin was also tasked with comparing the results to the population's future needs accounting for the impact of coverage provisions within the Affordable Care Act (ACA). The project has involved building a Bed Need Model for the state that will be used to provide guidance on the ideal number, location, and type of hospital beds; the model will also aid in estimating the cost of excess capacity.

Preliminary findings were presented on November 5, 2012, in Providence, to provide a framework for future work. Stakeholder interviews were conducted from November 2012 to January 2013. Initial interview themes and their potential impact on the Bed Need Model were presented via video conference on December 19, 2012. A Bed Need Model was then developed based on the preliminary findings, and incorporated input from stakeholder interviews.

In the report to follow, we first provide a background on trends in inpatient utilization and compare these to national and regional benchmarks. We then discuss our Bed Need Model results under a variety of inpatient demand scenarios. Following, we present a review of our stakeholder interview discussions and findings, a description of our Bed Need Model methodology, a narrative of our coordination with the Graham Center, an analysis of inpatient psychiatric utilization in Rhode Island, and an analysis of inpatient discharges performed in Providence hospitals. A bibliography, list of interviewees, list of interview tools, and detailed interview results may be found in the appendices.

Background Trends in Inpatient Utilization and Comparison to Benchmarks

Preliminary findings from our initial analyses focus on comparing the current statewide inpatient bed supply and demand with New England and national benchmarks, and provide a summary of other state policies to manage inpatient bed supply consistent with population demand. The findings are intended to establish a baseline for the bed need model and estimates of future inpatient cost savings. The key finding from these analyses are as follows:

After adjusting for differences in age and sex, Rhode Island discharges were 126 per 1,000 population in 2010, which was lower than the national average of 131 per 1,000 population and the Massachusetts average of 130 per 1,000 population, but higher than the rates of other New England states. After adjusting for age, sex and patient migration status, Rhode Island's inpatient days in 2010 were 585 per 1,000 population, compared to the US average of 617 per 1,000 population and the Massachusetts rate of 580 per 1,000 population. Inpatient days per 1,000 population in Rhode Island were lower than national benchmarks for most diagnostic categories in 2010 (***Figure 1***). [1]

[1] Source: US Census Bureau. State population estimates, Health Care Utilization Project (HCUP) Agency for Health Care Research and Quality (AHRQ) age/sex adjusted; includes only short term acute care hospitals for 2010.

Figure 1: Age-Adjusted Days per Thousand by Major Diagnostic Category (2010)

MDC	RI	US	MDC	RI	US
1 Nervous System	37.39	41.67	13 Female Reproductive System	6.55	6.03
2 Eye	0.47	0.63	14 Pregnancy, Childbirth, and the Puerperium	37.67	37.60
3 Ear, Nose, Mouth, and Throat	3.85	4.75	16 Blood, Blood Forming Organs, Immunology	6.78	8.13
4 Respiratory System	68.29	73.48	17 Myeloproliferative, Poorly Differentiated Neoplasm	5.78	9.10
5 Circulatory	71.67	82.04	18 Infectious and Parasitic Diseases, Systemic or Unspecified Sites	29.52	34.59
6 Digestive System	59.89	58.69	19 Mental [1/]	51.47	38.83
7 Hepatobiliary System and Pancreas	16.08	20.01	20 Alcohol/Drug Use and Alcohol/Drug Induced Organic Mental [1/]	8.75	7.42
8 Musculoskeletal System and Connective Tissue	46.96	51.53	21 Injuries Poisonings and Toxic Effects of Drugs	7.55	8.43
9 Skin, Subcutaneous Tissue, and Breast	15.18	15.44	22 Burns	0.49	1.20
10 Endocrine, Nutritional and Metabolic	13.47	16.75	23 Factors Influencing Health Stat and Other Contracts with health Services	15.72	23.37
11 Kidney and Urinary Tract	27.17	28.11	24 Multiple Significant Trauma	2.85	2.28
12 Male Reproductive System	2.19	2.00	25 Human Immunodeficiency Virus Infections	1.18	2.28

1/ Some states do not report discharge data for state psychiatric hospitals, which would under count the total number of psychiatric days provided to patients in the state. Therefore, these states may not be comparable to Rhode Island.

Source: HCUP - Health Care Utilization Project (AHRQ), includes only short term acute care hospitals, 2010, US Bureau of the Census – state population estimates. Rates adjusted for age but not for sex or migration. Normal Newborn and neonatal discharges (MDC 15) are excluded since they are not used in this study.

However, the study also finds that hospital inpatient days per 1,000 patients declined from 665 in 2007 to 592 in 2010—an 11 percent decline over the period. By comparison, a decline of 1.4 percent was observed in other New England states (MA, ME and VT) and a decline of 4.6 percent was observed nationally over the same period. [2] In addition, hospital inpatient staffed beds in Rhode Island increased from 2.24 per 1,000 residents in 2006 to 2.35 per 1,000 residents

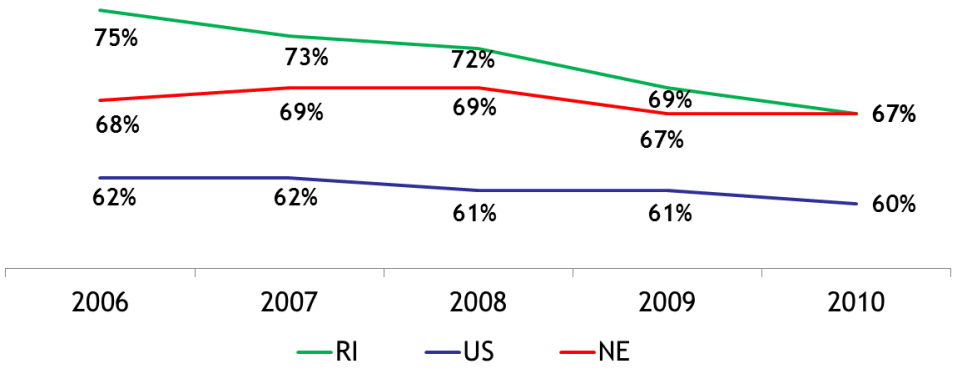
Discharges per thousand were multiplied by corresponding RI age and sex groups and then summed across all ages.

[2] Days per 1,000 patients were computed using data from the Hospital Cost and Utilization Project (HCUP), which includes only short term acute care hospitals and were adjusted for difference in age and sex across the areas using data from the U.S. Bureau of the Census.

in 2010 (a 4.9 percent increase), compared to a slight decline in beds per 1,000 population nationally and in other New England states. [3]

Taken together, between 2006 and 2010, these trends resulted in an overall decline in inpatient occupancy rates. During this period, inpatient occupancy rates decreased from 75 percent to 67 percent (***Figure 2***). This most recent rate is similar to the average occupancy rate in New England, which has stayed relatively stable over the five-year period, but is higher than the national rate of 60 percent, which only fell by 2 percent during the same time period (Centers for Medicare& Medicaid Services, 2006-2010). These differences hold true for two of the three bed types studied. Between 2006 and 2010, occupancy for Medical/Surgical beds declined from 74 percent to 66 percent in Rhode Island, but decreased slightly from 61 percent to 58 percent nationally. Occupancy for intensive care unit/critical care unit (ICU/CCU) and other special care beds decreased from 81 percent in 2006 to 72 percent in 2010 in Rhode Island, while national occupancy decreased from 68 percent in 2006 to 65 percent in 2010. However, occupancy for Psychiatric and Rehabilitation beds in Rhode Island experienced a smaller decline from 73 percent in 2006 to 72 percent in 2010, and actually increased from 66 percent to 67 percent in the US over the same time period.

Figure 2: Trends in Inpatient Occupancy Rates (2007-2011)



Source: Medicare Hospital Cost Report Information System (HCRIS). Includes short term acute care hospitals only and includes medical/surgical beds, ICU, CCU, rehabilitation and psychiatric beds.

Bed Need Model Results under Various Inpatient Demand Scenarios

The Bed Need Model, which is described in detail below, is used to develop inpatient demand estimates based on a range of assumptions about the future trend in hospital inpatient utilization by residents in the state and outside the state. For this report, we produce future bed need estimates for six scenarios in 2017 under various projection assumptions, which are described in detail below. ***Figure 3*** shows projected days, the number of beds that would be needed to provide those days of care, the shortage/surplus compared to 2012 staffed beds, and the cost of excess capacity, if any.

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[3] American Hospital Association Hospital Statistics; New England states include CT, ME, MA, NH, and VT; Community hospitals based on AHA definition of community based hospitals and exclude hospital based nursing home beds.

Figure 3: Summary of Bed Need under Various Projection Assumptions (2017)

	Target Occupancy Rate	Projected Inpatient Days	Projected Bed Need (Demand)	Current Staffed Beds 2012	Statewide Shortage/ Surplus of Beds	Cost of Excess Capacity (millions)
Bed Demand Projection to 2017 Based on Assumption Driven Trends						
Low-Range Estimate	78% (70% Obstetrics)	627,677	2,218	2,420	202	$12.6
High-Range Estimate	78% (70% Obstetrics)	703,332	2,484	2,420	(64)	N/A
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Bed Demand Projection to 2017 Based on Recent Trends with Target Occupancy of 74%						
Low-Range Estimate	74% (70% Obstetrics)	589,394	2,189	2,420	231	$14.5
High-Range Estimate	74% (70% Obstetrics)	630,483	2,341	2,420	79	$4.9

1/ Low range estimates assume Lewin population and demographic trends; increase in inpatient utilization for adults of 0.37 percent per year due to obesity; 50 percent reduction in hospital readmissions; 1.7 percent per year reduction in days due to shifting services to outpatient setting; continued recent historical trends in out-of-state patient volumes (imports), observation visits and patients leaving the state for inpatient care (exports). Assumes target occupancy rate of 78 percent (70 percent for Obstetrics).

High range estimates assumes Graham population and demographic trends; increase in inpatient utilization for adults of 0.82 percent per year due to obesity; 25 percent reduction in hospital readmissions; 1.1 percent per year reduction in days due to shifting services to outpatient setting; continued recent historical trends in out-of-state patient volumes (imports) and observation visits; 10 percent of and patients leaving the state for inpatient care (exports) are retained in state. Assumes target occupancy rate of 78 percent (70 percent for Obstetrics).

2/ Low-range estimate assumes Graham population and demographic trends; historical annual change in discharges per 1,000 and average length of stay for Rhode Island patients minus 10 percent; historical annual change in import cases and observation visits minus 10 percent. Assumes continued recent historical trends in patients leaving the state for inpatient care (exports). Assumes target occupancy rate of 78 percent (70 percent for Obstetrics).

High-range estimate assumes Lewin population and demographic trends; historical annual change in discharges per 1,000 and average length of stay for Rhode Island patients plus 10 percent; historical annual change in import cases and observation visits plus 10 percent. Assumes 10 percent of and patients leaving the state for inpatient care (exports) are retained in state. Assumes target occupancy rate of 78 percent (70 percent for Obstetrics).

3/ These scenarios use the same assumptions as described in note 2 but assumes target occupancy rate of 74 percent (70 percent for Obstetrics).

4/ Seventy percent is used as a target occupancy rate for obstetrics in order to account for the random versus predictable nature of the utilization of this service.

The first future demand scenario illustrates the low-range assumption for each of the following trend options included in the Bed Need Model:

- Lewin population and demographic trends, project a declining overall population but faster rate of growth for population over age 65 than the Graham Center population projections;
- Increase in inpatient utilization for adults of 0.37 percent per year due to obesity;

- 50 percent reduction in hospital readmissions;
- 1.7 percent per year reduction in days due to shifting services to outpatient setting;
- Continued recent historical trends in out-of-state patient volumes (Imports);
- Continued recent historical trends in observation visits;
- Continued recent historical trend in patients leaving the state for inpatient care (exports); and
- Impact of enhanced primary care based on a mature Accountable Care Organization (ACO) model, which is estimated by the Graham Center to reduce hospitalizations by 10.5 percent; we assume that some of this reduction is reduced readmissions to total impact is offset by reduced readmissions already accounted for above.

Figure 4 illustrates the impact of each of the various assumptions in the Bed Need Model on inpatient days by type of service in 2017 relative to 2010 actual days.[4] The table shows that under a low-range estimate, the demand for inpatient days could decrease by 52,117 days by 2017—a 7.7 percent decrease. We estimate there would be a decline in inpatient utilization for all bed types. However, if the current trend in observation visits continues, then there would be a projected increase in observation days of 14,743.

[4] We use 2010 as a base due to hospitals indicating that not all 2011 data had been included in DOH discharge file.

Figure 4: Impact of Low-Range Model Assumptions on Inpatient Utilization (Days of Care) Assuming Projections to 2017[1/]

	Type of Service								Change from Baseline
	Med/Surg	Obstetrics	Pediatrics	Pediatric Psych	Adult Psych	ICU	Observation	Total	
Baseline 2010	388,925	38,624	16,239	25,546	93,070	82,281	35,109	679,794	
Projection to 2017									
Impact of Population (Lewin population growth)	398,869	37,404	15,746	24,693	92,904	84,962	37,021	691,598	1.7%
Impact of ACA	405,239	37,404	16,129	25,506	99,982	86,485	37,021	707,766	2.3%
Impact of Obesity (low prevalence rate increase)	413,680	37,404	16,129	25,506	99,982	88,101	37,021	717,822	1.4%
Impact of Reduced Readmits (50% reduction)	392,496	35,581	15,421	24,274	94,773	83,690	37,021	683,256	-4.8%
Inpatient to Outpatient Shift (high transition rate)	356,915	35,581	14,232	22,203	86,025	76,290	37,021	628,266	-8.0%
Current Observation & Import Patient Trend	350,613	33,913	14,281	20,422	85,574	75,726	49,852	630,380	0.3%
Current Export Patient Trend	347,910	33,913	14,281	20,422	85,574	75,726	49,852	627,677	-0.4%
Impact of Enhanced Primary Care	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cumulative Effect	-10.5%	-12.2%	-12.1%	-20.1%	-8.1%	-8.0%	42.0%	-7.7%	

1/ Low range estimates assume Lewin population and demographic trends; increase in inpatient utilization for adults of 0.37 percent per year due to obesity; 50 percent reduction in hospital readmissions; 1.7 percent per year reduction in days due to shifting services to outpatient setting; continued recent historical trends in out-of-state patient volumes (imports), observation visits and patients leaving the state for inpatient care (exports). Assumes impact of primary care based on mature ACO model (10.5 percent utilization reduction offset by reduced readmission). Assumes target occupancy rate of 78 percent (70 percent for Obstetrics). Seventy percent is used as a target occupancy rate for obstetrics in order to account for the random versus predictable nature of the utilization of this service.

Figure 5: Bed Need Based on Patient Residence Compared to Capacity by Service Area Assuming Projections to 2017 (Low-Range Assumption) [1/]

Service Area	Med/Surg	Obstetrics	Pediatrics	Pediatric Psych	Adult Psych	ICU	Observation	Total
Estimated Utilization Based on Service Area of the Patient								
Newport	17,825	1,999	469	1,521	4,431	3,792	1,520	31,557
Pawtucket	29,818	3,998	1,370	1,144	8,970	5,765	3,703	54,769
Providence	166,730	17,784	9,354	11,526	43,680	39,867	29,427	318,369
Wakefield	11,988	1,172	252	960	2,927	5,487	3,926	26,712
Warwick	66,058	5,034	1,484	2,628	15,378	11,580	9,157	111,320
Westerly	12,853	994	182	290	1,588	2,248	491	18,646
Woonsocket	42,637	2,931	1,169	2,352	8,599	6,987	1,629	66,304
Specialty	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total	347,910	33,913	14,281	20,422	85,574	75,726	49,852	627,677
Estimated Utilization by Hospital Service Area Based on Current Patient Travel Patterns								
Newport	14,181	1,598	119	56	2,955	1,815	1,520	22,244
Pawtucket	21,311	1,046	176	16	400	3,032	3,703	29,684
Providence	215,060	25,924	13,661	726	35,966	57,393	29,427	378,157
Wakefield	11,436	952	62	14	361	4,948	3,926	21,699
Warwick	45,133	2,673	147	13	11,111	3,922	9,157	72,155
Westerly	10,936	756	67	13	175	1,430	491	13,868
Woonsocket	23,533	964	46	0	4,779	3,186	1,629	34,137
Specialty	6,320	0	3	19,583	29,827	0	0	55,732
Total	347,910	33,913	14,281	20,422	85,574	75,726	49,852	627,677

1/ Low range estimates assume Lewin population and demographic trends; increase in inpatient utilization for adults of 0.37 percent per year due to obesity; 50 percent reduction in hospital readmissions; 1.7 percent per year reduction in days due to shifting services to outpatient setting; continued recent historical trends in out-of-state patient volumes (imports), observation visits and patients leaving the state for inpatient care (exports).

Using a target occupancy rate of 78 percent (70 percent for Obstetrics)[5], we estimate that hospitals in the state would need 2,099 beds in 2017 to meet the demand estimated in on our low-range assumption (***Figure 6***). This would include 1,318 medical-surgical beds, which includes observation beds, 126 obstetrics beds, 48 pediatric medical/surgical beds, 68 pediatric psych beds, 286 adult psychiatric beds and 253 ICU beds. Based on data from the hospitals, about 2,420 beds were setup and staffed in September 2012. Comparing the number of needed beds under these assumptions to current capacity shows that there would be a surplus of 321 total beds in 2017, assuming no change in staffed beds over that period.

The bed need estimates presented in ***Figure 6*** illustrate the need based on the population within the hospital service area and do not take into account patient travel patterns or the availability

[5] Earlier studies have estimated optimum bed capacity at 74 percent, which was the average hospital occupancy rate prior to the implementation of Medicare PPS. Others have incorporated queuing theory models, where "ideal" occupancy rates increase with lower desired probabilities of having to turn away emergency patients. These models show that a hospital of about 150 beds would have an ideal occupancy rate of 78 percent for the probability of turning away 1 in 1,000 emergency cases.

of services that are provided within the service area. Because this analysis presents bed need based on population, the specialty hospitals are included in the Providence service area.

The data suggest that there would be a projected shortage of beds in almost every service area, except Providence, which would have an excess of beds relative to the population need in the service area. However, our observations of the data show that residents will typically travel across the state for inpatient services, primarily to Providence. The Dartmouth Atlas of Health Care designates the entire state of Rhode Island as a single Hospital Referral Region, which means that people will travel across the state for significant procedures and particularly to Providence. Additionally, historically, about 40 to 50 percent of psychiatric patient days within each service area are treated at the specialty hospitals, which are located in Providence.

Figure 6: Bed Need Based on Patient Residence Compared to Capacity by Service Area Assuming Projections to 2017 (Low-Range Assumption) [1/]

Service Area	Med/Surg	Obstetrics	Pediatrics	Pediatric Psych	Adult Psych	ICU	Total
Target Occupancy	78%	70%	78%	78%	78%	78%	
Estimated Beds Needed Based on Patient Residence							
Newport	68	8	2	5	16	13	112
Pawtucket	118	16	5	4	32	20	194
Providence	689	70	33	40	153	140	1,125
Wakefield	56	5	1	3	10	19	94
Warwick	264	20	5	9	54	41	393
Westerly	47	4	1	1	6	8	66
Woonsocket	155	11	4	8	30	25	234
Specialty	0	0	0	0	0	0	0
Total	1,397	133	50	72	301	266	2,218
Current Capacity - Staffed Beds - Based on Hospitals in Service Area							
Newport	66	10	2	0	10	10	98
Pawtucket	105	13	12	0	0	17	147
Providence	824	122	72	71	299	210	1,598
Wakefield	60	4	1	0	0	6	71
Warwick	186	22	4	0	12	38	262
Westerly	48	10	0	0	0	6	64
Woonsocket	137	11	0	0	18	14	180
Specialty	0	0	0	0	0	0	0
Total	1,426	192	91	71	339	301	2,420
Estimated Shortage / Surplus Based on Population							
Newport	-2	2	0	-5	-6	-3	-14
Pawtucket	-13	-3	7	-4	-32	-3	-47
Providence	135	52	39	31	146	70	473
Wakefield	4	-1	0	-3	-10	-13	-23
Warwick	-78	2	-1	-9	-42	-3	-131
Westerly	1	6	-1	-1	-6	-2	-2
Woonsocket	-18	0	-4	-8	-12	-11	-54
Specialty	0	0	0	0	0	0	0
Total	29	59	41	-1	38	35	202

1/ Low range estimates assume Lewin population and demographic trends; increase in inpatient utilization for adults of 0.37 percent per year due to obesity; 50 percent reduction in hospital readmissions; 1.7 percent per year reduction in days due to shifting services to outpatient setting; continued recent historical trends in out-of-state patient volumes (imports), observation visits and patients leaving the state for inpatient care (exports). Assumes target occupancy rate of 78 percent (70 percent for Obstetrics). Seventy percent is used as a target occupancy rate for obstetrics in order to account for the random versus predictable nature of the utilization of this service.

