

Review of Conclusions and Recommendations in the Bond Advisory Committee Report to the Board of Directors

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FINAL



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Section 1: Scope of Work and Approach

SCOPE OF WORK AND APPROACH

» Scope of Work:

- › To conduct an independent high level desk review of the Bond Advisory Committee (BAC) report to the Board of Directors related to:
 - Service line plans for acute care, ambulatory care and behavioral health;
 - Methodologies employed by consultants to the BAC to arrive at space needs and total project costs;
 - Methodologies used to perform the facility condition assessment to confirm if they meet industry acceptable standards; and
 - Operational cost saving opportunities.

SCOPE OF WORK AND APPROACH

» Key Questions to Address:

- › Are service line plans and assumptions reasonable and appropriate for the future state of healthcare?
- › Is \$935M sufficient to execute MIHS strategic vision and plan?
- › How can the strategic facility plan support operational cost savings, in particular energy savings?
- › Does MIHS strategy support population based health and foster community-based collaborative development?

» Our Approach:

- › Review key deliverables, assumptions and detailed supporting documentation from Navvis, KSA & MIHS.
- › Interviews of key MIHS executive, Navvis, and KSA team members.
- › Benchmarking methodologies and assumptions for service line strategies, space programming, budgeting and population health/community based development strategies against our team's experience with past similar projects, industry standards and best practices.
- › Summary of key findings and impact on service line strategies/plans, space needs, and costs.

Section 2: Executive Summary

EXECUTIVE SUMMARY – SERVICE LINE PLAN REVIEW

Key Findings/Conclusions:

- » The MIHS service area definition appears to follow generally accepted planning methodologies and uses valid data sources, including data from MIHS and the State of Arizona. The service area itself is quite large, both in terms of geography covered and population totals.
- » The population projections used to develop the volume projections are from well-regarded and validated sources. Projected population growth in the MIHS service area is quite strong and substantially higher than that projected for the U.S. as a whole.
- » Navvis utilized The Advisory Board and its proprietary volume projection model for the volume projections for the MIHS market areas. The Advisory Board is a well known healthcare firm, although since their volume projection model is proprietary we cannot comment on the appropriateness of the methodology used. It is our understanding that The Advisory Board uses generally recognized data sources.

EXECUTIVE SUMMARY – SERVICE LINE PLAN REVIEW

Key Findings/Conclusions:

- » The data we had access to from Navvis/Advisory Board showed 2012 volumes and total growth in volumes for 2017 and did not provide any information related to use-rates. In order to test the volume projections, we calculated use-rates from the data provided for 2012 and 2017 and compared those to use-rates for the State of Arizona as a whole as well as to the U.S.
- » When we calculated the inpatient use-rate for the MIHS service area for 2012 and 2017, it came out to be 102.9 discharges/1,000 population in 2012 and 100.3 in 2017.
- » Most healthcare experts expect use-rates to decline, so we assessed the impact on market volumes based on a 2017 use-rate of 96.0 discharges/1,000 population, which was the rate for the State of Arizona in 2012. Applying this use rate to projected service area population led us to conclude that market volumes may be overstated by approximately 18,000 discharges, or about 4%.

EXECUTIVE SUMMARY – SERVICE LINE PLAN REVIEW

Key Findings/Conclusions:

- » The Navvis/Advisory Board projections resulted in a modest increase in MIHS market share from 3.4% to 3.7% between 2012 and 2017. This represents a fairly dramatic increase in volumes for MIHS of about 1,650. In addition, a projected growth in inpatient volumes would represent a dramatic shift in the patterns of the last few years, which have seen steady declines in MIHS volumes.
- » If MIHS's market share remains at current levels rather than increasing as projected, its projected 2017 volumes would be somewhere between 900 and 1,300 lower than the Navvis projections (depending on the market volume). This would represent a lower average daily census of 11-15 patients.
- » Historical behavioral health market volumes increased 3.0% per year while MIHS volumes grew by almost 10% per year. Navvis projections call for a growth in MIHS Behavioral Health discharges of only 2.0% per year during the projection period. Based on historical patterns, it is likely this projection may be understated.

EXECUTIVE SUMMARY – SERVICE LINE PLAN REVIEW

Key Findings/Conclusions:

- » The Navvis/Advisory Board projections show MIHS ED volumes increasing well below historical growth rates and well below the projected growth in the service area population. Given the growth in retail/urgent healthcare as well as the development of additional MIHS health centers, this more modest growth in ED volumes is appropriate.
- » The Navvis/Advisory Board ambulatory growth assumptions appear to be somewhat aggressive in a few instances but overall appear consistent with MIHS's strategic initiatives and are appropriate strategic focal areas.

EXECUTIVE SUMMARY – REVIEW OF EXISTING FACILITY CONDITIONS ASSESSMENT METHODOLOGY

» Key Findings:

- › Three methods were used to assess existing space which are generally accepted approaches for this stage of facilities planning:
 1. a survey tool related to infrastructure and functionality;
 2. analysis of basic space and workload metrics for key space elements; and
 3. test layouts of conversion of inpatient units from multiple-occupancy rooms to private rooms.
- › KSA's analysis illustrates the complexity and functional compromises that could result from the conversion of existing patient rooms to private rooms. These findings appear logical and appropriate.
- › We also concur with KSA's approach and methodology for evaluating diagnostic and treatment space requirements.
- › The Behavioral units appear to have been assessed using acute care "standards" for net and departmental gross areas per bed, which is not the norm in behavioral.

EXECUTIVE SUMMARY – SPACE PROGRAM AND COST REVIEW

- » Our Approach to Reviewing Space Programming and Costs:
 - › For purposes of conducting our review, we did a comparative program and budget analysis of the most expensive Options, i.e., Option 2 for the Acute Care Hospital and Behavioral Health Hospital in addition to the associated options developed for the CHC's and FHC's.

- » Key Findings/Recommendations:
 - › General (applicable to all components):
 - Increase soft cost allocation from 10% to 20% to cover all professional fees and other related soft costs (excluding financing costs);
 - Use 3% annual escalation through 2017 and 4% thereafter vs. 3%/yr.;
 - Increase site work allocation to 10% from 7% given the unknown conditions of existing and to be acquired sites; and
 - 10% owner contingency vs. 20%.
 - › Acute Care Hospital (Option 2):
 - Reduce construction cost from \$390/BGSF (avg. 2013) to \$360/BGSF (current 2014 dollars).
 - Increase FFE/IT allocation from 25% to 40%.

EXECUTIVE SUMMARY – SPACE PROGRAM AND COST REVIEW

» Key Findings/Recommendations (Cont.):

› Education Bldg.:

- Increase construction cost from \$126/BGSF (avg. 2013) to \$220/BGSF (current 2014 dollars).
- Reduce FFE/IT allocation to 20% from 25%.

› Laundry:

- Although we do not have recent comps for laundry facilities since clients have moved to outsourcing this function, the construction costs used in the KSA cost model seemed reasonable. MIHS should study the cost benefit of outsourcing laundry.

› Demolition:

- The demolition budget at \$7M appeared low. We recommend budgeting \$15/BGSF for demolition and asbestos abatement plus allocations for soft costs and owner's contingency.

EXECUTIVE SUMMARY – SPACE PROGRAM AND COST REVIEW

» Key Findings/Recommendations (Cont.):

› Power Plant:

- Navigant had insufficient sizing/capacity and cost data assumptions to quantitatively evaluate the Power Plant costs used in the BAC Report; nevertheless, we are skeptical \$12M is an adequate budget due to concerns with the age of existing equipment and its compatibility with new energy efficient systems. Therefore, based on benchmarking recent replacement hospital projects, we recommend budgeting up to \$20M which assumes limited re-use of existing plant & equipment.

› Behavioral Health Hospital:

- Reduce construction cost from \$348/BGSF (avg. 2013) to \$300/BGSF (current 2014 dollars) based on our conclusion that the facility will have less % of space allocated to inpatient services than assumed in the KSA program.
- Reduce FFE/IT allocation to 20% from 25% as we believe the ultimate facility program will be less skewed towards inpatient units than in the KSA program.