Assuming patients travel across service areas within the state similar to historical patterns of use, then the bed need for each of the service areas would be very different and the bed surplus would be more evenly distributed across service areas. ***Figure 7*** shows the bed need by service area assuming historical travel patterns for each service type. For this analysis, the specialty

hospitals (Bradley, Butler and Rehab Hospital of Rhode Island) are separated into their own category.

Figure 7: Bed Need Based on Where Patients are Treated Compared to Capacity by Service Area Assuming Projections to 2017 (Low-Range Assumption) [1/]

Service Area	Med/Surg	Obstetrics	Pediatrics	Pediatric Psych	Adult Psych	ICU	Total
Target Occupancy [2/]	78%	70%	78%	78%	78%	78%	
Estimated Beds Needed Based on Where Patients are Treated							
Newport	55	6	0	0	10	6	79
Pawtucket	88	4	1	0	1	11	105
Providence	859	101	48	3	126	202	1,339
Wakefield	54	4	0	0	1	17	77
Warwick	191	10	1	0	39	14	255
Westerly	40	3	0	0	1	5	49
Woonsocket	88	4	0	0	17	11	120
Specialty	22	0	0	69	105	0	196
Total	1,397	133	50	72	301	266	2,218
Current Capacity - Staffed Beds - Based on Hospitals in Service Area							
Newport	66	10	2	0	10	10	98
Pawtucket	105	13	12	0	0	17	147
Providence	824	122	72	0	144	210	1,372
Wakefield	60	4	1	0	0	6	71
Warwick	186	22	4	0	12	38	262
Westerly	48	10	0	0	0	6	64
Woonsocket	97	11	0	0	18	14	140
Specialty	40	0	0	71	155	0	266
Total	1,426	192	91	71	339	301	2,420
Estimated Shortage / Surplus Based on Where Patients are Treated							
Newport	11	4	2	0	0	4	19
Pawtucket	17	9	11	0	-1	6	42
Providence	-35	21	24	-3	18	8	33
Wakefield	6	0	1	0	-1	-11	-6
Warwick	-5	12	3	0	-27	24	7
Westerly	8	7	0	0	-1	1	15
Woonsocket	9	7	0	0	1	3	20
Specialty	18	0	0	2	50	0	70
Total	29	59	41	-1	38	35	202

1/ Low range estimates assume Lewin population and demographic trends; increase in inpatient utilization for adults of 0.37 percent per year due to obesity; 50 percent reduction in hospital readmissions; 1.7 percent per year reduction in days due to shifting services to outpatient setting; continued recent historical trends in out-of-state patient volumes (imports), observation visits and patients leaving the state for inpatient care (exports). Assumes target occupancy rate of 78 percent (70 percent for Obstetrics). Seventy percent is used as a target occupancy rate for obstetrics in order to account for the random versus predictable nature of the utilization of this service.

We estimate that the cost of an empty bed in Rhode Island hospitals would be about $62,558, on average, in 2017. Thus, the cost of the excess 321 beds would be about $20.1 million, based on these demand forecast assumptions in 2017 (***Figure 8***).

Figure 8: Estimated Cost of Excess Bed Capacity in Rhode Island in 2017 (Low-Range Assumption)

	Med/Surg	Obstetrics	Pediatrics	Pediatric Psych	Adult Psych	ICU	Total
Bed Surplus	29	59	41	-1	38	35	202
Marginal Cost per Empty Bed	$57,405	$57,405	$57,405	$64,730	$64,730	$90,998	$62,558
Cost of Excess Capacity	$1,657,577	$3,402,367	$2,344,434	-$47,312	$2,487,232	$3,186,231	$12,617,413

Low range estimates assume Lewin population and demographic trends; increase in inpatient utilization for adults of 0.37 percent per year due to obesity; 50 percent reduction in hospital readmissions; 1.7 percent per year reduction in days due to shifting services to outpatient setting; continued recent historical trends in out-of-state patient volumes (imports), observation visits and patients leaving the state for inpatient care (exports). Assumes target occupancy rate of 78 percent (70 percent for Obstetrics). Seventy percent is used as a target occupancy rate for obstetrics in order to account for the random versus predictable nature of the utilization of this service.

Figure 9 illustrates a high-range demand scenario for each of the following trend options in the model and should be viewed as the maximum potential demand outcome:

- Graham Center population and demographic trends, which shows increasing overall population and consistent growth rates within age cohort;
- Increase in inpatient utilization for adults of 0.82 percent per year due to obesity;
- 25 percent reduction in hospital readmissions;
- 1.1 percent per year reduction in days due to shifting services to outpatient setting;
- Continued recent historical trends in out-of-state patient volumes (imports);
- Continued recent historical trends in observation visits;
- Assumes 10 percent of current patients leaving the state for inpatient care (exports) are retained in the state; and
- Impact of enhanced primary care based on an increased supply of primary care providers, which is estimated by the Graham Center to reduce hospitalizations by 3.75 percent; we assume that some of this reduction is due to reduced readmissions, so total impact of this assumption is offset by reduced readmissions already accounted for above.

The table shows that under a high-range estimate the demand for inpatient days could increase by 23,538 days by 2017 relative to 2010 utilization or 3.5 percent.

Figure 9: Impact of High-Range Model Assumptions on Inpatient Utilization (Days of Care) Assuming Projections to 2017[1/]

	Type of Service								Change from Baseline
	Med/Surg	Obstetrics	Pediatrics	Pediatric Psych	Adult Psych	ICU	Observation	Total	
Baseline 2010	388,925	38,624	16,239	25,546	93,070	82,281	35,109	679,794	
Projection to 2017									
Impact of Population (Graham Center population growth)	413,848	37,188	15,533	24,218	98,348	88,087	37,021	714,244	5.1%
Impact of ACA	421,142	37,188	15,910	25,014	105,844	89,817	37,021	731,934	2.5%
Impact of Obesity (high prevalence rate increase)	440,858	37,188	15,910	25,014	105,844	93,587	37,021	755,421	3.2%
Impact of Reduced Readmits (25% reduction)	429,519	36,282	15,562	24,411	103,078	91,231	37,021	737,104	-2.4%
Inpatient to Outpatient Shift (low transition rate)	403,771	36,282	14,772	23,042	96,799	85,886	37,021	697,573	-5.4%
Current Observation & Import Patient Trend	397,470	34,614	14,821	21,261	96,348	85,322	49,852	699,688	0.3%
10% of Current Export Patients Retained in RI	401,114	34,614	14,821	21,261	96,348	85,322	49,852	703,332	0.5%
Impact of Enhanced Primary Care (Increased PC Supply)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cumulative Effect	3.1%	-10.4%	-8.7%	-16.8%	3.5%	3.7%	42.0%	3.5%	

1/ High range estimates assumes Graham population and demographic trends; increase in inpatient utilization for adults of 0.82 percent per year due to obesity; 25 percent reduction in hospital readmissions; 1.1 percent per year reduction in days due to shifting services to outpatient setting; continued recent historical trends in out-of-state patient volumes (imports) and observation visits; 10 percent of and patients leaving the state for inpatient care (exports) are retained in state. Assumes target occupancy rate of 78 percent (70 percent for Obstetrics). Seventy percent is used as a target occupancy rate for obstetrics in order to account for the random versus predictable nature of the utilization of this service.

Using the same target occupancy rates as in the low-range scenario above, we estimate that hospitals in the state would need 2,484 beds in 2017 to meet the projected demand based on our high-range assumption (***Figure 10***). Comparing the number of needed beds to current capacity shows that there would be a shortage of 64 beds in total in 2017.

Figure 10: Impact of High-Range Assumption Model by Service Area Assuming Projections to 2017 [1/]

Service Area	Med/Surg	Obstetrics	Pediatrics	Pediatric Psych	Adult Psych	ICU	Total
Target Occupancy	78%	70%	78%	78%	78%	78%	
Estimated Shortage / Surplus Based on Population (High-Range Estimate)							
Current Bed Supply	1,426	192	91	71	339	301	2,420
Beds Needed	1,584	135	52	75	338	300	2,484
Shortage / Surplus	-158	57	39	-4	1	1	-64

1/ High range estimates assumes Graham population and demographic trends; increase in inpatient utilization for adults of 0.82 percent per year due to obesity; 25 percent reduction in hospital readmissions; 1.1 percent per year reduction in days due to shifting services to outpatient setting; continued recent historical trends in out-of-state patient volumes (imports) and observation visits; 10 percent of and patients leaving the state for inpatient care (exports) are retained in state. Assumes target occupancy rate of 78 percent (70 percent for Obstetrics). Seventy percent is used as a target occupancy rate for obstetrics in order to account for the random versus predictable nature of the utilization of this service.

Model Assumptions Based on Recent Usage Rate and Length of Stay Trends

To further test the sensitivity of our model, we forecast inpatient demand in Rhode Island assuming that trends in inpatient discharges per 1,000 population and average lengths of stay observed during the 2008 through 2011 period continue into the near future. Typically, the use of current trends is often a good predictor for short run forecasting. This analysis takes into account recent trends in utilization by service type and by age/sex category; changes in population and demographics; and the impact of expanded health insurance coverage under the ACA beginning in 2014.

Figure 11 illustrates high and low range demand scenarios that adjust the observed historical trends by +/- 10 percent. The historical trend data show declining use rates for most of the service categories, even after controlling for age and sex. Thus, the table shows that even under the high-range estimate that demand for inpatient days could decline by 49,311 days by 2017, relative to 2010 utilization; this equates to a decline of 7.3 percent. Under the low-range scenario, demand for inpatient days could decline by 90,400 days by 2017 relative to 2010 utilization, or 13.3 percent. Under both scenarios, demand for all types of beds, except observation beds, would decline.

Figure 11: Impact of Low and High-Range Model Assumptions on Inpatient Utilization (Days of Care) Based on Recent Usage Rate and Length of Stay Trends - Projections to 2017[1/]

	Type of Service							
	Med/Surg	Obstetrics	Pediatrics	Pediatric Psych	Adult Psych	ICU	Observation	Total
Baseline 2010	388,925	38,624	16,239	25,546	93,070	82,281	35,109	679,794
Projection to 2017								
Low Estimate: Trend - 10%	317,641	30,230	14,345	22,986	91,445	64,177	48,569	589,394
High Estimate: Trend + 10%	346,304	31,312	14,032	22,912	95,168	69,620	51,135	630,483
Percent Change from 2010 Baseline								
Low Estimate	-18.3%	-21.7%	-11.7%	-10.0%	-1.7%	-22.0%	38.3%	-13.3%
High Estimate	-11.0%	-18.9%	-13.6%	-10.3%	2.3%	-15.4%	45.6%	-7.3%

1/ Low-range estimate assumes Graham population and demographic trends; historical annual change in discharges per 1,000 and average length of stay for Rhode Island patients minus 10 percent; historical annual change in import cases and observation visits minus 10 percent. Assumes continued recent historical trends in patients leaving the state for inpatient care (exports). Assumes target occupancy rate of 78 percent (70 percent for Obstetrics).

High-range estimate assumes Lewin population and demographic trends; historical annual change in discharges per 1,000 and average length of stay for Rhode Island patients plus 10 percent; historical annual change in import cases and observation visits plus 10 percent. Assumes 10 percent of and patients leaving the state for inpatient care (exports) are retained in state. Assumes target occupancy rate of 78 percent (70 percent for Obstetrics).

Seventy percent is used as a target occupancy rate for obstetrics in order to account for the random versus predictable nature of the utilization of this service.

Comparing the number of needed beds to current capacity shows that there would be an excess between 193 and 338 beds in total, in 2017 (***Figure 12***). Under these scenarios, the cost of excess capacity in the system would be between $12.1 and $21.1 million in 2017.

Figure 12: Impact of High and Low-Range Bed Need Scenarios Based on Recent Usage Rate and Length of Stay Trends by Service Area Assuming Projections to 2017 [1/]

Service Area	Med/Surg	Obstetrics	Pediatrics	Pediatric Psych	Adult Psych	ICU	Total
Target Occupancy [2/]	78%	70%	78%	78%	78%	78%	
Estimated Shortage/Surplus Based on Population (Low-Range Estimate)							
Current Bed Supply	1,426	192	91	71	339	301	2,420
Beds Needed	1,286	118	50	81	321	225	2,082
Shortage/Surplus	140	74	41	-10	18	76	338
Cost of Excess Capacity	$8,019,408	$4,229,831	$2,331,433	-$630,420	$1,152,290	$6,877,650	$21,121,861
Estimated Shortage/Surplus Based on Population (High-Range Estimate)							
Current Bed Supply	1,426	192	91	71	339	301	2,420
Beds Needed	1,396	123	49	80	334	245	2,227
Shortage/Surplus	30	69	42	-9	5	56	193
Cost of Excess Capacity	$1,722,585	$3,986,588	$2,394,629	-$613,476	$305,828	$5,137,906	$12,065,969

1/ Low-range estimate assumes Graham population and demographic trends; historical annual change in discharges per 1,000 and average length of stay for Rhode Island patients minus 10 percent; historical annual change in import cases and observation visits minus 10 percent. Assumes continued recent historical trends in patients leaving the state for inpatient care (exports). Assumes target occupancy rate of 78 percent (70 percent for Obstetrics).

High-range estimate assumes Lewin population and demographic trends; historical annual change in discharges per 1,000 and average length of stay for Rhode Island patients plus 10 percent; historical annual change in import cases and observation visits plus 10 percent. Assumes 10 percent of and patients leaving the state for inpatient care (exports) are retained in state. Assumes target occupancy rate of 78 percent (70 percent for Obstetrics).

2/ Seventy percent is used as a target occupancy rate for obstetrics in order to account for the random versus predictable nature of the utilization of this service.

Model Assumptions Based on Alternative Target Occupancy Rates

The shortage/surplus estimates are very sensitive to the target occupancy rate used. Our review of the literature found that there is no standard for determining what an optimal occupancy rate should be. Standard occupancy rates used by state certificate of need (CON) programs for medium sized hospitals range from 65 and 85 percent and earlier studies on this issue estimated optimum bed capacity at 74 percent, the average hospital occupancy rate prior to Medicare prospective payment systems (PPS).

Our analyses above base a target occupancy rate on a queuing theory model, where the "ideal" occupancy rates increase with lower desired probabilities of having to turn away emergency patients. Using this method yields an ideal occupancy rate of 78 percent for a 150 bed hospital, with a probability of turning away 1 in 1,000 emergency cases. As a benchmark, our preliminary analysis of occupancy rates for Rhode Island hospitals found occupancy rates for acute care hospitals in Rhode Island to be 66 percent for medical-surgical beds (excluding observation days), 72 percent for ICU beds, and 72 percent for psychiatric/rehabilitation beds in 2010.

For illustrative purposes, we calculate the bed shortage/surplus using the same demand forecast assumptions presented in ***Figures 11 and 12,*** but assume a target occupancy rate of 74 percent instead of 78 percent (70 percent was still used for obstetric cases). ***Figure 13*** shows that

reducing the target occupancy rate from 78 percent to 74 percent can dramatically change the bed shortage/surplus estimates. This table shows that this decision would make a significant difference in the estimate of excess bed capacity in the state.

Figure 13: Impact Changing Target Occupancy Rates under a High and Low-Range Bed Need Scenarios Based on Recent Usage Rate and Length of Stay Trends by Service Area Assuming Projections to 2017 [1/]

Service Area	Med/Surg	Obstetrics	Pediatrics	Pediatric Psych	Adult Psych	ICU	Total
Target Occupancy	74%	70%	74%	74%	74%	74%	
Estimated Shortage / Surplus Based on Population (Low-Range Estimate)							
Current Bed Supply	1,426	192	91	71	339	301	2,420
Beds Needed	1,356	118	53	85	339	238	2,189
Shortage/Surplus	70	74	38	-14	0	63	231
Cost of Excess Capacity	$4,028,019	$4,229,831	$2,175,084	-$912,921	$28,436	$5,768,856	$14,480,431
Estimated Shortage / Surplus Based on Population (High-Range Estimate)							
Current Bed Supply	1,426	192	91	71	339	301	2,420
Beds Needed	1,471	123	52	85	352	258	2,341
Shortage/Surplus	-45	69	39	-14	-13	43	79
Cost of Excess Capacity	-$2,609,172	$3,986,588	$2,241,696	-$895,061	-$863,780	$3,935,071	$4,949,360

1/ Low-range estimate assumes Graham population and demographic trends; historical annual change in discharges per 1,000 and average length of stay for Rhode Island patients minus 10 percent; historical annual change in import cases and observation visits minus 10 percent. Assumes continued recent historical trends in patients leaving the state for inpatient care (exports). Assumes target occupancy rate of 74 percent (70 percent for Obstetrics).

High-range estimate assumes Lewin population and demographic trends; historical annual change in discharges per 1,000 and average length of stay for Rhode Island patients plus 10 percent; historical annual change in import cases and observation visits plus 10 percent. Assumes 10 percent of and patients leaving the state for inpatient care (exports) are retained in state. Assumes target occupancy rate of 74 percent (70 percent for Obstetrics).

Seventy percent is used as a target occupancy rate for obstetrics in order to account for the random versus predictable nature of the utilization of this service.

Review of Stakeholder Interviews

A group of Rhode Island stakeholders was identified by project sponsors to provide input on factors to be considered in developing the Bed Need Model. The group of 23 individuals was subdivided into three categories based on their relationship to the health care system; these groups included hospital executives or representatives, payers, and government officials and the public. Please refer to **Appendix 1** for a List of Interviewees. Individual interview tools were developed with questions targeted to elicit responses unique to the stakeholder's area of expertise. Please refer to **Appendix 2** for these Interview Tools. Interviews were conducted during from November 2012 to January 2013 via conference calls. The interview tools were used to guide the discussions, which centered around current health care issues in Rhode Island and their potential impact on inpatient bed need in the future. Several common themes emerged from the interviews, identified as factors that influence bed need and future health planning.

Initial themes and their potential impact on the Bed Need Model and future health planning was presented to the Health Planning Council on December 19, 2012 via video conference.

Factors that Influence Bed Need

Seven factors were identified during the interview process as having an influence on the Bed Need Model. The first factor was under-utilization of inpatient capacity. Interviewees noted that bed days had decreased significantly over time as inpatient services moved to outpatient settings. Occupancy is declining, while observation days are increasing, but are not counted as inpatient days, leading to differences in reported occupancy rates. Additionally, the patients that are still using inpatient services are much sicker than in the past. Thus, fewer beds are in use, but the case mix has become higher over time. There was general agreement that selective removal of beds in low occupancy settings would not necessarily reduce costs because of the associated overhead costs that cannot be easily eliminated.

The second factor identified as having an impact on inpatient bed need is excess capacity of inpatient beds. Most stakeholders agreed that there is an excess capacity of inpatient beds in Rhode Island hospitals. However, there was some dissension regarding the source of the excess capacity and the services impacted. Many felt that beds were simply maldistributed geographically, while others felt that there were too many beds in Providence and possibly Washington County, but not elsewhere. Opinions varied regarding the adequacy of behavioral health services and associated beds. Many stakeholders expressed a need for the availability of additional outpatient mental health and substance abuse services. Some wanted to see more outpatient services, while others believed that more inpatient psychiatric beds were necessary.