EXECUTIVE SUMMARY – SPACE PROGRAM AND COST REVIEW

- » Key Findings/Recommendations (Cont.):
 - › CHC's:
 - Use 20% gross up factor vs. 30% for the new East and West CHC's.
 - Increase construction cost from \$240/BGSF (avg. 2013) to \$260/BGSF (current 2014 dollars) for the new East and West CHC's.
 - Increase construction cost from \$182/BGSF (avg. 2013) to \$210/BGSF (current 2014 dollars) for the addition to the central CHC.
 - › FHC's:
 - Use 550 DGSF/exam vs. 650, which reduces overall space required for the FHC's by 12,000 BGSF.
 - Use current 2014 construction costs @ \$260/BGSF.
 - No land acquisition cost was noted in the BAC Report for relocation to new sites.
 - No recapture of funds from the sale of old sites is assumed in the BAC Report.
- » Comparative budgets based on the above key findings and recommendations are detailed on the following pages.

EXECUTIVE SUMMARY – ACUTE CARE SPACE PROGRAM AND COST REVIEW

Acute Care Hospital (Option 2)		Acute Care Hospital	Education Bldg	Laundry	Power Plant	Demolition	2619 Renovation	Totals
Beds		264	--	--	--	--	--	
BGSF / Bed		2,400	--	--	--	--	--	
Total BGSF		633,600	44,590	37,800	N/A	482,230	35,950	
Avg Cost / BGSF (2014)		\$360 ⁵	\$220 ⁷	\$116 ⁹	--	\$15 ¹¹	\$130 ¹²	
1	Site Work	\$26,700,000 ¹	\$1,100,000 ¹	\$500,000 ¹	--	--	\$500,000 ¹	\$28,800,000
2	Construction Costs	\$267,000,000 ²	\$10,800,000 ²	\$4,900,000 ²	--	\$8,600,000 ²	\$5,100,000 ²	\$296,400,000
3	FFE / IT	\$106,800,000 ⁶	\$2,200,000 ⁸	\$1,200,000	--	--	\$900,000 ¹³	\$111,100,000
4	Soft Costs	\$58,700,000 ³	\$2,400,000 ³	\$1,000,000 ³	--	\$1,700,000 ³	\$1,100,000 ³	\$64,900,000
5	Owner's Contingency	\$45,900,000 ⁴	\$1,700,000 ⁴	\$800,000 ⁴	--	\$1,000,000 ⁴	\$800,000 ⁴	\$50,200,000
Total - Navigant (rounded)		\$505,000,000	\$18,200,000	\$8,400,000	\$20,000,000 ¹⁰	\$11,300,000	\$8,400,000	\$571,000,000
Total - BAC Report		\$498,000,000	\$11,525,000	\$8,400,000	\$12,000,000	\$7,000,000	\$9,000,000	\$546,000,000
Variance		\$7,000,000	\$6,675,000	\$0	\$8,000,000	\$4,300,000	(\$600,000)	\$25,000,000 ^{5%}

EXECUTIVE SUMMARY – ACUTE CARE SPACE PROGRAM AND COST REVIEW

Corporate Budget Notes / Assumptions:

General

- 1 Navigant used 10% sitework allocation vs 7% used in the BAC Report due to unknown site conditions of existing site (utility relocations, etc.).
- 2 Escalation: Navigant assumed 3%/yr thru 2016 and 4%/yr thereafter to mid-point of construction vs 3%/yr in the BAC Report
- 3 Soft Costs: Navigant used 20% allocation of total construction costs vs. 10% in cost models used for the BAC Report; soft costs excludes financing costs
- 4 Owner Contingency: Navigant used 10% vs. 20% in the BAC Report; please note that our construction cost estimates include design and construction contingencies

Acute Care Hospital

- 5 Navigant used 2014 construction costs / BGSF @ \$360/BGSF vs. \$390 / BGSF (avg 2013) in cost models used for the BAC Report
- 6 Navigant used 40% allocation for FFE / IT vs. 25% in cost models used for BAC Report; assumes limited re-use of existing FFE / equipment

Education Building

- 7 Navigant used 2014 construction costs / BGSF @ \$220/BGSF vs. \$128 / BGSF (avg 2013) in cost models used for the BAC Report
- 8 Navigant used 20% allocation for FFE / IT vs. 25% in cost models used for BAC Report; assuming simulation labs will be included in program.

Laundry

- 9 Navigant agreed with the construction costs as used in cost models for BAC Report

Power Plant

- 10 Navigant had insufficient sizing / capacity and cost data assumptions to quantitatively evaluate the Power Plant sizing and cost methodologies used in the BAC Report; nevertheless we are skeptical \$12M is an adequate budget due to concerns with the age of existing equipment and its compatibility with new energy efficient systems. Therefore, based on benchmarking recent replacement hospital projects, we recommend budgeting up to \$20M which assumes limited re-use of existing plant & equipment.

Demolition

- 11 Navigant estimated 2014 demolition costs @ \$6/sf and abatement @ \$9/sf vs. 2013 costs of \$13 /sf total in BAC Report

2619 Renovation

- 12 Navigant used 2014 construction costs / BGSF @ \$130/BGSF vs. \$125 / BGSF (avg 2013) in cost models used for BAC Report
- 13 Navigant used 18% allocation for FFE / IT vs. 25% in cost models used for BAC Report

EXECUTIVE SUMMARY – BEHAVIORAL HEALTH HOSPITAL SPACE PROGRAM AND COST REVIEW

Beds	240	
BGSF / Bed	1,475	
Total BGSF	354,000	5
Avg Cost / BGSF (2014)	\$300	6
1	Site Work	\$12,400,000 1
2	Construction Costs	\$124,300,000 2
3	FFE / IT	\$24,900,000 7
4	Soft Costs	\$27,300,000 3
5	Owner's Contingency	\$18,900,000 4
Total - Navigant (rounded)		\$208,000,000
Total - BAC Report		\$247,000,000
Variance		(\$39,000,000) -16%

Corporate Budget Notes / Assumptions:

- 1 Navigant used 10% sitework allocation vs 7% used in the BAC Report due to unknown site conditions of existing site (utility relocations, etc.).
- 2 Escalation: Navigant assumed 3%/yr thru 2016 and 4%/yr thereafter to mid-point of construction vs 3%/yr in BAC Report
- 3 Soft Costs: Navigant used 20% allocation of total construction costs vs. 10% in cost models used for the BAC Report; soft costs excludes financing costs
- 4 Owner Contingency: Navigant used 10% vs. 20% in the BAC Report; please note that our construction cost estimates include design and construction contingencies
- 5 Navigant used corrected 354K BGSF vs 352K BGSF used in the KSA cost model.
- 6 Navigant used 2014 construction costs / BGSF @ \$300/BGSF vs. \$348 / BGSF (avg 2013) in cost models used for BAC Report, based on our conclusion that the facility will have less % of space allocated to inpatient services than assumed in the KSA program.
- 7 Navigant used a 20% allocation for FFE / IT vs 25% used in the cost models used for BAC Report as we believe the FFE / IT requirements will be less intensive for a BH facility.

EXECUTIVE SUMMARY – CHC SPACE PROGRAM AND COST REVIEW

		Expand Central CHC (Add Floor)	New East CHC	New West CHC	Totals
Total BGSF		27,000 7	89,760 8	89,760 8	
Avg Cost / BGSF (2014)		\$210 6	\$260 9	\$260 9	
1	Site Work	\$600,000 1	\$2,600,000 1	\$2,600,000 1	
2	Construction Costs	\$6,300,000 2	\$25,700,000 2	\$25,700,000 2	
3	FFE / IT	\$1,600,000 5	\$6,400,000 5	\$6,400,000 5	
4	Soft Costs	\$1,400,000 3	\$5,700,000 3	\$5,100,000 3	
5	Owner's Contingency	\$1,000,000 4	\$4,000,000 4	\$4,000,000 4	
Total - Navigant (rounded)		\$11,000,000	\$44,000,000	\$44,000,000	\$99,000,000
Total - BAC Report		\$10,000,000	\$46,000,000	\$46,000,000	\$102,000,000
Variance		\$1,000,000	(\$2,000,000)	(\$2,000,000)	(\$3,000,000) -3%