The third factor that stakeholders thought could affect bed need is the concept that the volume of services delivered can affect quality of care. Many people noted that there is a demonstrated link between the volume of certain services provided and the quality of the health care achieved. Stakeholders cited the current fragmentation in the system as prohibiting the scale or volume of services necessary to achieve the best quality and lowest costs for select services. Most interviews included a discussion of whether Centers of Excellence might be an option for the provision of specialized services. The majority of stakeholders agreed that this could be a good solution to reach the volume and scale of services necessary for quality outcomes, but there were differing opinions regarding the need for in-state versus out-of-state options.

The fourth factor that stakeholders suggested for consideration is the idea that "a bed is not a bed is not a bed," or the need to differentiate between the different types of beds according to the services delivered and the accompanying resource needs of medical/surgical, obstetric, psychiatric, intensive care, and teaching or academic beds. Many people suggested that the Bed Need Model should account for the economic value of research, medical education, and should support a "stand-by" capacity and other medical services required by the state. In addition to type of bed, the level of case-mix or patient acuity ought to be part of the calculation to determine inpatient bed need. Finally, the issue of bed type, or licensed versus staffed beds, was raised by many interview participants. The consensus was that the Bed Need Model should use staffed beds since because it is a more accurate reflection of the actual beds in use in Rhode Island hospitals.

The fifth factor that stakeholders anticipate will affect bed need is the evolution of reimbursement models that will be implemented in the future. Many interviewees pointed to the Patient Centered Medical Home pilot program currently ongoing in Rhode Island as an example of a reimbursement model which appears to have reduced inpatient utilization. Other provisions of health reform that may impact utilization are the Medicare readmission reduction program, and incentives for providers to form Accountable Care Organizations (ACOs). Participants felt that moving toward bundled payments, global budgets or capitation may have the effect of "right sizing" inpatient utilization. Certain initiatives that have recently begun, such as the Medicare Pioneer ACOs and moving Medicare-Medicaid enrollees into managed care arrangements will likely impact future inpatient utilization.

The sixth factor, population health and changing demographics, is an overarching theme which will impact all aspects of health service delivery and inpatient bed need in the future. About half of the stakeholders thought that health status in Rhode Island is considered average compared to neighboring states, while others cited specific diseases and conditions that they felt needed additional attention in the future. People noted the impact of an aging population, high rates of cancer, cardiac disease, mental health and substance abuse conditions, increasing incidence of infectious disease and certain illnesses with higher prevalence among populations of lower socioeconomic status, particularly obesity[6]. In addition, changing demographics in Rhode Island are expected to impact service needs, requiring different types of services delivered in a culturally competent manner. Many people noted transportation challenges as a barrier to accessing care. Public transportation is inadequate in some areas of the state, and Rhode Islanders are traditionally reluctant to travel for health care services. Finally, several interviewees noted that Rhode Island has been disproportionately impacted by the "Great Recession" and that it may be a factor in recent health care utilization trends.

The seventh and final factor to influence inpatient bed supply is the impact of the ACA provisions on utilization of services. Stakeholders were mostly in agreement that the ACA provisions would have a minimal impact on bed need because people who need care are receiving it now, even if they are not insured. Interviewees felt that the ACA will result in more people having health insurance in Rhode Island, which may encourage an initial increase in utilization as people access procedures they previously delayed, but most people thought that there would be a decrease in utilization in the long term as coordination of care initiatives are implemented care settings are shifted.

Factors That Influence Future State Planning

Four other factors that could influence future state health planning efforts also emerged from the interviews. The first factor is a general agreement that population health should be the focus moving forward. Individuals felt that health outcomes could be better in Rhode Island and that there was a need to better target services to new populations brought about by changing demographics. The second factor that most individuals voiced was the need to revise the Certificate of Need (CON) process. Many individuals noted that the process is rigorous and probably deters unwarranted applications, but it does not adequately assess need and almost

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[6] Ball, K., and D. Crawford. 2005. Socioeconomic Status and Weight Change in Adults: A Review. *Social Science & Medicine* 60(9): 1987-2010.

never denies applications. The current process has likely been eclipsed by changes in the health care system and the pressure of market forces for efficiency. The third factor, raised by many interviewees, is that a comprehensive health plan is necessary to guide future resource allocation decisions. The current state plan has not been updated in 25 years and it is difficult to consider bed need in a vacuum without looking at other factors that have an impact. A statewide plan is necessary to address high costs and poor financial performance in Rhode Island hospitals. Finally, almost all interview participants expect future health planning to be affected by additional mergers of hospitals, clinics and provider groups. Mergers can bring consolidation of services, improved quality and reduced costs for better coordinated services at the best value.

The results of the interviews are summarized and compiled in three separate documents corresponding to stakeholder categories which highlight themes, agreement on the themes within the group, and selected quotes to illustrate the dimensions of the topic. All quotes are anonymous. See **Appendix 3** for detailed Interview Results.

Description of Bed Need Model Methodology

The purpose of the Bed Need Model is to estimate the potential surplus or deficit of hospital inpatient staffed beds in Rhode Island. The basic methodology for the model is first to estimate future demand for hospital inpatient services as defined by inpatient days, based on changes in population, demographics and health care trends. Projected inpatient days are divided by 365 days per year to compute an average daily census, which is the average number of occupied beds per day. Average daily census is converted to the optimum number of beds that are required for all hospitals in an area to operate at maximum capacity. The optimum number of beds is then compared to the actual number of staffed beds in the area and the difference yields the bed surplus or deficit.

Population Projections

The population projections produced by the U.S. Bureau of the Census for the state of Rhode Island show that there were about 1.117 million residents in the state in 2010.[7] The Census Bureau also estimates that the Rhode Island population will increase to 1.154 million by 2020. These estimates were prepared in 2005 and based on the 2000 Census of the population. The U.S. Bureau of the Census has not produced more recent state-level population projections and does not plan to in the future. The Rhode Island Statewide Planning Program estimates there were 1.074 million people in the state in 2010 which will increase to 1.111 million by 2020 and 1.140 million by 2030.

However, these trends contradict the U.S. Census Bureau's recent state-level estimates for Rhode Island that shows the population in the state has been declining over the recent years from 1.064 million in 2005 to 1.050 million in 2012. For the Bed Need Model, we create two sets of population projections to examine the sensitivity of the model around population growth and demographic change. The first uses the Graham Center population projections for the state by age and sex that show an increase in the population similar to the Census Bureau and

[7] Annual projections based on the 2000 Census of the Population by single year of age and sex, http://www.census.gov/population/projections/data/state/projectionsagesex.html

Statewide Planning Program assumption. These data are used in order to be consistent with the Graham Center Primary Care report for the state. The second set of population projections are produced by Lewin using the Census Bureau's current estimates for the state by age and sex that show a declining population from 2006 to 2012; we then project these trends through 2030. ***Figure 14*** shows the statewide projections under both assumptions. However, neither set of projections include estimates by race or ethnicity.

The U.S. Bureau of the Census does not produce sub-state population projections at the county, city or town level. The Census Bureau does produce current estimates of the population at the county level by various demographic groups. However, only total population estimates are produced for cities and towns. We explored using data from the Rhode Island State Planning Project, which provided total population projection estimates by county, city and town. However, population projections by age, sex, and race are calculated using statewide age, sex, and race distributions. Therefore, the demographic mix for each community is exactly the same, which did not suit the purpose for the model.

Figure 14: Population Projection Scenarios for the State of Rhode Island (2010-2030)

Demographic Group	2010	2015	2020	2025	2030
Graham Center Population Projections (Increasing Population)					
Under 18	223,955	214,669	206,587	199,612	190,764
18-44 Male	189,832	185,362	182,814	182,058	176,447
18-44 Female	193,959	187,796	183,653	181,407	174,608
45-64	292,940	333,719	383,174	443,579	500,918
65-74	73,880	75,730	78,922	83,675	86,513
75 & over	78,001	79,937	83,776	90,081	91,884
Total	1,052,567	1,077,213	1,118,926	1,180,413	1,221,134
Lewin Group Population Projections (Decreasing Population) [1/]					
Under 18	223,955	215,429	216,623	217,184	213,351
18-44 Male	189,832	185,846	182,199	175,905	171,770
18-44 Female	193,959	189,011	185,331	177,344	171,831
45-64	292,940	291,055	274,279	259,787	247,577
65-74	73,880	89,765	104,002	114,931	120,056
75 & over	78,001	75,426	78,929	91,041	106,435
Total	1,052,567	1,046,532	1,041,363	1,036,192	1,031,020

1/ Lewin Group projections using historical trends from U.S. Census Bureau current estimates of the Rhode Island population.

For the Lewin projections, we examine data from the American Community Survey (ACS); this is also conducted by the U.S. Bureau of the Census and is an ongoing statistical survey that samples a small percentage of the population every year and provides detailed information on population within small areas. We use these data to estimate the population by age and sex for

each city and town in Rhode Island.[8] We then adjust the population counts to match the state-level projections for 2010 by age and sex ***(Figure 15)***.

Future population projections are estimated using the annual state-level population change by age and sex, applied to the city and town level estimates for 2010. We then made a second adjustment so that total population equaled the Lewin projected state totals for 2008 through 2030 as shown in ***Figure 14***.

Due to limited detailed demographic information in the population projections that are available, we are not able to include race, ethnicity or insurance coverage status in our population data for the Bed Need Model.

[8] Data from the 2007-2011 American Community Survey 5-Year Estimates were used for the analysis.

Figure 15: Estimates of 2010 Population by City, Town and Demographic Group in Rhode Island (Lewin Group Projections using Current Census Population Estimates)

Town	Under 18	18-44 Female	18-44 Male	45-64	65-74	75 & over	Total
Barrington	4,492	2,222	1,963	5,333	1,145	1,241	16,396
Bristol	3,697	4,561	4,174	6,504	1,843	2,303	23,082
Burrillville	3,329	2,574	2,613	5,531	904	999	15,950
Central Falls	5,486	4,102	4,629	3,737	931	1,012	19,897
Charlestown	1,405	1,306	1,148	2,535	989	488	7,871
Coventry	8,034	5,529	5,365	10,866	2,893	2,315	35,002
Cranston	16,432	13,371	15,097	23,410	5,551	6,510	80,371
Cumberland	7,173	5,277	5,836	9,652	2,306	3,048	33,292
East Greenwich	3,381	1,837	1,838	4,294	823	968	13,141
East Providence	9,364	8,204	7,498	13,198	3,958	4,950	47,172
Exeter	1,319	1,104	1,009	2,368	430	286	6,516
Foster	1,031	626	698	1,633	407	185	4,580
Glocester	2,029	1,645	1,497	3,484	653	497	9,805
Hopkinton	1,371	1,273	1,207	3,038	603	672	8,164
Jamestown	1,116	645	563	2,194	547	365	5,430
Johnston	5,756	4,586	4,811	7,939	2,448	3,196	28,736
Lincoln	4,489	3,281	3,388	6,506	1,756	1,663	21,083
Little Compton	686	351	447	1,218	483	323	3,508
Middletown	3,703	2,676	2,542	4,657	1,214	1,398	16,190
Narragansett	2,397	3,061	2,760	5,032	1,364	1,329	15,943
New Shoreham	153	94	126	364	126	92	955
Newport	3,841	5,320	5,551	6,304	2,065	1,547	24,628
North Kingstown	6,343	4,014	4,007	8,614	2,082	1,437	26,497
North Providence	6,025	5,615	5,283	8,978	2,750	3,468	32,119
North Smithfield	2,483	1,840	1,503	3,762	1,086	1,171	11,845
Pawtucket	16,271	13,668	13,304	18,642	4,371	4,890	71,146
Portsmouth	3,710	2,230	2,446	5,848	1,557	1,526	17,317
Providence	41,586	43,925	41,015	35,324	7,535	7,671	177,056
Richmond	1,947	1,286	1,403	2,353	521	164	7,674
Scituate	2,417	1,457	1,482	3,635	820	503	10,314
Smithfield	3,674	4,279	3,859	5,953	1,732	1,914	21,411
South Kingstown	5,773	6,160	5,958	8,256	1,937	2,291	30,375
Tiverton	3,140	2,379	2,279	4,954	1,511	1,445	15,708
Warren	2,037	1,536	1,938	3,384	911	915	10,721
Warwick	15,695	13,760	13,576	25,572	6,489	8,031	83,123
West Greenwich	1,479	1,076	864	2,043	374	185	6,021
West Warwick	5,780	5,251	5,829	8,426	2,005	1,937	29,228
Westerly	4,853	3,661	3,539	6,899	1,992	1,885	22,829
Woonsocket	10,058	8,177	6,787	10,500	2,768	3,181	41,471
State Total	223,955	193,959	189,832	292,940	73,880	78,001	1,052,567

Source: Lewin Group population projections based on the American Community Survey data for 2007-2011 (5-year estimates).

Inpatient Utilization Data

The primary data source for the Bed Need Model is the Rhode Island Department of Health Hospital Discharge Data for 2008 through 2011. These data include inpatient discharges for all Rhode Island hospitals within a fiscal year. The data include discharges for Rhode Island

residents as well as patients from outside the state who are accessing Rhode Island hospitals. The inpatient hospital discharge data do not include stays for Rhode Island residents that use inpatient services outside the state. The data do not include discharges for outpatient/observation stays. The discharge data consist of 565,399 discharges over the four-year period and we include discharge data for all acute care hospitals in the state as well as Rehab Hospital of Rhode Island, Butler Hospital and Emma Bradley Hospital.

For the Bed Need Model, we exclude discharges for normal newborns with DRG 795 (34,532 discharges), children under 28 days old (15,987 discharges) and for patients whose age was unknown (17 discharges). We also exclude discharges for Rhode Island patients where the town or city is unknown (4,044 discharges). Thus, the total number of discharges used for the Bed Need Model is 469,651 Rhode Island residents and 41,168 non-residents. ***Figure 16*** shows the total number of days and discharges included in the model.

Figure 16: Discharges, Days, and ALOS used for the Bed Need Model [1/]

	2008	2009	2010	2011
Sum of Discharges				
RI patients	120,693	120,018	113,676	115,264
Out of state patients	10,566	10,510	10,172	9,920
Total	131,259	130,528	123,848	125,184
Sum of Days				
RI patients	641,228	624,897	592,364	591,251
Out of state patients	58,475	59,168	52,321	50,561
Total	699,703	684,065	644,685	641,812
Average Length of Stay				
RI patients	5.3	5.2	5.2	5.1
Out of state patients	5.5	5.6	5.1	5.1
Total	5.3	5.2	5.2	5.1

1/ Include Rhode Island patients using Rhode Island hospitals, excludes newborns less than 28 days.

We categorize each discharge into service groups based on patient age and DRG ***(Figure 17).*** Discharges, total days and ICU/CCU days for Rhode Island patients are summarized by year, service category, age/sex (to match population data) and city/town. We also include race/ethnicity (white, black, Asian, Hispanic and other) and insurance status (self-pay and other) that are not currently used by the model but could be included later if population data that includes these variables become available. Discharges for non-Rhode Island patients are also summarized by year, service group and hospital in order to examine the trend in patient imports for the model.

Figure 17: Service Categories used for the Bed Need Model

Service Category	Description
Pediatrics	All services for patients under age 18, except psychiatrics
Obstetrics	Pregnancy, Childbirth, Puerperium (MDC 14)
Cardiology	Diseases of the Circulatory System (MDC 5)
Orthopedics	Musculoskeletal System and Connective Tissue (MDC 8)
Psychiatrics	Mental Disorders and Alcohol/Drug Abuse (MDC 19/20)
Other Medical	All other medical DRGs
Other Surgical	All other surgical DRGs

Information on outpatient/observation visits from 2009 through 2012 was provided by the Hospital Association of Rhode Island for each acute care hospital in the state. These data show that the number of observation visits increased from 23,540 in 2009 to 29,617 in 2012—a 26 percent increase. Data on the number of observation days were not available, so we assume that the average length of an observation stay is 1.25 days based on a study of Medicare observation visits from 2007 to 2009.[9]

Recent Trends in Inpatient Utilization

The summarized hospital inpatient discharge data for Rhode Island patients are combined with the Rhode Island population data in order to examine trends in use rates (discharges per 1,000 population) and average length of stay (ALOS). ***Figure 18*** shows the recent trends in discharges per 1,000 population and ALOS from 2008 through 2011 by service group and age/sex.

[9] Zhanlian Feng, Brad Wright and Vincent Mor, "Sharp Rise In Medicare Enrollees Being Held In Hospitals For Observation Raises Concerns About Causes And Consequences", Health Affairs, June 2012.

Figure 18: Recent Trends in Discharges per 1,000 Population and ALOS (2008-2011) [1/]

Service Group	Demo Group	Discharges per 1000 population					Average Length of Stay				
		2008	2009	2010	2011	Annual Trend	2008	2009	2010	2011	Annual Trend
Cardiology	18-44 Female	2.1	1.9	1.7	1.7	-7%	3.5	3.9	3.9	3.7	2%
	18-44 Male	3.3	3.1	2.8	2.6	-8%	2.8	3.1	3.3	3.1	4%
	45-64	18.6	17.4	15.4	14.5	-8%	3.6	3.8	3.8	4.0	4%
	65-74	49.6	46.2	41.2	37.9	-9%	4.2	4.2	4.5	4.5	2%
	75+	111.2	102.8	94.0	88.7	-7%	4.8	4.7	4.9	4.8	0%
Obstetrics	18-44 Female	62.1	59.8	58.2	58.5	-2%	3.0	3.1	3.0	3.0	0%
	45-64	0.1	0.1	0.0	0.1	7%	5.4	3.2	4.1	3.5	-13%
Orthopedics	18-44 Female	3.3	3.2	3.0	2.7	-7%	3.5	3.7	3.2	3.2	-3%
	18-44 Male	4.1	4.4	4.0	4.1	0%	3.8	3.8	3.9	3.9	1%
	45-64	11.5	12.0	11.4	12.3	2%	4.1	4.0	4.0	3.8	-3%
	65-74	27.0	26.3	25.1	26.8	0%	4.4	4.3	4.3	3.8	-5%
	75+	43.7	42.8	41.5	41.6	-2%	5.4	5.1	5.1	4.9	-3%
Other Medical	18-44 Female	20.3	20.2	18.5	18.4	-3%	3.8	4.0	3.8	3.8	0%
	18-44 Male	17.2	18.2	18.2	18.8	3%	4.3	4.2	4.1	4.1	-2%
	45-64	46.5	47.1	45.0	46.5	0%	5.1	5.0	5.1	5.0	-1%
	65-74	103.2	100.9	97.6	101.6	-1%	5.9	5.5	5.7	5.5	-2%
	75+	226.7	220.7	217.0	226.3	0%	5.8	5.7	5.7	5.6	-1%
Other Surgical	18-44 Female	12.3	12.6	10.5	10.3	-6%	3.7	3.8	3.7	3.6	-1%
	18-44 Male	6.3	5.8	5.4	5.1	-6%	7.4	6.7	7.2	7.7	1%
	45-64	19.2	19.4	16.9	15.9	-6%	6.4	6.3	6.4	6.3	-1%
	65-74	31.9	32.2	28.5	26.6	-6%	7.9	7.7	7.3	7.5	-2%
	75+	38.3	36.9	32.6	30.3	-8%	9.0	8.9	9.1	8.6	-1%
Pediatric	Under18	23.4	25.8	21.8	22.4	-1%	3.3	3.1	3.1	3.3	-1%
Psychiatrics	Under18	7.4	7.9	9.5	9.6	9%	12.6	12.6	10.5	10.4	-6%
	18-44 Female	15.1	15.2	15.0	15.1	0%	7.5	6.7	6.6	5.9	-8%
	18-44 Male	15.7	17.3	17.5	19.6	8%	6.7	6.3	6.0	5.9	-4%
	45-64	16.9	17.1	16.7	18.3	3%	8.2	7.7	7.2	7.0	-5%
	65-74	8.7	9.2	9.1	9.8	4%	10.7	10.6	10.8	10.4	-1%
	75+	12.4	12.4	12.1	12.0	-1%	10.5	9.7	10.3	10.7	0%

1/ Include Rhode Island patients using Rhode Island hospitals, excludes newborns less than 28 days. Population based on Census Bureau population estimates for Rhode Island.