EXECUTIVE SUMMARY – CHC SPACE PROGRAM AND COST REVIEW

Corporate Budget Notes / Assumptions:

General

- 1 Navigant used 10% sitework allocation vs 7% used in the BAC Report due to unknown conditions of the existing and prospective sites.
- 2 Escalation: Navigant assumed 3%/yr thru 2016 and 4%/yr thereafter to mid-point of construction vs 3%/yr in BAC Report
- 3 Soft Costs: Navigant used 20% allocation of total construction costs vs. 10% in cost models used for the BAC Report; soft costs excludes financing costs
- 4 Owner Contingency: Navigant used 10% vs. 20% in the BAC Report; please note that our construction cost estimates include design and construction contingencies
- 5 Navigant agreed with the 25% allocation for FFE / IT in the cost models used for BAC Report

Expand Central CHS

- 6 Navigant used 2014 construction costs / BGSF @ \$210/BGSF vs. \$182 / BGSF (avg 2013) in cost models used for BAC Report
- 7 Per KSA, assumed expand by 1/2 floor

East and West CHC

- 8 Navigant used a 20% gross up factor vs. 30% used in sizing / cost models in the BAC Report
- 9 Navigant used 2014 construction costs / BGSF @ \$260/BGSF vs. \$240 / BGSF (avg 2013) in cost models used for the BAC Report

EXECUTIVE SUMMARY – FHC SPACE PROGRAM AND COST REVIEW

Total BGSF		77,750	6
Avg Cost / BGSF (2014)		\$260	7
1	Site Work	\$2,200,000	1
2	Construction Costs	\$22,300,000	2
3	FFE / IT	\$3,300,000	5
4	Soft Costs	\$4,900,000	3
5	Owner's Contingency	\$3,300,000	4
Total - Navigant (rounded)		\$36,000,000	8
Total - BAC Report		\$26,000,000	
Variance		\$10,000,000	38%

Corporate Budget Notes / Assumptions:

- 1 Navigant used 10% sitework allocation
- 2 Escalation: Navigant assumed 3%/yr thru 2016 and 4%/yr thereafter to mid-point of construction vs 3%/yr in BAC Report
- 3 Soft Costs: Navigant used 20% allocation of total construction costs (excludes financing costs); KSA incorporated into their total project cost PSF
- 4 Owner Contingency: Navigant used 10%; KSA incorporated into their total project cost PSF
- 5 Navigant used 15% allocation for FFE / IT; KSA incorporated an allocation into their total project cost PSF; assumes minimal re-use
- 6 Navigant assumed 550 DGSF / exam vs. 650 in the BAC Report cost model which decreased overall BGSF by 12,000 for the 6 new FHC's
- 7 Navigant used 2014 construction costs / BGSF @ \$260/BGSF vs. \$287 / BGSF escalated all-in average project cost in cost models used for BAC Report
- 8 No land acquisition cost was noted in the BAC Report for relocation to new sites; No recapture of funds from the sale of old sites is assumed in the BAC Report

EXECUTIVE SUMMARY – SPACE PROGRAM AND COST REVIEW: OVERALL COMPARISON

	Acute Care Hospital	Behavioral Health Hospital	CHC's	FHC's	Total	
Navigant Budget Totals	\$571,000,000	\$208,000,000	\$99,000,000	\$36,000,000	\$914,000,000	
BAC Report Budget Totals	\$546,000,000	\$247,000,000	\$102,000,000	\$26,000,000	\$921,000,000	
Variance	\$25,000,000	(\$39,000,000)	(\$3,000,000)	\$10,000,000	(\$7,000,000)	-0.8%

- » Based on our recommended modifications to the approach to programming and budgeting for Option 2, approximately \$914M will be required to execute this option. This is \$7M lower than the upper range in the BAC Report, which is a less than 1% variance, a statistically insignificant difference.
- » Based on our conclusion that acute care bed need may be overstated by 8 to 15 beds, if MIHS reduced the number of acute care beds by 10, the resulting cost reduction would be \$19M and total capital requirements would be approximately \$895M.

EXECUTIVE SUMMARY – OPERATIONAL COST SAVING OPPORTUNITIES

- » Healthcare buildings account for less than one percent of all commercial buildings, and two percent of all commercial floor space, yet account for 5.5% of commercial building energy consumption. This figure has increased since 2004, when healthcare consumed 4.3% of the total delivered energy within the building sector (EIA, 2012). Looking at healthcare's energy footprint in another way, hospitals are the second most energy intensive building type per square foot, just behind fast food restaurants, and as an industry spend over \$8 billion annually on energy costs (HHI, 2013). (Burpee, 2013).
- » 2011 AHA data reported an average cost of \$3.23 per square foot for utility costs, with electrical accounting for 71 percent of these costs. One patient discharge is the equivalent of two months of typical home use. Utility costs account for approximately 2.7 percent of typical hospital costs.
- » Evidence shows significant cost reduction opportunities with the careful design of a new facility. For example, a recent study of Scandinavian hospitals found their energy consumption to be almost half the level of comparable hospitals in the northwest. (Burpee, 2013).
- » MIHS should also experience material savings in R&M costs due to new modern facilities.

EXECUTIVE SUMMARY – OPERATIONAL COST SAVING OPPORTUNITIES

- » Although the proposed hospital is estimated to be 30% larger than the existing facility, efficient design and planning of systems could have a significant effect on the utility budget. Unless LEED and other strategies from reducing consumption are realized, the system could anticipate a significant increase in their utility budget.
- » ARCHITECTURAL STRATEGIES:
 - › Shading, reducing solar heat gain.
 - › Improved thermal envelope.
 - › Reformulation of the building massing to create greater exterior connection.
 - › Daylighting throughout with electric lighting reductions.
- » BUILDING MECHANICAL STRATEGIES:
 - › De-coupled ventilation and thermal tempering, virtually eliminating re-heat.
 - › Control strategies that turn spaces “off” when not in use, including operating rooms.
 - › Heat recovery at every opportunity possible.
- » In our experience, deploying the above strategies for new facility development can yield 10% to 15% in annual energy savings alone.

Section 3: Service Line Plan Review – Acute Care, Ambulatory Care & Behavioral Health

SCOPE OF SERVICE LINE PLAN REVIEW

The facility plan and the associated financial requirements outlined in the MIHS report are the result of the anticipated volume of patients MIHS expects to serve in the future. In this section, we review the methodologies, key assumptions and data sources used by Navvis to generate the patient volumes that drive the facility plan. The scope of our review focused on assessing the appropriateness of the methodologies used to project future volumes, the reasonableness of the key assumptions underlying the volume projections, and the validity and general acceptability of the data sources. We also reviewed the strategic direction and major initiatives in the MIHS strategy for appropriateness and relevance based on our knowledge of the current and emerging local, regional, and national healthcare trends.

The scope of our assistance excluded preparing any independent volume projections, conducting any independent analyses regarding the market served by MIHS, or interviewing stakeholders with respect to the volume projections, market dynamics, or MIHS's strategic direction.

SCOPE OF SERVICE LINE PLAN REVIEW

Based on our experience in developing volume projections for healthcare organizations throughout the United States, we know that healthcare volumes are a function of the following key factors:

- The area served by the institution (known as the service area);
- The composition of the population residing in the service area (e.g., total size of the population, age profile of the population, etc.);
- The rate of utilization (typically expressed as a rate per 1,000 population), and
- The percentage of the market served by the institution (known as market share).