Figure 19 shows the recent trend in inpatient days for non-Rhode Island patients being treated in Rhode Island hospitals. These data represent "imports" and show that the days of care for non-residents using Rhode Island hospitals is declining for most hospitals.

Figure 19: Recent Trends in Inpatient Days for Non-Rhode Island Patients Treated in Rhode Island Hospitals (Imports) 2008-2011 [1/]

Service	2008	2009	2010	2011	Annual Trend (CAGR)
Emma Bradley Hospital	6,105	6,545	2,945	3,898	-14%
Butler Hospital	2,522	2,818	2,714	2,636	1%
Kent Hospital	1,542	1,411	1,189	1,710	4%
Landmark Medical Center	2,379	2,739	2,516	2,395	0%
Memorial Hospital	2,700	2,352	2,088	2,119	-8%
The Miriam Hospital	5,062	4,606	4,498	3,414	-12%
Newport Hospital	1,082	895	900	593	-18%
Rehabilitation Hospital	1,166	1,132	936	908	-8%
Rhode Island Hospital	19,579	21,488	19,880	20,072	1%
Roger Williams Medical Center	1,400	1,090	1,291	898	-14%
South County Hospital	280	194	236	249	-4%
St. Joseph Health Services	1,482	1,275	1,144	724	-21%
Westerly Hospital	6,192	5,972	5,927	5,399	-4%
Women & Infants Hospital	6,984	6,651	6,057	5,546	-7%
Total	58,475	59,168	52,321	50,561	-5%

1/ Include non-residents using Rhode Island hospitals, excludes normal newborns.

Projecting Future Inpatient Utilization

The Bed Need Model provides a number of options for projecting inpatient utilization for Rhode Island hospitals. The following user options are available:

	User Inputs
Projection year (2012-2030)	2017
Population Scenario	2
1. Graham Center Projections (increasing population)	
2. Lewin Group Projections (decreasing population)	
Projected use rates (discharges per 1,000)	1
1. Status Quo (same as current)	
2. Current trend / dampening effect	1.0
Other Factors Influencing Utilization	
1. Impact of Obesity	0.0%
2. Reduced Readmissions	0.0%
3. Shift from Inpatient to Outpatient	0.0%

	User Inputs
Projected Average Length of Stay	1
1. Status Quo (same as current)	
2. Current trend / dampening effect	1.0
Projected Observation Visits	1
1. Use most recent utilization	
2. Current trend / dampening effect	0.0
Projected Import Patients	1
1. Use most recent utilization	
2. Current trend / dampening effect	0.0
Projected Exports	1
1. No change	
2. Current trend	
3. Assume percent retained in-state	0%
Impact of Enhanced Primary Care	1
1. PCMH (8.1% reduction in hospitalizations)	
2. ACO (10.5% reduction based on Wellmed)	
3. HRR increase in PC supply (3.75% reduction)	
In State Patient Migration Assumption	1
1. Bed need based on patient residence (no travel)	
2. Bed need assumes current travel patterns	
Target Occupancy Rate	
Medical/Surgical	78%
Obstetrics	70%
Pediatrics	78%
Pediatric Psych	78%
Adult Psych	78%
ICU	78%

Projection Year and Scenario: This option selects the year for the projection and is used to determine the future population and demographic distribution by city and town for that year. The population scenario allows for using the two different population trends described above.

Projected use rates: This option allows two selections that are used to adjust the discharges per 1,000 population rate, which is based on the last year of complete historical data (2010).

- "Status Quo" option is used to simulate only the effect of changes in the population on inpatient demand. This option does not change the discharges per 1,000 population rates from the last historical year, which assumes there is no change in the inpatient usage rates of residents.

- "Current Trend" option calculates the trend in usage rates over the four year historical period for each service category and age/sex group using a compound annual growth rate method. The result of this calculation is used to project use rates for the "Projection Year". This method assumes that the observed historical trend in utilization continues into the future. However, we provide an option for a dampening effect, which limits the impact of the trending function. We recommend this be set between 0.5 and 1.5. For example, if the trending function determines that use rates will decline by 50 percent over the projection period, then a dampening effect of 0.5 will limit that decline to only 25 percent.

Other Factors Influencing Inpatient Utilization: We also provide two additional adjustments to inpatient use rates that account for the impact of increases in the prevalence of obesity over time, the potential reduction in readmission rates and trend of services from inpatient to outpatient.

- *Obesity*: A recent study estimated that the cost of obesity-related illnesses in adults will account for 10.3 percent of national health spending in 2018 as compared to 3.9 percent in 2008 if current trends in obesity prevalence rates continue.[10] Based on this analysis, we assume that the increased prevalence of obesity and its impact on health spending will have a proportionate impact on inpatient utilization. Since the prevalence of overweight and obese adults in Rhode Island in 2011 is similar to the national average, (62.5 percent compared to 63.3 percent respectively) [11] it can be anticipated that the current trend in obesity prevalence will increase inpatient utilization for adults by an additional 0.37 percent to 0.82 percent per year. Values in this range can be used for this option in the Bed Need Model to assume an increase in inpatient demand due to obesity-related illnesses.
- *Readmission Rates*: A national study found that all-cause readmissions within 30 days of discharge accounted for 15.4 percent of total inpatient admissions in 2008.[12] Another study found that about 70 percent of Medicare readmissions that occur within 30 days of discharge are potentially avoidable. [13] Thus, about 11 percent (15.4 percent * 70 percent) of readmissions could be potentially avoidable. Although these studies did not provide state-specific information, we assume that readmission rates in Rhode Island hospitals are similar to national averages. This assumption is based on Medicare Hospital Compare data on readmission rates for Medicare heart attack, heart failure and pneumonia patients indicating that rates for most Rhode Island hospitals are not statistically different from national benchmarks. Based on these data, this option in the model can be set to measure the impact on future demand assuming that potentially avoidable readmissions are reduced over the projection period. This reduction rate is applied across all types of services since service specific data was not available. We

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[10] Kenneth Thorpe, "The Future Costs of Obesity: National and State Estimates of the Impact of Obesity on Direct Health care Expenses," November 2009

[11] Kaiser State Health Facts – Health Status Indicators

[12] Weir, Barret, Stiener and Jiang, "All-Cause Readmissions by Payer and Age, 2008," HCUP Statistical Brief #15, June 2011

[13] Jenny Minott, "Reducing Hospital Readmissions," Academy Health, November 2008.

would recommend using values between -5.5 percent and -2.75 percent, which would represent a 25 to 50 percent reduction in potentially avoidable readmissions.

- *Shift from Inpatient to Outpatient*: Through technology advances there has been a steady trend of hospitals services that have been shifting from the inpatient setting to the outpatient setting and assume that this trend will continue. To estimate this trend we looked at hospital gross inpatient revenue as a percent of total from 2006 through 2010 for Community hospitals in Rhode Island and nationally (***Figure 20***). We used this trend as a proxy for how volume of services has shifted from inpatient to outpatient over this period. We assumed the Rhode Island annual trend (-1.1 percent) and the national trend (-1.7 percent) as a low and high range estimate respectively.

Figure 20: Trend in Hospital Inpatient and Outpatient Gross Revenue Percentage (2006-2010)

	2006	2007	2008	2009	2010	Trend (CAGR)
Rhode Island						
Inpatient	52.7%	52.3%	52.4%	52.1%	50.4%	-1.1%
Outpatient	47.3%	47.7%	47.6%	47.9%	49.6%	
National						
Inpatient	62.2%	61.5%	60.5%	59.0%	58.0%	-1.7%
Outpatient	37.8%	38.5%	39.5%	41.0%	42.0%	

Source: AHA Hospital Statistics 2012

Projected average length of stay: This option allows two selections that are used to adjust the average length of stay, which is based on the last year of historical data.

- "Status Quo" option is used to simulate only the effect of changes in the population on inpatient demand. This option does not change the average length of stay from the last historical year, which assumes there is no change in the length of stay for patients in the state.
- "Current Trend" option calculates the trend in length of stay over the four-year historical period for each service category and age/sex group using a compound annual growth rate method, and uses the result of this calculation to project length of stay to the "Projection Year". This method assumes that the observed historical trend in utilization continues into the future. However, we provide an option for a dampening effect, which limits the impact of the trending function. We recommend this be set between 0.5 and 1.5. For example, if the trending function determines that length of stay will decline by 50 percent over the projection period then a dampening effect of 0.5 will limit that decline to only 25 percent.

Impact of the Affordable Care Act (ACA): The Bed Need Model accounts for the potential increase in hospital inpatient utilization due to the anticipated increase in health insurance coverage for Rhode Island residents beginning in 2014. For this adjustment, we estimate that the percent of Rhode Island residents that are uninsured will decline from 15.2 percent to 6.5 percent once all provisions of the ACA are fully implemented. Using the Rhode Island inpatient

discharge data for 2008 to 2011, we calculate discharges per 1,000 population by age and service category for insured and uninsured patients (assuming the self-pay payer category for uninsured patients) as shown in ***Figure 21***. We then recalculate the number of discharges using the estimated insured and uninsured population by demographic group under the ACA. This analysis assumes that newly insured individuals under the ACA will use the same level of inpatient services as currently insured people within the same demographic group. The last column of the table shows the utilization adjustment that will be used in the model, which will be phased in from 2014 to 2016, when full enrollment in the various programs under the ACA will have occurred.

Figure 21: Calculation of Inpatient Utilization Adjustment due to the ACA Beginning in 2014

Service Group	Demographic Group	Discharges/1,000 Population		Number Discharges		Utilization Adjustment
		Uninsured	Insured	Baseline	ACA	
Cardiology	18-44Female	1.0	2.0	359	383	1.0675
	18-44Male	2.3	2.9	567	587	1.0345
	45-64	11.9	16.4	4,784	4,895	1.0233
Orthopedics	18-44Female	1.1	3.4	598	656	1.0974
	18-44Male	2.5	4.3	787	853	1.0837
	45-64	3.0	12.6	3,428	3,663	1.0688
Other Medical	18-44Female	12.6	20.3	3,773	3,961	1.0499
	18-44Male	15.8	16.8	3,455	3,495	1.0116
	45-64	28.9	46.8	13,447	13,886	1.0327
Other Surgical	18-44Female	4.0	12.9	2,232	2,453	1.0994
	18-44Male	4.2	5.6	1,083	1,136	1.0492
	45-64	7.7	18.6	5,184	5,451	1.0515
Pediatric	Under18	6.4	22.8	5,245	5,406	1.0307
Psychiatrics	Under18	1.1	8.5	1,933	2,006	1.0377
	18-44Female	3.8	17.4	2,941	3,279	1.1148
	18-44Male	5.7	20.3	3,342	3,891	1.1643
	45-64	5.8	18.2	5,012	5,317	1.0610

Source: Lewin Group estimates using the Rhode Island Hospital Discharge data 2008-2011.

Projection Method for Rhode Island residents using Rhode Island hospitals: The Bed Need Model uses the population, inpatient utilization and observation visit utilization data described above to project future inpatient demand as measures in days of care based on the various assumptions specified in the "User Input" section of the model. Projecting future days is done as follows:

- The model first projects population by city/town and age/sex group to the projection year specified and the population growth scenario selected (increasing or decreasing population);

- The model uses base 2010 discharges per 1,000 population for Rhode Island patients using Rhode Island hospitals as the base. These rates are calculated using the population growth scenario selected and computed for each city/town, service category and age/sex cell in the model. An adjustment factor is created for each service category and age/sex group beginning with base year 2010 data, which is trended to the projection year based on all the various projection options described above. The base year 2010 discharge per 1,000 population rates for each city/town, service group and age/sex cell is adjusted by the appropriate service group and age/sex adjuster. This provides the future use rates for each cell.

- Similarly, the model uses base 2010 ALOS for Rhode Island patients using Rhode Island hospitals as the base. These ALOS values are calculated using inpatient days divided by discharges for each city/town, service category and age/sex cell in the model. An adjustment factor is created for each service category and age/sex group beginning with base year 2010 data, which is trended to the projection year based on the all the various projection options described above. The base year 2010 ALOS values for each city/town, service group and age/sex cell is adjusted by the appropriate service group and age/sex adjuster. This provides the future ALOS values for each cell.

- Future demand for Rhode Island patients using Rhode Island hospitals is then calculated for each City/town, service group and age/sex category as:

Projected Population * Trended Discharges/1,000 * Trended ALOS

Projected Observation Visits: The Bed Need Model includes trend data on hospital observation visits provided by the Hospital Association of Rhode Island. However, these are summary data provided for each hospital and not associated with the residence of the patient. Thus, population data is not available to project the potential impact of demographic and population changes on these services. Therefore, the model provides an option that allows two selections that are used to project future observation visits:

- "Use Most Recent Utilization" option maintains the same number of observation visits as was reported in the last year of historical data provided.
- "Current Trend" option calculates the trend in observation visits over the four-year historical period for each hospital using a least squares method, and uses the result of this calculation to project observation visits to the "Projection Year". This method assumes that the observed historical trend continues into the future. However, we provide an option for a dampening effect, which limits the impact of the trending function. This can be set between 0.0 and 1.0. For example, if the trending function determines that length of stay will decline by 50 percent over the projection period, then a dampening effect of 0.5 will limit that decline to only 25 percent.

Note that observation visits are provided and not days. Therefore the model converts visits to days using an average length of stay of 1.25 days, as described above.

Projected Import Patients: The Bed Need Model includes trend data on patient discharges, total days and ICU days for non-Rhode Island patients using Rhode Island hospitals by service type

and hospital. Since these are not Rhode Island residents, population data is not available to project the potential impact of demographic and population changes on these services. Therefore, the model provides an option that allows two selections that are used to project future import patients:

- "Use Most Recent Utilization" option maintains the same number of import patient days as reported in the last year of historical data provided.
- "Current Trend" option calculates the trend in days for import patients over the four year historical period for each hospital using a compound annual growth rate method. The result of that calculation is then used to project number of days to the "Projection Year". This method assumes that the observed historical trend continues into the future. However, we provide an option for a dampening effect, which limits the impact of the trending function. This can be set between 0.0 and 1.0. For example, if the trending function determines that length of stay will decline by 50 percent over the projection period, then a dampening effect of 0.5 will limit that decline to only 25 percent.

Projected Export Days: The Bed Need Model estimates the trend in inpatient days for Rhode Island patients receiving inpatient care in Massachusetts or Connecticut. Summary discharge information for these cases was provided by Lifespan and Care New England. These data show an increase in adult and pediatric cases leaving the state from 6,897 in 2010 to 7,145 in 2011 and represents about five percent of total discharges in the residents in the state.[14] The summary data do not provide detail on number of days, type of service and town of the patient. In using these data in the model, we make the following assumptions: the average length of stay was 5.1 days, export discharges are distributed across service areas in proportion to in-state discharges, and all days were categorized as medical-surgical days.

We provide several options for projecting the impact of export patients on future hospital bed need in Rhode Island:

- "No Change" option assumes there is no change in the volume of export patients in the future. The model will show zeros for export days indicating no impact on bed need.
- "Current Trend" option assumes that the current trend in export patients continues into the future. Although we base this trend on only two years of data, we assume that export cases increase by 3.6 percent annually but assume that average length of stay will decrease by 2.4 percent annually (based on length of stay trends for import patients). Thus, we assume an increase in export patient days of 1.2 percent annually. The model will present the difference between the projected number of days and the total days in 2011 indicating the impact of patients leaving Rhode Island for inpatient care.
- "Assume a Percent of Export Patients Retained In-State" option allows for a 'what if' scenario that will assume that a specified percent of current 2011 export days will be provided by Rhode Island hospitals. This option can be used to model the impact on bed

[14] Discharge data on Rhode Island residents receiving inpatient care outside the state does not include newborns, mental health and substance abuse.

need in the state if services by Rhode Island hospitals are expanded or enhanced to attract patients that are currently leaving the state for care.

Projecting ICU days: The Bed Need Model calculates future inpatient demand in days of care as described in the sections above. From the base year 2010 discharge data, we calculated ICU days as a percent of total days for each cell in the model (city/town, demographic group and service category). Projected ICU days were computed as projected total days multiplied by the ICU percentage observed in the 2010 data.

Impact of Enhanced Primary Care: The Graham Center provided us with estimates of the potential impact on inpatient utilization under three different scenarios of enhancing primary care in the state. The first scenario assumes a statewide primary care medical home model (PCMH), which could reduce inpatient hospitalizations by 8.1 percent. The second scenario assumes primary care providers in the state achieve results similar to a mature Accountable Care Organization, which could reduce inpatient utilization by 10.5 percent based on savings estimates from Wellmed ACO in Texas. The third scenario assumes that increasing primary care physician supply in Rhode Island would reduce hospitalizations by 3.5 percent based on Hospital Referral Region variation in hospitalizations using the Dartmouth Atlas of Healthcare data.

However, we assume that much of the reduction in hospitalizations due to enhanced primary care will focus on hospital readmissions. Therefore, this assumption is reduced if it is used in conjunction with the parameter for reduced hospital readmissions (above) in order to eliminating double counting this effect.

In-State Migration Option: The Bed Need Model provides an option for calculating inpatient demand based on the population within each service area or using historical travel patterns of patients.

- Bed need based on patient residence (no travel): This option calculates bed need based on the population within the service area. This assumes that patients do not travel outside the service area for inpatient care. The results under this option represent bed need based on the population and historical use rates for people within the service area. Under this option, the three specialty hospitals (Butler, Bradley and Rehab Hospital of Rhode Island) are included in the Providence service area.

- Bed need assuming current travel patterns: This option calculates bed need based on historical travel patterns of patients for inpatient care across service areas within the state. ***Figure 22*** shows the percentage of inpatient days for patients residing in a service area versus the hospitals' service area where the care is actually provided. For example, for all medical-surgical days of care for Newport residents, 65.6 percent of days are provided by the hospital in Newport, 30.9 percent of days are provided by hospitals in Providence and the remainder provided by other hospitals within the state. Under this option, specialty hospitals are categorized as a separate group.

Figure 22: In-State Patient Migration from Patient Service Area to Hospital Service Area

Patient Service Area	Hospital Service Area								
	Newport	Pawtucket	Providence	Wakefield	Warwick	Westerly	Woonsocket	Specialty Hospitals	Total
Medical-Surgical Days									
Newport	69.4%	0.3%	27.5%	2.1%	0.5%	0.0%	0.1%	0.2%	100.0%
Pawtucket	0.0%	45.7%	52.4%	0.1%	0.4%	0.0%	0.4%	1.0%	100.0%
Providence	0.8%	3.1%	89.3%	0.2%	4.0%	0.0%	1.2%	1.5%	100.0%
Wakefield	1.7%	0.4%	26.5%	59.1%	6.2%	5.8%	0.1%	0.2%	100.0%
Warwick	0.5%	0.4%	36.7%	4.7%	56.8%	0.1%	0.1%	0.6%	100.0%
Westerly	0.7%	0.2%	19.8%	6.1%	2.5%	70.3%	0.1%	0.4%	100.0%
Woonsocket	0.0%	5.4%	38.2%	0.1%	0.7%	0.0%	48.9%	6.7%	100.0%
Obstetrics Days									
Newport	70.9%	0.2%	25.9%	1.5%	1.3%	0.1%	0.0%	0.0%	100.0%
Pawtucket	0.1%	14.6%	83.8%	0.0%	1.1%	0.0%	0.4%	0.0%	100.0%
Providence	0.7%	2.1%	92.5%	0.1%	4.1%	0.0%	0.6%	0.0%	100.0%
Wakefield	2.1%	0.4%	34.6%	48.8%	8.5%	5.5%	0.1%	0.0%	100.0%
Warwick	0.9%	0.6%	60.0%	3.9%	34.3%	0.2%	0.1%	0.0%	100.0%
Westerly	0.3%	0.3%	19.5%	15.5%	3.6%	60.9%	0.0%	0.0%	100.0%
Woonsocket	0.0%	1.8%	67.5%	0.1%	2.1%	0.0%	28.5%	0.0%	100.0%
Pediatric Days									
Newport	23.0%	0.1%	76.8%	0.1%	0.0%	0.0%	0.0%	0.0%	100.0%
Pawtucket	0.1%	9.0%	90.7%	0.0%	0.2%	0.0%	0.1%	0.0%	100.0%
Providence	0.1%	0.5%	99.0%	0.0%	0.3%	0.0%	0.1%	0.0%	100.0%
Wakefield	0.0%	0.0%	79.7%	17.1%	1.5%	1.7%	0.0%	0.0%	100.0%
Warwick	0.1%	0.2%	91.1%	0.8%	7.8%	0.0%	0.0%	0.0%	100.0%
Westerly	0.0%	0.0%	71.7%	2.8%	0.0%	25.5%	0.0%	0.0%	100.0%
Woonsocket	0.0%	1.4%	94.5%	0.0%	0.2%	0.0%	3.6%	0.2%	100.0%
Pediatric Psych Days									
Newport	3.6%	0.0%	2.7%	0.0%	0.0%	0.0%	0.0%	93.7%	100.0%
Pawtucket	0.0%	1.2%	4.0%	0.0%	0.0%	0.0%	0.0%	94.8%	100.0%
Providence	0.0%	0.0%	3.4%	0.0%	0.0%	0.0%	0.0%	96.5%	100.0%
Wakefield	0.0%	0.0%	2.7%	1.0%	0.0%	0.1%	0.0%	96.2%	100.0%
Warwick	0.0%	0.0%	4.0%	0.1%	0.5%	0.0%	0.0%	95.4%	100.0%
Westerly	0.0%	0.0%	2.7%	0.1%	0.0%	4.2%	0.0%	93.1%	100.0%
Woonsocket	0.0%	0.0%	4.2%	0.0%	0.0%	0.0%	0.0%	95.7%	100.0%

Patient Service Area	Hospital Service Area								
	Newport	Pawtucket	Providence	Wakefield	Warwick	Westerly	Woonsocket	Specialty Hospitals	Total
Adult Psychiatric Days									
Newport	50.7%	0.0%	14.8%	0.1%	6.4%	0.0%	0.8%	27.2%	100.0%
Pawtucket	0.5%	3.1%	39.7%	0.0%	14.3%	0.0%	3.4%	39.1%	100.0%
Providence	1.0%	0.1%	55.9%	0.0%	10.7%	0.0%	2.0%	30.2%	100.0%
Wakefield	2.7%	0.3%	30.5%	8.0%	9.3%	1.0%	2.3%	45.8%	100.0%
Warwick	0.7%	0.0%	29.7%	0.6%	24.7%	0.0%	1.8%	42.4%	100.0%
Westerly	2.2%	0.0%	39.6%	0.8%	8.2%	6.9%	6.0%	36.2%	100.0%
Woonsocket	0.4%	0.3%	30.9%	0.0%	7.2%	0.0%	35.5%	25.8%	100.0%
ICU Days									
Newport	44.3%	0.1%	52.9%	2.5%	0.1%	0.0%	0.2%	0.0%	100.0%
Pawtucket	0.0%	35.3%	63.9%	0.1%	0.3%	0.0%	0.4%	0.0%	100.0%
Providence	0.3%	1.8%	95.7%	0.1%	1.4%	0.0%	0.7%	0.0%	100.0%
Wakefield	0.0%	0.1%	31.3%	64.9%	1.6%	1.9%	0.1%	0.0%	100.0%
Warwick	0.1%	0.3%	61.7%	9.3%	28.1%	0.1%	0.3%	0.0%	100.0%
Westerly	0.1%	0.3%	41.4%	8.4%	1.1%	48.7%	0.0%	0.0%	100.0%
Woonsocket	0.0%	3.7%	57.3%	0.1%	0.4%	0.0%	38.5%	0.0%	100.0%

Source: Lewin Group estimates using the Rhode Island Hospital Discharge data 2008-2011.

Definition of Service Areas Used in the Bed Need Model

As described above, the Bed Need Model calculates inpatient demand (days) for Rhode Island residents using Rhode Island hospitals for each city and town in the state and produces two tables. The first shows the projected days of care for Rhode Island patients using Rhode Island hospitals. Days of care are summarized by city and town for each bed type (Medical-surgical, Obstetrics, Psychiatric and ICU). Total projected days are compared to historical 2010 days to analyze differences.

These data are then summarized by market area, which we have defined as hospital service area. The Dartmouth Atlas of Health Care defines hospital service areas as local health care markets for hospital care. This is a collection of ZIP codes in which residents receive most of their hospitalizations from the hospitals in that area. Rhode Island has six hospital service areas that include Newport, Providence, Woonsocket, Warwick, Wakefield and Westerly (***Figure 23 and 24***). We map each of the cities and towns in the state into the hospital services areas. Dartmouth also defines hospital referral regions that represent regional health care markets for tertiary medical care that generally requires the services of a major referral center. The entire state of Rhode Island is considered a single hospital referral region. The following lists the hospitals for each service area in the state:

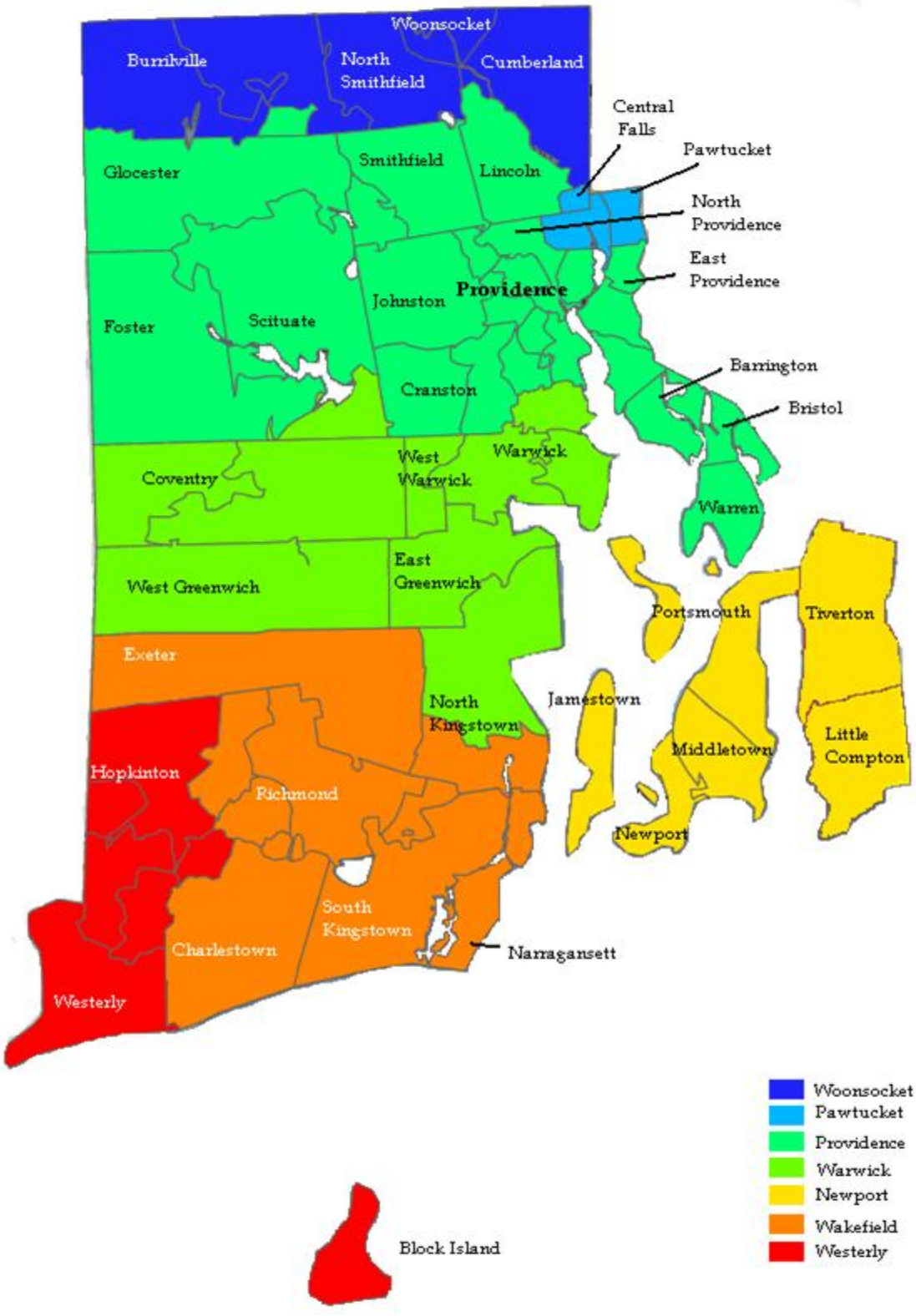
- Woonsocket: Rehab Hospital of Rhode Island, Landmark Medical Center
- Pawtucket: Memorial Hospital of Rhode Island

- Providence: Miriam Hospital, Rhode Island Hospital, Roger Williams Medical Center, St. Joseph Health Services, Women and Infants Hospital of Rhode Island, Butler Hospital and Emma Bradley Hospital
- Warwick: Kent County Memorial Hospital
- Newport: Newport Hospital
- Wakefield: South County Hospital
- Westerly: Westerly Hospital

Figure 23: Rhode Island Towns by Hospital Service

Service Area	Town	Service Area	Town
Newport	Jamestown	Pawtucket	Central Falls
	Little Compton		Pawtucket
	Middletown	Wakefield	Charlestown
	Newport		Exeter
	Portsmouth		Narragansett
	Tiverton		Richmond
Providence	Barrington		South Kingstown
	Bristol	Warwick	Coventry
	Cranston		North Kingstown
	East Greenwich		Warwick
	East Providence		West Greenwich
	Foster		West Warwick
	Glocester	Westerly	Hopkinton
	Johnston		New Shoreham
	Lincoln		Westerly
	North Providence	Woonsocket	Burrillville
	Providence		Cumberland
	Scituate		North Smithfield
	Smithfield		Woonsocket
	Warren		

Figure 24: Hospital Service Areas for Rhode Island (Dartmouth Atlas of Health Care)



Determining Target Occupancy Rates

The Bed Need Model calculates future inpatient demand (days) for Rhode Island hospitals by geographic area. In order to determine the number of beds that are needed to meet the projected inpatient demand, the Bed Need Model divides the projected number of inpatient days by 365 days per year to compute an average daily census, which is the average number of occupied beds per day. Average daily census is converted to the optimum number of beds that are required for all hospitals in an area to operate at maximum capacity by dividing by a target occupancy rate that can be specified in the model. For purposes of calculating needed beds, observation days are added to general medical-surgical days prior to converting the number to beds needed.

Our review of the literature finds that there is no standard for determining what an optimal occupancy rate should be. However, commonly cited figures put optimal occupancy rate between 70 and 85 percent. ***Figure 25*** lists standard occupancy rate targets for medical-surgical beds used for CON purposes across states with CON regulations.

Earlier studies have estimated optimum bed capacity at 74 percent, which was the average hospital occupancy rate prior to the implementation of Medicare PPS.[15] Others have incorporated queuing theory models, where "ideal" occupancy rates increase with lower desired probabilities of having to turn away emergency patients. These models show that a hospital of about 150 beds would have an ideal occupancy rate of 78 percent for the probability of turning away 1 in 1,000 emergency cases.

[15] Keeler, Ying, "Hospital Costs and Excess Bed Capacity: A Statistical Analysis", The Review of Economics and Statistics, 1996.

Figure 25: Standard Annual Occupancy Rate Targets for Medical/Surgical Beds

State	Basis for Avg. Annual Occupancy Rate Target	Avg. Annual Occupancy Rate Target Medical-Surgical Beds for Selected Average Dailey Census Levels [1/]			
		0-49	50-99	100-299	300+
AK	Number of Beds	50%	65%	75%	75%
WA	Number of Beds	50%	65%	70-75%	80%
KY	Number of Beds	60%	60-65%	65-75%	75%
MI	Average Daily Census	60-65%	65-71%	71-79%	79-85%
IA	No. of Beds & Avg. Daily Census	60-64%	64-73%	73-83%	83%
WV	Number of Beds	60-75%	77%	80-82%	85%
SC	Number of Beds	65%	65%	65-70%	70-75%
GA	Location (non-Rural/Rural)	65-75%	65-75%	65-75%	65-75%
NC	Number of Beds	67%	67%	71-75%	75%
OR	Location (multi-facility area/isolated) & Avg. Daily Census	68%	68-75%	75-81%	81%
MS	Bed Category	70%	70%	70%	70%
MD	Average Daily Census	70%	75%	80%	83%
AL	Bed Category/No. of Admissions	75-80%	75-80%	75-80%	75-80%
HI	Location (Urban/Rural) & No. of Admissions & Number of Beds	75-90%	75-80%	75-80%	85%
NH	Bed Category	75-90%	75-90%	75-90%	75-90%
MO	Bed Category	80%	80%	80%	80%
NJ	New Hospital Only	80%	80%	80%	80%
TN	Bed Category	80%	80%	80%	80%
VA	Bed Category	80%	80%	80%	80%
IL	Number of Beds	80%	80%	85-90%	90%
NY	Location (Urban/Rural)	80-85%	80-85%	80-85%	80-85%
DC	Bed Category	85%	85%	85%	85%
ME	Bed Category	85%	85%	85%	85%
DE	Location (County)	85-88%	85-88%	85-88%	85-88%

1/ Occupancy rate targets have been rounded to the nearest whole digit.
Source: Survey conducted by Maryland Health Care Commission staff via phone and e-mail.

The Bed Need Model provides an option for specifying target occupancy rates for the various bed types used in the model including medical-surgical beds, obstetrics, pediatric, pediatric psych, adult psychiatric and ICU. The Bed Need Model will use the specified target occupancy rates to determine the number of beds that are required for the projected inpatient demand calculated in the steps above.

As a benchmark, our preliminary analysis of occupancy rates for Rhode Island hospitals indicates an average occupancy rate of 66 percent for medical-surgical beds (excluding observation days), 72 percent for ICU beds and 72 percent for psychiatric/rehabilitation distinct part units in 2010 from the Medicare Hospital Cost Reports. For each bed category, we find

Rhode Island hospitals to have higher occupancy rates than national benchmarks by 5 to 8 percentage points.

Current Inpatient Capacity in Rhode Island

Data on staffed beds for each Rhode Island hospital were provided by the Hospital Association of Rhode Island. ***Figure 26*** shows the number of staffed beds for each hospital by type of service at point in time (September 30, 2012). These data are used to determine current inpatient bed supply in Rhode Island by type of bed.

Figure 26: Staffed Inpatient Beds by Type on September, 30 2012

Name	Service Area	Staffed Beds	Staffed Beds by Type					
			Med/Surg	Obstetrics	Pediatrics	Pediatric Psych	Adult Psych	ICU
Memorial Hospital	Pawtucket	147	105	13	12	0	0	17
Roger Williams Medical Center	Providence	126	80	0	0	0	36	10
St. Joseph Health Services	Providence	147	86	0	0	0	53	8
Newport Hospital	Newport	98	66	10	2	0	10	10
Rhode Island Hospital	Providence	685	401	0	72	0	55	157
South County Hospital	Wakefield	71	60	4	1	0	0	6
Kent Hospital	Warwick	262	186	22	4	0	12	38
Women & Infants Hospital	Providence	167	45	122	0	0	0	0
Landmark Medical Center	Woonsocket	140	97	11	0	0	18	14
The Miriam Hospital	Providence	247	212	0	0	0	0	35
Westerly Hospital	Westerly	64	48	10	0	0	0	6
Rehabilitation Hospital	Woonsocket	40	40	0	0	0	0	0
Butler Hospital	Providence	137	0	0	0	11	126	0
Emma Bradley Hospital	Providence	60	0	0	0	60	0	0
Kent Beds at Butler [1/]	Providence	29	0	0	0	0	29	0

1/ 29 psychiatric beds under Kent Hospital license but physically located at Butler Hospital.

Source: Hospital Association of Rhode Island. Excludes bassinets and excludes NICU beds for Women and Infants Hospital.

Staffed beds are defined as available beds for patients given current staffing in the reporting period. Beds ordinarily occupied for less than 24 hours, such as those in the emergency department, clinic, labor (birthing) rooms (LDRP rooms (labor, delivery recovery, and post-partum) should be included), surgery and recovery rooms and outpatient holding beds, are not included. For the modeling, we use the following definitions for bed types:

- ***Medical/Surgical***: Beds on any medical/surgical unit, also thought of as "ward" beds and rehabilitation – beds in a dedicated rehab unit were included in this category;
- ***Obstetrics***: Beds in the maternity unit;

- ***Pediatrics***: ward medical/surgical beds for patients 17 and younger;
- ***Pediatric Psych***: Ward beds on a closed/locked psychiatric unit for patients 17 and younger;
- ***Adult Psychiatric***: Ward beds on a closed/locked psychiatric unit for patients age 18 and older; and
- ***ICU/CCU***: Beds that can support critically ill/injured patients, including ventilator support, and pediatric ICU are combined in this category.

Comparing Projected Inpatient Demand to Current Inpatient Capacity in Rhode Island

As described above, the Bed Need Model calculates future inpatient demand (days) for Rhode Island hospitals by geographic area of the patient based on the projected inpatient days and the specified target occupancy rate. In addition to the estimated beds needed, the model compiles the current supply of staffed hospital beds for all hospitals in the geographic area for each type of bed. These will be presented as staffed beds from the most recent year of available data. The model then computes the difference between current capacity and estimated bed need. A negative number suggests a bed shortage while a positive number shows a surplus.

The analysis of bed need by geographic area is based on the hospital's service area and does not account for patients traveling across service areas for hospital services. However, as defined by researchers at Dartmouth, hospital referral regions represent regional health care markets for tertiary medical care that generally requires the services of a major referral center. The entire state of Rhode Island is considered a single hospital referral region. Thus, for major procedures, residents have been found to travel across the state and particularly to Providence for these procedures. It may not be unreasonable to consider patients traveling beyond these service areas.

Cost of Excess Capacity

For this analysis, we were asked to estimate the cost of excess hospital inpatient bed capacity in Rhode Island, if an excess in hospitals beds in the state was determined from the analysis. The recent decline in inpatient utilization in Rhode Island hospitals has raised concerns that the costs associated with empty beds represent a potentially wasteful expense. Hospitals with low occupancy rates need to spread their fixed costs across a smaller number of patients which in turn generates higher costs on a per patient basis. However, the health economics literature contains contradictory empirical findings regarding the cost of an empty hospital bed. Empirical studies which account for the endogeneity of reserve capacity produce high estimates of these costs, while earlier studies and industry experts maintain that empty beds are inexpensive. Studies from the 1980's show mixed results for the cost of an empty bed, which range from $4,250 to $98,630, depending on the cost methodology used.[16]

In our interviews, stakeholders indicated that patient staffing levels are determined based on patient volumes at a given time and not necessarily determined by the number of available or

[16] Anderson, Gaynor, "Hospital Costs and the Cost of Empty Hospital Beds", NBER working papers, 1991.

staffed beds that are provided for various reports. They also indicated that census counts do not accurately capture the number of patients in the hospital during the course of a day due to patient turnover during the day and the census being performed at midnight. Thus, unoccupied beds are not being attended and the actual cost for these unoccupied beds is relatively small.

To test this hypothesis, we collected data from the Medicare Hospital Cost Reports for Rhode Island hospitals for 2010 on total salaries, overhead costs, available beds and number of inpatient days for adult and pediatric medical/surgical units. [17] Salaries per available bed were highly correlated with occupancy rate (0.92). Although differences in occupational mix of staff, patient acuity and other factors could also be drivers, the data suggest that Rhode Island hospitals do attempt to staff appropriately for the patient load that they have and not on the number of available beds reported. Average salary per occupied bed was negatively correlated with occupancy rate, but this association was not as significant.

The data also show that the average overhead cost per occupied bed was negatively correlated with occupancy rate. This suggests that hospitals with low occupancy rates do need to spread their fixed costs across a smaller number of patients, which in turn generates higher costs on a per patient basis and thus creates higher costs in the system. Average overhead cost per available bed was positively correlated with occupancy rate but not to a statistically significant degree which may indicate that overhead costs are set appropriately for the anticipated volume based on the number of available beds set up.

This analysis supports theory from Pauly and Friedman [18] stating in the case of hospitals, fixed capacity is represented by the number of hospital beds. If a bed is anticipated to be unoccupied, then the variable cost associated with the output is avoided. This may include variable nurse staffing costs. However, fixed costs, which vary with the number of available beds, cannot be avoided. In this context, the cost of an empty bed that was anticipated to be unoccupied will be less than that of an unexpectedly empty bed because the variable cost could be avoided in the former scenario. Thus, the cost of an expected empty bed is the fixed cost associated with that bed. Through econometric modeling, Anderson and Gaynor (1991) estimate that the marginal fixed cost associated with an empty bed was equal to about 18 percent of the average total cost per bed.

We estimate total cost per available bed using data from the 2009 and 2010 Medicare Cost Report Data and blend the two years of cost data for all Rhode Island hospitals for medical/surgical beds, ICU and other special care unit beds, and psychiatric beds. We assume a 2.0 percent cost increase from 2009 to 2010 based on Global Insight Market Basket estimates from Q4 2009 to Q3 2010. Using the marginal fixed cost estimate of 18 percent, we estimate that the cost of an empty bed would be 18 percent of the total costs, as shown in ***Figure 27***.

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[17] Costs are not adjusted for differences in occupational mix of staff, patient acuity and other factors could drive differences in staffing costs across hospitals. Medicare Hospital Cost Reports for 2010. Beds from Worksheet S-3, Part I, Line 1, Column 1; salary costs from Worksheet A, Line 25, Column 1; other direct costs from Worksheet A, Line 25, Column 2, total costs with allocated overhead from Worksheet B, Part I, Line 25, Column 27. Overhead costs were computed as total costs – salary costs – other direct costs. Rhode Island Hospital was excluded because of the higher indirect costs due to supporting standby capacity.

[18] Friedman, Bernard and Mark V. Pauly "Cost Functions for a Service Firm with Variable Quality and Stochastic Demand: The Case for Hospitals," Review of Economics and Statistics, November 1981.

Figure 27: Cost for an Empty Bed in 2010

Type of Bed	Total Cost per Staffed Bed	Marginal Fixed Cost per Empty Bed
Medical/Surgical	$261,203	$47,017
ICU and other special care units	$414,054	$74,530
Psychiatric	$294,533	$53,016
Average	$284,648	$51,237

Source: Medicare Hospital Cost Reports for 2010. Source: Medicare Hospital Cost Reports for 2010. Beds from Worksheet S-3, Part I, Lines 1, 6-10, 14, 14.01, Column 1; total costs with allocated overhead from Worksheet B, Part I, Line 25, 26-30, 31, 31.01, Column 27. These data exclude costs for interns and residents in teaching hospitals.

The Bed Need Model will use these estimates to calculate the cost of excess capacity in Rhode Island hospitals based on the results of the Bed Need Model. The model will inflate this amount to the projection year using the Global Insight projected Market Basket Index. The total cost of excess capacity is provided in the last row of the table.

Coordination with the Graham Center

The Robert Graham Center (Graham Center) of the American Academy of Family Physicians is working concurrently with the Rhode Island Coordinated Health Planning Project to provide two gap analyses related to the future capacity of the health delivery system in Rhode Island. The first analysis provides an estimate of the need for primary care service and the current and future availability of primary care providers. The second analysis reviews health care workforce development and estimates future needs.

The Graham Center provided us with estimates of the potential impact on inpatient utilization under three different scenarios of enhancing primary care in the state. The first scenario assumes a statewide primary care medical home model (PCMH), which could reduce inpatient hospitalizations by 8.1 percent. The second scenario assumes primary care providers in the state achieve results similar to a mature Accountable Care Organization, which could reduce inpatient utilization by 10.5 percent based on savings estimates from Wellmed ACO in Texas. The third scenario assumes that increasing primary care physician supply in Rhode Island would reduce hospitalizations by 3.5 percent based on Hospital Referral Region variation in hospitalizations using the Dartmouth Atlas of Healthcare data.

The Graham center also supplied us with population estimates by city/town, age and sex that are used in our model in order to have consistent approaches across the Lewin and Graham Center reports.

Analysis of Inpatient Psychiatric Utilization in Rhode Island

Our preliminary analysis indicates that inpatient mental health and substance abuse utilization in Rhode Island was higher than the national average. However, some states do not report discharge data for their state psychiatric hospitals, so rates may not be comparable to Rhode Island. However, data on the prevalence of mental illness among adults show that Rhode Island

had the highest rate of any state at 24.3 percent compared to a national average of 19.7 percent; it has also exhibited the highest rate of adults with serious mental illness (7.2 percent) compared to national average of 4.6 percent. [19]

Inpatient discharges for behavioral health (mental health and substance abuse) performed in Rhode Island hospitals grew from 14,968 discharges in 2008 to 16,812 in 2011, or 3.9 percent annually. However, discharges for patients from outside the state grew from 5.6 percent of total cases in 2008 to 6.1 percent in 2011, thus accounting for a larger portion of inpatient behavioral health services (***Figure 28***).

Figure 28: Analysis of Inpatient Behavioral Health Discharges in Rhode Island Hospitals (2008-2011)

	2008	2009	2010	2011	Annual Trend
In-state Patient Discharges	14,123	14,644	14,888	15,782	3.8%
Out of State Patient Discharges	845	906	937	1,030	6.8%
Total Discharges	14,968	15,550	15,825	16,812	3.9%
Percent out of state	5.6%	5.8%	5.9%	6.1%	

Source: Lewin Group analysis of Rhode Island Inpatient Discharge Data 2008-2011

Behavioral health discharges per 1,000 Rhode Island residents increased most quickly for pediatric patients over this period—by 9 percent annually and by 8 percent for adult males age 18 to 44. In 2011, the highest use rates were for males age 18 to 44, followed by adults 45 to 64 (***Figure 29***). However, the average length of stay for behavioral health inpatient cases dropped significantly for all age groups in the state.

[19] State Estimates of Adults with Mental Illness. Rep. Substance Abuse and Mental Health Services Administration: National Survey on Drug Use and Health, 2011. http://oas.samhsa.gov/2k11/078/WEB_SR_078.htm

Figure 29: Discharges per 1,000 Population and Average Lengths of Stay Hospitals for Rhode Island Residents Using Rhode Island Hospitals (2008-2011)

Demographic Group	2008	2009	2010	2011	Annual Trend
	Discharges per 1,000 population				
Under18	7.4	7.9	9.5	9.6	9%
18-44Female	15.1	15.2	15.0	15.1	0%
18-44Male	15.7	17.3	17.5	19.6	8%
45-64	16.9	17.1	16.7	18.3	3%
65-74	8.7	9.2	9.1	9.8	4%
75+	12.4	12.4	12.1	12.0	-1%
	Average Length of Stay				
Under18	12.6	12.6	10.5	10.4	-6%
18-44Female	7.5	6.7	6.6	5.9	-8%
18-44Male	6.7	6.3	6.0	5.9	-4%
45-64	8.2	7.7	7.2	7.0	-5%
65-74	10.7	10.6	10.8	10.4	-1%
75+	10.5	9.7	10.3	10.7	0%

Source: Lewin Group analysis of Rhode Island Inpatient Discharge Data 2008-2011

About 75 percent of all inpatient behavioral health services for Rhode Island patients were primarily provided by Providence hospitals and nearly half of those were provided at the two specialty hospitals (***Figure 30***). Within each service area, most patients were treated in Providence hospitals with the exception of Newport. Thus, the vast majority of inpatient behavioral health services are performed in Providence hospitals.

Figure 30: Percent of Inpatient Behavioral Health Discharges by Patient Service Area that were Treated in Providence Hospitals 2008-2011

Patient Service Area	Percent Treated in Providence Hospitals	Percent Treated in Providence Specialty Hospitals
Newport	41%	29%
Pawtucket	78%	44%
Providence	86%	36%
Wakefield	69%	43%
Warwick	69%	43%
Westerly	64%	35%
Woonsocket	56%	32%
Total	75%	37%

Source: Lewin Group analysis of Rhode Island Inpatient Discharge Data 2008-2011

The trend in out-of-state patients using Rhode Island hospitals for behavioral health services grew dramatically over the 2008 to 2011 period, from 835 discharges in 2008 to 1,030 in 2011 (***Figure 31***). Kent County, Landmark and Rhode Island hospitals experienced double digit annual growth in out of state cases over this period. Similar to the in-state utilization, about 75 percent of all out of state behavioral health cases are treated in Providence hospitals.

Figure 31: Inpatient Behavioral Health Discharges for Out-of-State Patients Treated in Rhode Island Hospitals (2008-2011)

	Out of State Discharges				
Hospital	2008	2009	2010	2011	CAGR
Bradley	94	112	80	105	4%
Butler	341	367	364	371	3%
Kent County	65	89	98	134	27%
Landmark	29	30	41	65	31%
Memorial	3	5	5	7	33%
Miriam	6	5	14	3	-21%
Newport	45	40	46	32	-11%
Rhode Island	131	112	128	173	10%
Roger Williams	63	59	58	69	3%
South County	1	5	5	3	44%
St Joseph	49	60	78	56	5%
Westerly	18	22	20	12	-13%
Total	845	906	937	1,030	7%

Source: Lewin Group analysis of Rhode Island Inpatient Discharge Data 2008-2011

Rhode Island residents have the highest prevalence rate of mental illness for adults in the country. Analysis of inpatient discharge data show discharges per 1,000 for adult males age 18 to 44 increasing at a rate of 8 percent per year and 3 percent per year for adults age 45 to 64. However, the fastest growing utilization is for children, which grew at 9 percent per year from 2008 to 2011. Although inpatient discharges for behavioral health grew rapidly, average lengths of stay declined.

Rhode Island hospitals also appear to be importing more and more psychiatric patients from out of state. Cases for out of state patients grew from 5.6 percent of total behavioral health cases in 2008 to 6.1 percent by 2011.

Analysis of Inpatient Discharges Performed in Providence Hospitals

In this section, we examine the type and volume of services that are performed in Providence hospitals for Rhode Island residents from outside the Providence service area. This analysis presents the total number of hospital inpatient discharges for Rhode Island residents in each of the 6 service areas in the state excluding Providence. ***Figures 32 and 34*** show the number of discharges in 2010 for Medical DRGs within Major Diagnostics Category (MDC) and for surgical DRGs. ***Figures 33 and 35*** shows the percent of those discharges that were performed in Providence acute care hospitals. The specialty hospitals (Bradley, Butler and Rehab Hospital of Rhode Island) are excluded from this analysis.

The data for 2010 show that less than one-third of medical DRGs cases are performed in Providence hospitals with the exception of obstetrics (MDC 14), where 56 percent of cases are performed in Providence hospitals. However, about 55 percent of surgical DRG cases are performed in Providence hospitals. Thus, the primary reason for Rhode Island residents receiving care in Providence is for obstetrics care and surgical procedures, particularly neurology and cardiology.

Figure 32: Number of Inpatient Discharges by Service Area of Patient for Medical DRGs within MDC (2010)

MDC		Total Number of Discharges from Patients Residing in Service Area						
		Newport	Pawtucket	Wakefield	Warwick	Westerly	Woonsocket	Total Non-Providence
Medical DRGs within MDC								
0	Pre-MDC	0	1	0	9	0	1	11
1	Nervous System	275	577	256	1,054	131	580	2,873
2	Eye	9	18	7	17	3	11	65
3	Ear, Nose, Mouth And Throat	28	113	27	154	25	72	419
4	Respiratory System	625	1,124	529	2,396	382	1,367	6,423
5	Circulatory System	567	1,134	566	2,404	389	1,368	6,428
6	Digestive System	425	750	354	1,598	299	895	4,321
7	Hepatobiliary System And Pancreas	129	170	76	353	61	196	985
8	Musculoskeletal System And Connective Tissue	123	212	141	465	87	217	1,245
9	Skin, Subcutaneous Tissue And Breast	94	290	78	497	76	329	1,364
10	Endocrine, Nutritional And Metabolic System	116	318	119	491	72	288	1,404
11	Kidney And Urinary Tract	189	398	204	1,037	172	484	2,484
12	Male Reproductive System	12	15	14	36	1	15	93
13	Female Reproductive System	3	30	9	55	12	18	127
14	Pregnancy, Childbirth And Puerperium	462	1,028	301	1,271	217	799	4,078
15	Newborn And Other Neonates (Perinatal Period)	0	4	1	1	0	1	7
16	Blood and Blood Forming Organs and Immunological Disorders	81	146	59	249	40	169	744
17	Myeloproliferative DDs (Poorly Differentiated Neoplasms)	20	58	10	118	10	58	274
18	Infectious and Parasitic DDs	291	225	212	812	88	328	1,956
19	Mental Diseases and Disorders	880	1,176	422	2,084	248	1,294	6,104
20	Alcohol/Drug Use or Induced Mental Disorders	180	272	123	500	61	243	1,379
21	Injuries, Poison And Toxic Effect of Drugs	73	144	83	260	46	138	744
22	Burns	0	8	5	8	1	7	29
23	Factors Influencing Health Status	111	153	76	468	39	335	1,182
24	Multiple Significant Trauma	8	6	2	16	8	11	51
25	Human Immunodeficiency Virus Infection	7	22	0	4	0	16	49

Figure 33: Percent of Inpatient Discharges Performed in Providence Acute Care Hospitals by Service Area of Patient for Medical DRGs within MDC (2010)

MDC		Percent of Discharges for Patients Residing in Service Area that were Treated in Providence Acute Care Hospitals						
		Newport	Pawtucket	Wakefield	Warwick	Westerly	Woonsocket	Total Non-Providence
Medical DRGs within MDC								
0	Pre-MDC	0%	0%	0%	0%	0%	0%	0%
1	Nervous System	35%	51%	38%	42%	44%	60%	47%
2	Eye	67%	67%	71%	65%	0%	45%	60%
3	Ear, Nose, Mouth And Throat	32%	50%	37%	43%	12%	56%	44%
4	Respiratory System	11%	46%	14%	29%	8%	32%	28%
5	Circulatory System	19%	37%	14%	31%	8%	25%	27%
6	Digestive System	21%	49%	11%	39%	7%	38%	34%
7	Hepatobiliary System And Pancreas	15%	48%	21%	35%	11%	26%	30%
8	Musculoskeletal System And Connective Tissue	24%	40%	16%	39%	16%	42%	34%
9	Skin, Subcutaneous Tissue And Breast	14%	54%	13%	38%	17%	40%	38%
10	Endocrine, Nutritional And Metabolic System	23%	39%	20%	41%	11%	39%	35%
11	Kidney And Urinary Tract	17%	53%	12%	34%	9%	35%	32%
12	Male Reproductive System	8%	73%	7%	36%	0%	60%	38%
13	Female Reproductive System	67%	73%	33%	36%	0%	61%	46%
14	Pregnancy, Childbirth And Puerperium	22%	82%	29%	57%	18%	63%	56%
15	Newborn And Other Neonates (Perinatal Period)	0%	75%	100%	0%	0%	100%	71%
16	Blood and Blood Forming Organs and Immunological Disorders	15%	48%	22%	51%	8%	48%	41%
17	Myeloproliferative DDs (Poorly Differentiated Neoplasms)	70%	67%	40%	69%	10%	67%	65%
18	Infectious and Parasitic DDs	13%	65%	13%	29%	9%	36%	29%
19	Mental Diseases and Disorders	9%	37%	25%	25%	28%	23%	25%
20	Alcohol/Drug Use or Induced Mental Disorders	21%	38%	21%	37%	30%	42%	34%
21	Injuries, Poison And Toxic Effect of Drugs	22%	39%	17%	36%	13%	33%	31%
22	Burns	0%	100%	80%	75%	100%	100%	90%
23	Factors Influencing Health Status	9%	24%	11%	13%	10%	13%	14%
24	Multiple Significant Trauma	75%	100%	100%	88%	38%	82%	78%
25	Human Immunodeficiency Virus Infection	71%	68%	0%	50%	0%	31%	55%

Figure 34: Number of Inpatient Discharges by Service Area of Patient for Surgical DRGs within MDC (2010)

MDC		Total Number of Discharges from Patients Residing in Service Area						
		Newport	Pawtucket	Wakefield	Warwick	Westerly	Woonsocket	Total Non-Providence
Surgical DRGs within MDC								
0	Pre-MDC	40	93	30	143	31	86	423
1	Nervous System	60	92	77	219	32	116	596
2	Eye	2	2	2	5	0	6	17
3	Ear, Nose, Mouth And Throat	14	25	8	48	6	27	128
4	Respiratory System	36	55	22	109	14	76	312
5	Circulatory System	220	383	224	864	100	620	2,411
6	Digestive System	249	283	214	743	125	307	1,921
7	Hepatobiliary System And Pancreas	75	117	93	201	48	140	674
8	Musculoskeletal System And Connective Tissue	562	594	562	1,907	242	701	4,568
9	Skin, Subcutaneous Tissue And Breast	40	64	45	140	25	61	375
10	Endocrine, Nutritional And Metabolic System	38	81	40	173	21	83	436
11	Kidney And Urinary Tract	52	67	57	255	34	104	569
12	Male Reproductive System	27	31	23	139	19	31	270
13	Female Reproductive System	111	203	132	383	75	212	1,116
14	Pregnancy, Childbirth And Puerperium	257	449	170	660	108	342	1,986
16	Blood and Blood Forming Organs and Immunological Disorders	2	5	3	5	1	4	20
17	Myeloproliferative DDs (Poorly Differentiated Neoplasms)	5	11	5	23	6	12	62
18	Infectious and Parasitic DDs	44	29	24	105	11	47	260
19	Mental Diseases and Disorders	0	6	2	7	0	3	18
21	Injuries, Poison And Toxic Effect of Drugs	15	20	18	58	4	22	137
22	Burns	0	4	0	0	0	0	4
23	Factors Influencing Health Status	6	3	3	14	4	6	36
24	Multiple Significant Trauma	9	8	2	22	3	14	58

Figure 35: Percent of Inpatient Discharges Performed in Providence Acute Care Hospitals by Service Area of Patient for Surgical DRGs within MDC (2010)

MDC		Percent of Discharges for Patients Residing in Service Area that were Treated in Providence Acute Care Hospitals						
		Newport	Pawtucket	Wakefield	Warwick	Westerly	Woonsocket	Total Non-Providence
Surgical DRGs within MDC								
0	Pre-MDC	53%	57%	63%	40%	29%	45%	47%
1	Nervous System	87%	89%	74%	68%	78%	79%	77%
2	Eye	50%	100%	0%	100%	0%	83%	76%
3	Ear, Nose, Mouth And Throat	57%	68%	63%	79%	67%	56%	68%
4	Respiratory System	53%	51%	64%	55%	86%	57%	56%
5	Circulatory System	92%	83%	75%	78%	74%	53%	73%
6	Digestive System	26%	64%	18%	52%	17%	60%	45%
7	Hepatobiliary System And Pancreas	23%	52%	12%	41%	10%	40%	35%
8	Musculoskeletal System And Connective Tissue	39%	71%	32%	48%	30%	69%	50%
9	Skin, Subcutaneous Tissue And Breast	58%	61%	31%	61%	32%	69%	56%
10	Endocrine, Nutritional And Metabolic System	84%	75%	73%	77%	29%	84%	76%
11	Kidney And Urinary Tract	42%	81%	33%	43%	24%	68%	50%
12	Male Reproductive System	37%	84%	43%	29%	5%	71%	41%
13	Female Reproductive System	48%	76%	36%	69%	33%	56%	59%
14	Pregnancy, Childbirth And Puerperium	21%	78%	26%	50%	19%	63%	51%
16	Blood and Blood Forming Organs and Immunological Disorders	100%	60%	33%	60%	100%	25%	55%
17	Myeloproliferative DDs (Poorly Differentiated Neoplasms)	80%	91%	60%	61%	50%	83%	71%
18	Infectious and Parasitic DDs	30%	83%	25%	32%	18%	49%	39%
19	Mental Diseases and Disorders	0%	83%	50%	57%	0%	67%	67%
21	Injuries, Poison And Toxic Effect of Drugs	47%	70%	50%	60%	50%	82%	62%
22	Burns	0%	100%	0%	0%	0%	0%	100%
23	Factors Influencing Health Status	50%	67%	67%	29%	25%	33%	39%
24	Multiple Significant Trauma	67%	100%	100%	77%	100%	79%	81%

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Appendix A - List of Interviewees

Peter Andruszkiewicz, President and Chief Executive Officer, Blue Cross Blue Shield of Rhode Island

Tim Babineau, President and CEO, Lifespan (Rhode Island Hospital)

Steve Costantino, Secretary, Rhode Island Executive Office of Health and Human Services

Al Charbonneau, Independent Insurance Professional

Rick Charest, President, Landmark Medical Center, Woonsocket

Mike Dexter, Chief, Office of Health Systems Development, Rhode Island Department of Health

Dr. Michael Fine, Director of Health, Rhode Island Department of Health

Dr. Neil Galinko, Senior Medical Director, United Health Care

Louis R. Giancola, President and CEO, South County Hospital Healthcare System

Herb Gray, Vice President, Rhode Island Business Group on Health

Dennis Keefe, President and CEO, Care New England

Eve Keenan, Chairperson, South County Hospital Healthcare System Board of Trustees

Kate Kennedy, Executive Director, Rhode Island Business Group on Health

Dale Klatzker, PhD, President and Chief Executive Officer, The Providence Center

Dr. Gus Manocchia, Senior Vice President and Chief Medical Officer, Blue Cross Blue Shield of Rhode Island

Mark Montella, Senior Vice President, External Affairs, Lifespan

Elena Nicollela, Medicaid Director, Rhode Island Department of Human Services

Ed Quinlan, President, Hospital Association of Rhode Island

Mike Souza, Senior Vice President, Hospital Association of Rhode Island

Rachel Schwartz, Vice President Strategic Planning and Analysis, Lifespan

Mark Waggoner, Senior Vice President, Network Management, Blue Cross Blue Shield of Rhode Island

Dr. Terrie "Fox" Wetle, Professor, Brown University

Don Williams, Health Care Consultant

Appendix B – Interview Tools

Rhode Island Coordinated Health Planning Project Interview Protocol

Hospital/Health System CEOs and/or Senior Staff

Date:_____

Interviewee Name:_____

Title/Organization:_____

1. How would you characterize the **overall health status** of Rhode Island residents? Relative to surrounding states?	
2. What would you consider to be the most **important health problems treated at your facility**? Are any population groups or local communities particularly affected by these problems? How do these populations or treatments/procedures/diagnoses differ in Rhode Island versus other states you may have experience with?	
3. From your experience, how would you describe how well the RI (Certificate of Need) CON program has contributed to "right sizing" the number and mix of inpatient hospital services?	
4. Area hospitals have been forming affiliations with each other or seeking to merge with out-of-state hospitals. What is your reaction to these plans?	
5. How have mergers and consolidations influenced, if at all, the way inpatient services have been delivered (e.g., reductions in bed capacity)? If they have, to what extent do you think these changes have influenced access and cost?	

6. What additional hospital organizational changes do you believe are anticipated for the future (e.g., changes in how care is delivered, additional consolidations, and need for individual centers of excellence)? What are their likely impacts on inpatient bed capacity?	
7. How are provisions of ACA likely to influence future demand for inpatient beds (e.g., coverage expansions, payments related to quality, contracting with health plans on the Exchange)? How are RI hospitals likely to respond to these changes?	
8. In your opinion, how would you describe the distribution, including oversupply and undersupply of specific inpatient services, in Rhode Island?	
9. In your opinion, is there **excess capacity or duplication** of acute care hospital beds in Rhode Island? If so, which geographic areas and services are most affected?	
10. In your view, could meaningful cost savings be achieved through selective inpatient bed reductions in hospitals with low inpatient occupancy rates? If so, what is the best approach?	
11. What other policy/market forces unique to RI should we take into consideration when estimating future statewide inpatient bed need (e.g. state CON requirements)?	
12. Do you possess any relevant studies, such as statewide and local bed need analyses, that you can share with us?	

Rhode Island Coordinated Health Planning Project Interview Protocol

Payers Date:_____

Interviewee Name:_____

Title/Organization:_____

1. How would you characterize the **overall health status** of Rhode Island residents? Relative to surrounding states?	
2. From a payer perspective, could inpatient service delivery be better/more efficiently organized in Rhode Island? If so, what is the best approach?	
3. Do you anticipate that future hospital mergers and consolidations will result in changes in hospital inpatient service capacity (e.g., reductions in bed capacity, increase in payment rates by changing competition)? If so, how will these mergers change the dynamics between hospitals and payers in local markets?	
4. Is current statewide inpatient hospital capacity adequate or are there gaps in care? • Are there local areas of the state that are over or under bedded? • Are there specific services that are over or under bedded? • Are there related issues that deserve particular attention in this project?	
5. In your view, could meaningful cost savings be achieved through selective inpatient bed reductions in hospitals with low inpatient occupancy rates? If so, what is the best approach?	

6. From a payer perspective how is the implementation of ACA likely to influence future demand for inpatient services? How are Rhode Island hospitals likely to respond?	
7. How do you expect your organization's contracting to change if you become a participant in the Health Insurance Exchange?	
8. What are other current or anticipated policy/market forces unique to Rhode Island that we should take into consideration when developing our inpatient bed need analysis (e.g. state CON requirements, additional merger activity, etc.)?	

Rhode Island Coordinated Health Planning Project Interview Protocol

Public Health/Government

Date:_____

Interviewee Name:_____

Title/Organization:_____

1. How would you characterize the **overall health status** of Rhode Island residents? Relative to surrounding states?	
2. What would you consider to be Rhode Island's **most important health problems**? Are any population groups or Rhode Island communities particularly affected by these problems?	
3. Has a community health **needs assessment** been completed recently in Rhode Island? If so, what were the assessment's key findings?	
4. In your view, have hospitals and other health care providers in the community taken an active role in addressing community health needs? If so, how? If not, what actions should providers consider taking?	
5. From your perspective, how could inpatient service delivery be better or more efficiently organized in Rhode Island?	
6. In your view, is there **excess capacity or duplication** of acute care hospital beds in Rhode Island? If so, which geographic areas and services are most affected?	

7. In your view, could meaningful cost savings be achieved through inpatient bed reductions? If so, what is the best approach?	
8. Are there specific inpatient **services that are not adequately provided** in Rhode Island? Are there geographic areas within RI with an under or over supply of beds?	
9. Area hospitals have been forming affiliations with each other hospitals or seeking to merge with out-of-state hospitals. What is your reaction to these plans?	
10. Have mergers and consolidations resulted in changes in how inpatient services have been delivered (e.g., reductions in bed capacity)? If so, to what extent have these changes influenced access and cost?	
11. What additional hospital organizational changes are anticipated for the future (e.g., pending mergers, closures)? What are their likely impacts on inpatient bed capacity?	
12. How are provisions of ACA likely to influence future demand for inpatient beds (e.g., coverage expansions)? How are RI hospitals likely to respond?	
13. Are there any other policy/market forces unique to RI that we should take into consideration when estimating future statewide inpatient bed need (e.g. state CON requirements)?	

Appendix C – Interview results

Hospital Stakeholders – Detailed Responses

1. How would you characterize the **overall health status** of Rhode Island residents? Relative to surrounding states?

	High Cancer	High Cardiac Disease	High Mental Health	High Infectious Disease	High Age related co-morbidities	High poverty related illnesses	High Substance Abuse	Obesity/ Type II diabetes	Indicators typical
Interviewee 1	x	x	x	x	x				
Interviewee 2									x
Interviewee 3	x		x			x			
Interviewee 4			x	x		x	x	x	
Interviewee 5									x
Interviewee 6									
Interviewee 7									x

Comments:

Rural and urban areas have different problems.
Large elderly population, lots of cancer.
High incidence of cancer and other diseases from from previous exposure to textile mills and metals.
Access is a key issue, many transportation barriers.
Inventory of health measures shows a lot of cancer but lower mortality due to good screening programs.
High mental health services use rates due to decreased stigma in accessing services.
Mental health beds always full, need more especially geriatric psychiatric beds.
Many poor, undocumented people accessing care, doesn't show up on radar, have complex conditions.
Anecdotally, 50% of ambulance runs are for behavioral health issues.
Premature births an issue related to poverty.
DOH needs assessment will look at health status.

Need to look at health disparities by ethnicity. Infant mortality for Latinos much higher. Need to focus on cultural competency and tailoring programs for specific cultures. Rhode Island has one of the highest ambulatory sensitive rates in the region, services that could be outpatient wind up being inpatient. Value for investment of dollars is poor. Should be getting better care for all the money in the system. Lots of redundancy, silos, uncoordinated care. Other states do better because they do a better job of focusing resources.

2. What would you consider to be the most **important health problems treated at your facility**?

   Are any population groups or local communities particularly affected by these problems?

   How do these populations or treatments/procedures/diagnoses differ in Rhode Island versus other states you may have experience with?

	Infectious Disease/Pneumonia	Mental health	Alcohol Abuse	Cancer	Congestive Heart Failure/Cardiac disease	Poverty related
Interviewee 1	x	x	x			
Interviewee 2						x
Interviewee 3						x
Interviewee 4	x		x		x	
Interviewee 5				x	x	
Interviewee 6						
Interviewee 7		x	x			

Comments:
5th highest population over 65 years of age, 1st highest population over 85 years of age.
Hispanic population doubled in 10 years.
Disparities across state, between urban and rural areas.
Size of Rhode Island makes it a regional marketplace.
Alcohol abuse especially prevalent in elderly.
Congestive heart failure expensive and difficult to manage.
Fairly typical diseases of aged population.
No correlation between age and disease status. Population has aged but discharges have dropped.
Many new treatments such as statins for cardiology drive inpatient discharges down.
Behavioral health issues (mental health and substance abuse) are instrumental in health care delivery system. Lack of treatment with other conditions causes overutilization of beds. Need more integrated whole person approach.
If we treated behavioral health issues, we wouldn't need more inpatient beds.

3. From your experience, how would you describe how well the RI (Certificate of Need) CON program has contributed to "right sizing" the number and mix of inpatient hospital services?

	Doesn't deny anything	Contributes to duplication/proliferation of outpatient facilities	Is rigorous, thorough review.	Requirements of process deter applications, decreasing denials.	Decisions are political
Interviewee 1	x	x			
Interviewee 2	x	x			
Interviewee 3	x		x		x
Interviewee 4	x	x	x	x	
Interviewee 5			x	x	
Interviewee 6	x				
Interviewee 7	x				

Comments:
No planning process to determine need.
Nothing gets denied, not useful process, not effective.
Has allowed large growth in outpatient centers, hospitals lose profitable patients.
Outpatient settings not required to take all payers like hospitals, are big revenue generators.
Process does do thorough review.
Based on community need but no definition of "community."
RI population is not mobile, not well educated (to choose healthcare options.)
Process had done a good job of control tertiary services. Rigor of process is a deterrent to unworthy proposals, there are a lot of withdrawals when it becomes apparent application won't be successful.
Rules are different for inpatient and outpatient services.
Constrained growth of beds and deters bad proposals.
CON process wasn't designed to "right size"
Is a blunt instrument.
Hasn't addressed changing capacity, models of care or access to capital.
Assessment of need is driven by applicant not master plan, data or patterns of behavior and norms.

4. Area hospitals have been forming affiliations with each other or seeking to merge with out-of-state hospitals. What is your reaction to these plans?

	For-profits come for market share, increases leverage	Independents can't survive payment disparities	New payment models and incentives will force consolidation
Interviewee 1		x	
Interviewee 2		x	
Interviewee 3	x	x	
Interviewee 4	x		
Interviewee 5			x
Interviewee 6			x
Interviewee 7	x		

Comments:
Payment disparities are from private payers.
Mergers okay if they improve efficiency and quality of care.
Hard to close a hospital, have huge community support.
Many hospitals not profitable, 6 of 11 have lost money in the past 4 years. No re-investment without partners. EHRs are huge cost, can't finance beginnings of new systems in order to seek EHR implementation incentives.
Market will change the way hospitals think about delivering care.
Hospitals will be incented to join systems, expect more mergers.
Don't need out of state access to services that are available in Rhode Island.
If you believe that health care can be better delivered in a system, than it makes sense.
Don't like for profit model because it takes money out of the system that should be put back in for improvements.
If mergers result in better quality, outcomes and lower price, that's good. If they result in monopoly and price increases, that's bad and that's what has happened in Rhode Island.

5. How have mergers and consolidations influenced, if at all, the way inpatient services have been delivered (e.g., reductions in bed capacity)?
   If they have, to what extent do you think these changes have influenced access and cost?

	No influence	Increased costs	Duplication of services	Consolidation of services
Interviewee 1			x	
Interviewee 2	x			x(beginning)
Interviewee 3	x			
Interviewee 4		x	x	x(beginning)
Interviewee 5				x
Interviewee 6	x			x (beginning)
Interviewee 7				x (beginning)

Comments:
Slow to make consolidation of services.
Quality should be measured on same metrics.
Not improved quality or efficiency of delivery system.
Not used capabilities to increase community based care.
No incentive to manage teamwork, no systemization.
Some consolidation beginning now.
Community hospitals don't have to provide all services, shouldn't duplicate.
Rhode Island should look at more free-standing facilities to meet needs such as emergency departments, endoscopy, other ambulatory care.
Larger hospitals will provide more care integration and coordination of service lines.
Keep affiliations in state for cooperation, coordination.
Rhode Island is a declining market, as people make choices about where to go, there are impacts on capacity, costs go up and are untenable at 40-50%
There is a relationship between volume and fixed costs.
Now systems are trying to be more coordinated.
Lack of willingness to travel drives standalone operations.
Mergers haven't done anything but enhance the ability of organizations to leverage higher rates.

6. What additional hospital organizational changes do you believe are anticipated for the future (e.g., changes in how care is delivered, additional consolidations, and need for individual centers of excellence)?
   What are their likely impacts on inpatient bed capacity?

	Smaller hospitals unable to compete	More mergers pending	More observation days	Less inpatient more outpatient services (reduced beds)	Consolidation into natural Centers of Excellence
Interviewee 1	x				
Interviewee 2		x			
Interviewee 3			x	x	
Interviewee 4	x			x	x
Interviewee 5		x		x	x
Interviewee 6					
Interviewee 7				x	

Comments:
If large organizations are allowed to get larger, community hospitals won't be able to compete. Lack of competition breeds complacency.
Beneficial to publicize quality data.
Centers of Excellence good idea unless everybody has one.
Rapid change in ownership of hospitals.
Will transition away from inpatient care until it drops dramatically. More care moved to observation days. More care in outpatient facilities now. Will have excess beds.
New payment mechanisms will incentivize patient focus and quality.
Natural centers of excellence seem to be Women and Infants for OB/GYN, Lifespan for open heart, Mariam/Rhode Island for interventional cardiology, Land Mark for emergency cardiology intervention.
Possible consolidation of OB beds, currently 5 hospitals offer services.
Two hospitals in financial distress currently, notion of bed need hasn't come up, no political will to raise issue.
Statewide study indicates that PCMH reduces bed days and keeps people out of ED.
Payment incentives engage everyone to be efficient.
What is role of community hospital in the future?
If financial incentives change to incent wellness we will see closure of some beds and redistribution of resources to community health, primary care and medical homes.

7. How are provisions of ACA likely to influence future demand for inpatient beds (e.g., coverage expansions, payments related to quality, contracting with health plans on the Exchange)?
   How are RI hospitals likely to respond to these changes?

	Minimal, most people getting care now	Utilization may increase slightly initially	Greater emphasis on quality	Payment models will reduce utilization	New payment mechanisms will add risk. Hospitals will be cautious
Interviewee 1	x				x
Interviewee 2			x		x
Interviewee 3	x	x			
Interviewee 4	x	x	x		x
Interviewee 5	x	x		x	
Interviewee 6				x	
Interviewee 7		x			

Comments:
Most people getting care now, maybe additional elective services.
Shouldn't need to increase beds, need to manage surges.
Need to manage risk to adopt PCMH and ACOs.
Long way to go to adopt new payment systems and collaboration.
Don't really know how ACA will impact beds.
All hospitals currently receive DSH payments, those are eliminated under ACA.
Aging population will impact need, but maybe not more beds.
Need to get control of chronic diseases.
How will health insurance exchange offerings impact payment?
Movement to risk based payment will cause more careful use of resources.
Medicare ACOs, bundled payments will reduce utilization; private insurers will follow with new payment mechanisms.
Assault on readmission rates will reduce utilization.
Unknown how ACA will impact Rhode Island. ED use increased in Massachusetts. Have to offset with forces to keep patients out of hospitals.
Will increase demand for services, especially from currently underserved populations.
Need to transform system to treat more people in least settings.

8. In your opinion, how would you describe the distribution, including oversupply and undersupply of specific inpatient services, in Rhode Island?

	Mal-distribution of beds	Oversupply of everything	Undersupply of psychiatric beds	Consider open or staffed beds, not licensed	Don't know, need data
Interviewee 1	x		x	x	
Interviewee 2					x
Interviewee 3				x	
Interviewee 4	x		x		
Interviewee 5	x			x	
Interviewee 6	x				
Interviewee 7		x			

Comments:
Beds concentrated in Providence and inner cities, compete with community hospitals.
Lack of transportation limits access. People unwilling or unable to travel.
No proliferation of tertiary beds.
More than necessary in Providence.
No incentive to distribute beds in efficient manner.
Hospitals will continue to operate as they always have.
Doing little bits of everything everywhere doesn't work. Need volume and higher occupancy.
Services need to be aggregated.
Rhode Island has an oversupply of everything, including psychiatric beds. Need investment to keep people from inpatient bed, put resources elsewhere.

9. In your opinion, is there **excess capacity or duplication** of acute care hospital beds in Rhode Island?

   If so, which geographic areas and services are most affected?

	Yes, excess capacity	Not distributed properly	Average compared to nation
Interviewee 1	x	x	
Interviewee 2			x
Interviewee 3	x		
Interviewee 4		x	
Interviewee 5	x	x	
Interviewee 6	x		
Interviewee 7	x		

Comments:
What is definition of excess? Rhode Island hospital occupancy is around 60%, same as nation.
Too many beds in some areas, not enough in others.
Currently have several initiatives to reduce utilization.
Should manage to demand of care, redistribute beds.
Consider staffed beds, not just licensed.
Need to deploy resources to support people in community, PCMH can result in decreasing demand, then we will have excess capacity.
Must look at actual staffed beds. If staffed beds not high enough, it's not economical to run a unit.
Providence has excess capacity.
Have to make services economically viable.
Rhode Island has porous borders, can't put up a wall to keep people from going elsewhere.
Too many services, two hospitals in receivership. Is expensive to operate full service hospitals with low volume.
Hospitals farther from Providence are hard to sustain. People are not forced to move beyond their community to get what they need.

10. In your view, could meaningful cost savings be achieved through selective inpatient bed reductions in hospitals with low inpatient occupancy rates?

    If so, what is the best approach?

	Yes, put patients in cost effective beds	No, removing beds doesn't save much. Look at cost structure.	No, occupancy doesn't matter, look at census.
Interviewee 1	x		
Interviewee 2		x	
Interviewee 3			x
Interviewee 4		x	
Interviewee 5	x		
Interviewee 6		x	
Interviewee 7	x		

Comments:
Think about how to allocate beds to maintain access and quality.
Fixed costs stay even when beds are removed.
Not economic to run facilities with low occupancies.
Low occupancy mainly outside of Providence.
Need enough beds to be financially viable.
Can't selectively reduce because costs remain.
Teaching hospitals/beds have very different cost structure, serve different need and provide different benefits. Shouldn't be treated like other beds in analysis. Need to measure public utility of beds.
Market forces and payment incentives will lead to right sizing and manage bed need.
Drop in inpatient days attributable to PCMH shift in location of services, observation days that don't count, migration of care to other states.
Need bed reductions based on normed needs and assessment of population health needs. Occupancy doesn't correlate to need.

11. What other policy/market forces unique to RI should we take into consideration when estimating future statewide inpatient bed need (e.g. state CON requirements)?									
	Only two payers	Very little true managed care	Proliferation of free standing centers	Bed cost not related to quality	Drop in Medicare reimb.	Aging population	Aversion to travel by residents	Out migration	Employ ment
Interviewee 1	x			x					
Interviewee 2					x	x			
Interviewee 3								x	
Interviewee 4			x		x				
Interviewee 5		x			x				
Interviewee 6							x		x
Interviewee 7									x

Comments:
Recognize different bed types, a bed is not a bed.
Physicians are not aligned with hospitals financially, have different incentives.
Aging physical plant.
State should add resources to health planning.
Duplicate infrastructure for outpatient services.
80% of patients seeking care out of state are private pay.
Free standing centers contribute to duplication, not helped reduce costs or increase quality. Reimbursement changes may de-incent these centers.
Lack of public acute care hospitals in Rhode Island adds another financial challenge.
Models should be based on primary care so that inpatient utilization is a last resort. Is a failure to have person in emergency department or admitted to hospital.
Managed care not part of Rhode Island mindset.
Health care is a driver of employment in Rhode Island. Can move inpatient employees to outpatient setting.
Rhode Island is a high cost state. Premiums are high and costs are high but everyone feels they are underpaid.
Employment is a huge issue.
Lack of courage to make tough choices. Only add things, don't subtract.
See acceleration in mergers, will soon have 2-3 systems in state, maybe only 1.

12. Do you possess any relevant studies, such as statewide and local bed need analyses, that you can share with us?		
	Yes	No
Interviewee 1	x	
Interviewee 2	x	
Interviewee 3	x (maybe)	
Interviewee 4		x
Interviewee 5	x	
Interviewee 6		x
Interviewee 7		x

1. How would you characterize the **overall health status** of Rhode Island residents? Relative to surrounding states?			
	Good	Fair	High incidence of mental health, substance abuse issues
Interviewee 11	x		
Interviewee 12		x	x
Comments: Surprised at high rankings in survey because he sees a lot of patient noncompliance. Referenced UHG America's Health Rankings (RI is 10th in nation) Good immunization rates. Poor end of life care issues, low utilization of hospice care.			

2. From a payer perspective, could inpatient service delivery be better/more efficiently organized in Rhode Island? If so, what is the best approach?					
	More cardiovascular service availability	More mental health service availability	Consolidate maternity care	Focus on readmissions	Decrease fragmentation of service delivery. Consolidate and coordinate.
Interviewee 11	x	x		x	
Interviewee 12			x		x
Comments: Angioplasty not available in all regions. Mental health services not adequate. Efforts to improve readmissions by hospitals and QIOs could be better. System is high highly fragmented, majority of hospitals are own systems. Care is costly, unorganized and unsafe because there is not enough volume. Could get efficiencies from having all maternity care in one system. Fragmentation is expensive, uncoordinated. Need new alignment of incentives to restructure systems. Will come in new payment models. A lot of care leaves for Boston due to perception of quality. A center of excellence concept is dated phenomenon. Future gives opportunity to think about consolidation.					

3. Do you anticipate that future hospital mergers and consolidations will result in changes in hospital inpatient service capacity (e.g., reductions in bed capacity, increase in payment rates by changing competition)?

   If so, how will these mergers change the dynamics between hospitals and payers in local markets?

	Hospitals have more leverage with payers	Care quality not improved yet	Consolidation will increase volume and quality
Interviewee 11	x	x	
Interviewee 12			x

Comments:
Mergers are about bottom line.
Change from mergers is slow in coming.
Hope so but don't know how mergers will change dynamics.
Recent mergers have not resulted in much consolidation.
Rhode Island is a good laboratory for adopting a coordinated system.
Can meet quality issues with scale of consolidation.
Rhode Island is one of few states that don't report to LeapFrog quality initiative.
Volume is key to quality.
Best scenario would be two systems to consolidate and coordinate care.

4. Is current statewide inpatient hospital capacity adequate or are there gaps in care?
   - Are there local areas of the state that are over or under bedded?
   - Are there specific services that are over or under bedded?
   - Are there related issues that deserve particular attention in this project?

	Adequate	Areas	Services	Issues
Interviewee 11	x	x (Providence overbedded)	x(cardiology inadequate)	x (travel time)
Interviewee 12		x (South County)	x (imaging over utilized) x (behavior health services inadequate)	x (migration, potential return of patients)

Comments:
Providence has a lot of hospital beds and is probably overbedded.
South part of state may be overbedded.
Cardiology not available everywhere.
Capacity is adequate but people need to adjust mindset/expectations about travel time.
Some hospitals are protected by location – Newport.
Many hospitals located close to one another are providing similar services.
Costs of care in state are much higher than neighbors, pharmacy is 5 points higher.
All projections based on historical data but they are irrelevant for future of managed risk and global budgets.

5. In your view, could meaningful cost savings be achieved through selective inpatient bed reductions in hospitals with low inpatient occupancy rates?

   If so, what is the best approach?

	Yes, available beds will get filled.	No, consolidation will reduce beds
Interviewee 11	x	
Interviewee 12		x

Comments:
Hospitals will fill available beds, not most cost effective way to improve population health.
Need fewer beds, more focus on patient.
As primary care infrastructure strengthens, will see reduced need for inpatient occupancy and rates will drop.
How can hospitals survive? Staff can be re-purposed to outpatient settings.

6. From a payer perspective how is the implementation of ACA likely to influence future demand for inpatient services?

   How are Rhode Island hospitals likely to respond?

	Initially more insured, more utilization	In future, better care coordination, fewer beds (PCMH)	More complex conditions
Interviewee 11	x	x	x
Interviewee 12	x	x	

Comments:
More proliferation of PCMH should lower need for beds, but not as dramatically as we have seen with first 100,000.
Most physician practices not ready to make changes for care coordination, information sharing.
Not good data.
Newly covered people are already getting services, maybe 2-3% increase.
People who haven't had care may access it, will see short term bump.
Maybe 10% decrease in bed days, plus readmissions will decline. Bed days will drop.

7. How do you expect your organization's contracting to change if you become a participant in the Health Insurance Exchange?		
	Contracting will change.	No change expected
Interviewee 11	x	
Interviewee 12		x
Comments: Payers and HIE are about 90% aligned in what they want to do.		

8. What are other current or anticipated policy/market forces unique to Rhode Island that we should take into consideration when developing our inpatient bed need analysis (e.g. state CON requirements, additional merger activity, etc.)?			
	Centers of Excellence	Need to engage patients, public	Lack of good CON process to limit proliferation of new services.
Interviewee 11	x	x	
Interviewee 12			x
Comments: It's okay to have Centers of Excellence in NY, Boston or CT. But people won't travel for routine care. Have to separate inpatient from outpatient perspective. Outpatient centers impact hospitals adversely.			

1. How would you characterize the **overall health status** of Rhode Island residents?

   Relative to surrounding states?

	Average compared to nation, surrounding states	Better in some areas	Worse in some areas
Interviewee 21		x	x
Interviewee 22			
Interviewee 23	x		
Interviewee 24		x	x
Interviewee 25	x		
Interviewee 26	x		

Comments:
Depends on metric used to measure.
Population is elderly but there is good access.
Concerned about quality of care to geriatric patients.
Geographic disparities in care due to environmental and economic issues. Poor people in Providence have exposure to lead paint and metal and there are food deserts.
Decisions made over the years have not impacted health status.
Need integration of services in both medical and behavioral health area.
More immigrants in Rhode Island as a percent than surrounding states.
Demographics important, will be increase in utilization among non-English speaking population as primary care Language Access Standards are implemented.
No geographic roadblocks to hospital and imaging services, easy access to many services leads to overutilization.

2. What would you consider to be Rhode Island's **most important health problems**?

   Are any population groups or Rhode Island communities particularly affected by these problems?

	Obesity and related diseases (diabetes)	Infectious diseases	Coronary heart disease	Behavioral health	Disparities by population
Interviewee 21	x	x			
Interviewee 22					
Interviewee 23	x				
Interviewee 24			x	x	x
Interviewee 25	x				
Interviewee 26			x	x	x

Comments:
Obesity a growing problem, especially among children.
Obesity is becoming the number one problem.
Low incidence of stroke, injuries, suicide, obesity, smoking.
High level of preventive care.
Disparity of cholesterol screening in Hispanic population.
Most important health problem is paying for care.
Behavioral health has extra morbidity perhaps due to high unemployment, economic stress, income inequalities and intense substance abuse morbidity. Mental health services are available and there is a lot of distress.
Not enough inpatient substance abuse treatment, better treatment of substance abuse might prevent other health conditions.
Most important health problems are unintentional injury (overdose from opiods), cancer malignancies, heart disease and perinatal complications.

3. Has a community health **needs assessment** been completed recently in Rhode Island? If so, what were the assessment's key findings?		
	DOH study getting started	Yes, RIPHI findings-Community unsafe to play, no grocery stores
Interviewee 21	x	x
Interviewee 22	x	
Interviewee 23		
Interviewee 24	x	
Interviewee 25		
Interviewee 26	x	
Comments: Rhode Island Public Health Institute did targeted community study, neighborhood level assessments. Healthy People 2010 Advisory council. Community structure is an important component of where the beds should go. DOH community needs assessment is just beginning. What is role of community hospital, who do they serve? Lack of willingness to travel for services is a problem. Not aware of any recent studies, the last state health plan was 1987.		

4. In your view, have hospitals and other health care providers in the community taken an active role in addressing community health needs? If so, how? If not, what actions should providers consider taking?

	No	Yes, outreach for disease awareness	Need to share data	Need to coordinate care
Interviewee 21	x		x	x
Interviewee 22				
Interviewee 23		x		
Interviewee 24				
Interviewee 25		x		
Interviewee 26				

Comments:
Hospitals have not been involved in service systems previously. Are going to be asked to be different in future, must coordinate with ACOs, be part of a network, and need to focus on primary care and outcomes.
Need good information technology to share patient data.
Health care providers have been engaged in outreach to improve the health of the community because it makes economic sense to keep people healthy.

5. From your perspective, how could inpatient service delivery be better or more efficiently organized in Rhode Island?

	Improve geriatric services	Better coordination of services	Effective transitions of care to avoid readmission and improve quality	Move inpatient services to other settings	Consolidate OB beds	Focus on primary care
Interviewee 21	x	x	x			x
Interviewee 22						
Interviewee 23				x		
Interviewee 24		x			x	
Interviewee 25		x				
Interviewee 26		x	x	x		x

Comments:
Acute care providers must re-think their role, need to partner in ACOs.
Financial models for hospitals will need to change.
Complex cases should be at high level hospitals, other services at community hospitals.
OB bed distribution is an issue.
Should consolidate into fewer providers (3-4) and coordinate services.
Aggregation helps small hospitals who would be subsumed by the system.
ACOs will drive people/hospitals into a system using payment incentives.
Need scale and volume for information technology, quality and cost effectiveness
Services should be connected to a primary care infrastructure to deflect 30- 50% of utilization.
Should organize around maternity care. Could also move low risk maternity care to community based centers.
Need fewer hospitals and their services should be focused on things that only a hospital can do.
Need to coordinate services with primary care.

6. In your view, is there **excess capacity or duplication** of acute care hospital beds in Rhode Island?

If so, which geographic areas and services are most affected?

	Yes, excess capacity	Duplication of services	Geographic mal-distribution
Interviewee 21	x		x
Interviewee 22		x	x
Interviewee 23	x		x
Interviewee 24	x	x	x
Interviewee 25	x	x	
Interviewee 26	x		

Comments:
Real issue is coordination of care across hospitals.
Need to redistribute services to centers of excellence to get volume/quality.
Need smart placement of services, geographic dispersion.
Have duplication of services such as MRI by guy on the corner.
Occupancy low, suggests overcapacity.
People from one part of state don't want to travel to another part of state to receive care.
Excess capacity in outer community hospitals. More efficient to provide high end care in specialized facilities.
Hospitals are in a race to the bottom, should be a race to the top.
Need CON process that can refer to a health plan to made decisions on beds.
Inpatient services need to be better organized.
The number of services provided is dropping significantly while the number of beds has stayed the same.
The issue isn't the number of beds but the unnecessary utilization of inpatient services.
Geography plays a role because Rhode Islanders don't want to travel even 15 minutes for health care.
There is some duplication of services at smaller hospitals.
There is a lack of evidence on hospital beds and health outcomes. We need evidence to prove outcomes and make changes.

7. In your view, could meaningful cost savings be achieved through inpatient bed reductions?

   If so, what is the best approach?

	Reduce costs, not beds	Need integrated care system for quality and cost savings.	No political will to reduce beds/services/employment
Interviewee 21	x		
Interviewee 22	x		
Interviewee 23			x
Interviewee 24		x	
Interviewee 25		x	x
Interviewee 26	x		

Comments:
Need to think about cost reductions in hospitals, what are contributors to overhead?
What is volume of services in community hospitals? What is needed?
Can remove beds but not supporting costs and it won't matter.
May end up shifting capacity from efficient to inefficient hospitals.
Skeptical about big savings.
Disrupts employment.
Political forces strong.
Shift from inpatient to outpatient and aging of population will require different services.
Cost savings would be a side benefit, need integrated health care system that provides good care.
Hospitals need to prepare for the future, starting to use primary care as a centerpiece.
Is waste of time to try to reduce beds, is really a utilization issue.
CON process is outdated and not necessary anymore. Hospitals will not build beds they can't support financially. Number of beds will respond to market forces.
Not by bed reductions alone, need to build up community based infrastructure and shrink hospital spending. Savings will come from reducing unnecessary services.

8. Are there specific inpatient **services that are not adequately provided** in Rhode Island?

Are there geographic areas within Rhode Island with an under or over supply of beds?

	Capacity good if willing to travel	Access to primary care services limited by reimbursement	Lacking adequate behavioral health care for children	Lacking adequate dental care
Interviewee 21	x	x	x	x
Interviewee 22	x			
Interviewee 23	x			
Interviewee 24	x		x	
Interviewee 25	x			
Interviewee 26	x			

Comments:
Services are there if reimbursed, harder for uninsured folks to access.
Primary care physicians are underpaid, no incentive to provide access.
Centers of excellence don't have to be in Rhode Island if specialized, not routine care.
Services exist in Boston and New Haven. Should be regionalized so Rhode Island doesn't have to use resources to compete.
Makes sense to have centers of excellence outside of Rhode Island, some people will travel but some won't.
All services are available, except pediatric bone marrow transplants.
Not enough volume to support some services.
Ethnicity of state is changing, may require different services.
No lack of services given size of state. Do have a lack of outpatient services, need chronic pain treatment center to address prescription drug abuse.

9. Area hospitals have been forming affiliations with other hospitals or seeking to merge with out-of-state hospitals. What is your reaction to these plans?			
	Positive	Negative	Depends
Interviewee 21			x
Interviewee 22	x		
Interviewee 23	x		
Interviewee 24			x
Interviewee 25			x
Interviewee 26			x

Comments:
Reaction depends on the system. Don't see them as positive or wanting to provide high quality care.
What is the incentive? Don't want mergers just to have companies come in and take the profits.
Mergers don't usually save money but can consolidate services and improve quality.
Merged organizations have market share leverage with insurers.
Makes sense given market forces and trend of moving from fee for service to global payments and consolidation of services.
Mergers can facilitate use of electronic health records to avoid duplication.
Danger of monopoly and higher prices, can be addressed by payment policies.
Charter Care is the only change of ownership.
All services are adequately supplied. If there is money in it, a provider will offer it.
Expect more mergers because they can achieve a scale of economy in providing services.
ACO payment incentives will encourage mergers.
Best to keep jobs in Rhode Island, but clinically want to achieve economies of scale and critical mass of services.
Need to centralize services and have community based organizations to share services across the state.

10. Have mergers and consolidations resulted in changes in how inpatient services have been delivered (e.g., reductions in bed capacity)? If so, to what extent have these changes influenced access and cost?

	No change	Consolidations	Increased access	Decreased costs
Interviewee 21				
Interviewee 22				
Interviewee 23				
Interviewee 24	x	x (recent)		
Interviewee 25	x			
Interviewee 26				

Comments:
Marian and RH Hospital merged in 1994, took 17 years to for open heart surgery to be moved to one specialized unit at RIH.
No reduction in licensed beds.
No impact on cost or access so far.
Some aggregation, no reduction in beds.
Some consolidation has occurred in open heart surgery.
There are opportunities to do more low risk OB in community hospitals.

11. What additional hospital organizational changes are anticipated for the future (e.g., pending mergers, closures)?
What are their likely impacts on inpatient bed capacity?

	Impacts bed capacity	Won't impact bed capacity
Interviewee 21		
Interviewee 22		
Interviewee 23		
Interviewee 24		x
Interviewee 25		x
Interviewee 26		

Comments:
Merging two hospitals did not reduce costs but could improve quality. Improves market share and increases costs.
Rhode Island physicians are not in hospitals and can be expensive. Productivity depends on incentives.
Key is collaboration, need to have everyone on board and working together.
Two hospitals in receivership, a few other looking for partners.
Haven't seen any drop in service.
Two services were consolidated at Charter Care.
Inpatient bed capacity not really an issue.
Chafee asking Lifespan and Care NE to coordinate.
Need more than one health care entity.
Hospital bed need is not the question. Let hospitals do what they want so long as they meet standards of care.
No comment.

12. How are provisions of ACA likely to influence future demand for inpatient beds (e.g., coverage expansions)?

How are RI hospitals likely to respond?

	Short term increase in utilization	Long term decrease in utilization	Focus on wellness and primary care	Increased use of physician extenders	Will see vertical integration of services.
Interviewee 21	x	x		x	
Interviewee 22					
Interviewee 23	x	x	x		
Interviewee 24					x
Interviewee 25	x	x			
Interviewee 26			x		

Comments:
Depends on timeframe. Access to high quality care reduces utilization.
More people will have insurance but they are currently receiving care for the most part.
ACA will affect the way hospitals operate.
New payment incentives will change delivery system.
Hospitals that are ahead of the curve should be okay.
Enough beds in mothballs, won't result in new beds.
ACOs will encourage movement from inpatient to outpatient.
Not sure. Probably impact on demand for primary care.
May impact hospital financing because of less uncompensated care.
May actually increase number of uninsured if cost of insurance is unaffordable.

13. Are there any other policy/market forces unique to Rhode Island that we should take into consideration when estimating future statewide inpatient bed need (e.g. state CON requirements)?

	Unemployment rate	Lack of political will/community support to make changes	Number of undocumented/uninsured people seeking care	Dense population makes good laboratory for change	"Pride of Rhode Island" attitude which limits consideration of outside options. Wealth balance different than surrounding states.
Interviewee 21	x		x		
Interviewee 22					
Interviewee 23				x	x
Interviewee 24			x		x
Interviewee 25	x	x			
Interviewee 26					

Comments:
Political community is one party, makes it hard to bring up new ideas.
Wary of deliberate part-timing of staff to avoid offering health insurance.
Many small businesses with underinsured employees.
Wealth balance is different from Massachusetts, can't use it as a model.
Should look at affordability and sustainability.
Recent legislative bill permits hospitals to provide services in clinics and other places without bringing clinics up to hospital standards.
Need to take the numbers out of the plan to have it be acceptable to state and community.
Fewer payers raises risk of consolidation and monopoly pricing, not clear how it impacts bed need.
Number of hospitals and marketing drives demand.