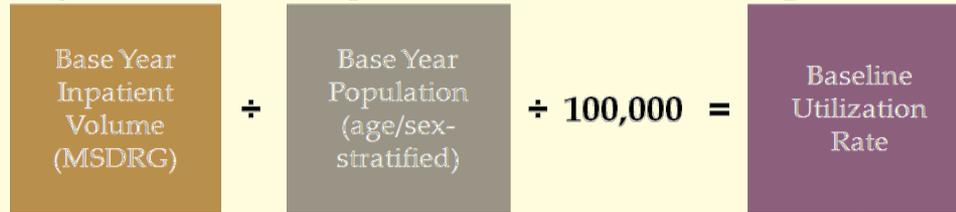
The graphics on the following two pages highlight Navigant's well-developed and thoroughly tested methodology for projecting inpatient and outpatient volumes.

INPATIENT VOLUME PROJECTION METHODOLOGY

Navigant's Inpatient Volume Projection Methodology

Inpatient volumes are projected based on market size estimates (based on use rates and population) and by applying market share growth assumptions.

Projected IP Discharge Volume: Market & Hospital



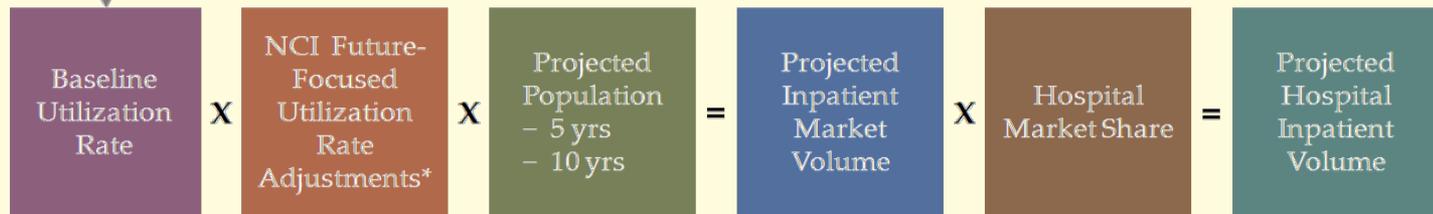
Source: Thomson, State Hospital Association, other

Source: Claritas, other demographer

Key Assumptions & Variables

- Population/demographics
- Use rates – Science and Technology
- Medical staff mix changes
- Hospital market share (by service line)
- In/outmigration (by service line)
- ALOS: Science and Technology / Performance Improvement

Projected IP Discharge Volume: Market & Hospital



* Incorporate changes in utilization due to science & technology, shift to less acute sites of care, socioeconomic characteristics.

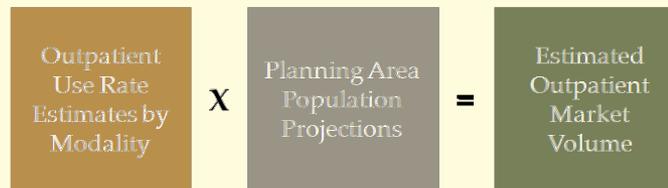
Sensitivity Analyses/Strategic Scenarios:
Ability to model multiple future outcomes for planning purposes.

OUTPATIENT VOLUME PROJECTION METHODOLOGY

Navigant's Outpatient Volume Projection Methodology

Navigant's market-driven volume forecasting model helps determine future outpatient volumes at the modality level.

Outpatient Market Volume Projection Methodology



Source:
• IMV data
• NCI experience
• Medstat/Solucient

Source:
• Claritas

Outpatient Diagnostic and Therapeutic Modalities

- Cardiac: Cath, EP, ECHO, Nuclear
- GI Endoscopy Lab Procedures
- Imaging: CT, MRI, PET, Ultrasound, Mammography
- Interventional Radiology
- Neurological: Electromyography (EMG), Electroencephalogram (EEG)
- Pulmonary Function Testing
- Radiation Oncology
- Sleep Studies

Service Area Definition and Demographics

SERVICE AREA DEFINITION AND DEMOGRAPHICS

As noted in the previous section, the key factors driving healthcare volumes (both current and projected) include the area served by the institution, the size and age profile of the population residing in the service area, the rate of utilization, and anticipated market share of the institution. In this section, we review the service area definition used in the projection of MHS patient volumes and the demographic composition of the service area, with a specific focus on the methodology, key assumptions, and data sources. Utilization and market share assumptions will be addressed in a subsequent section of this document.

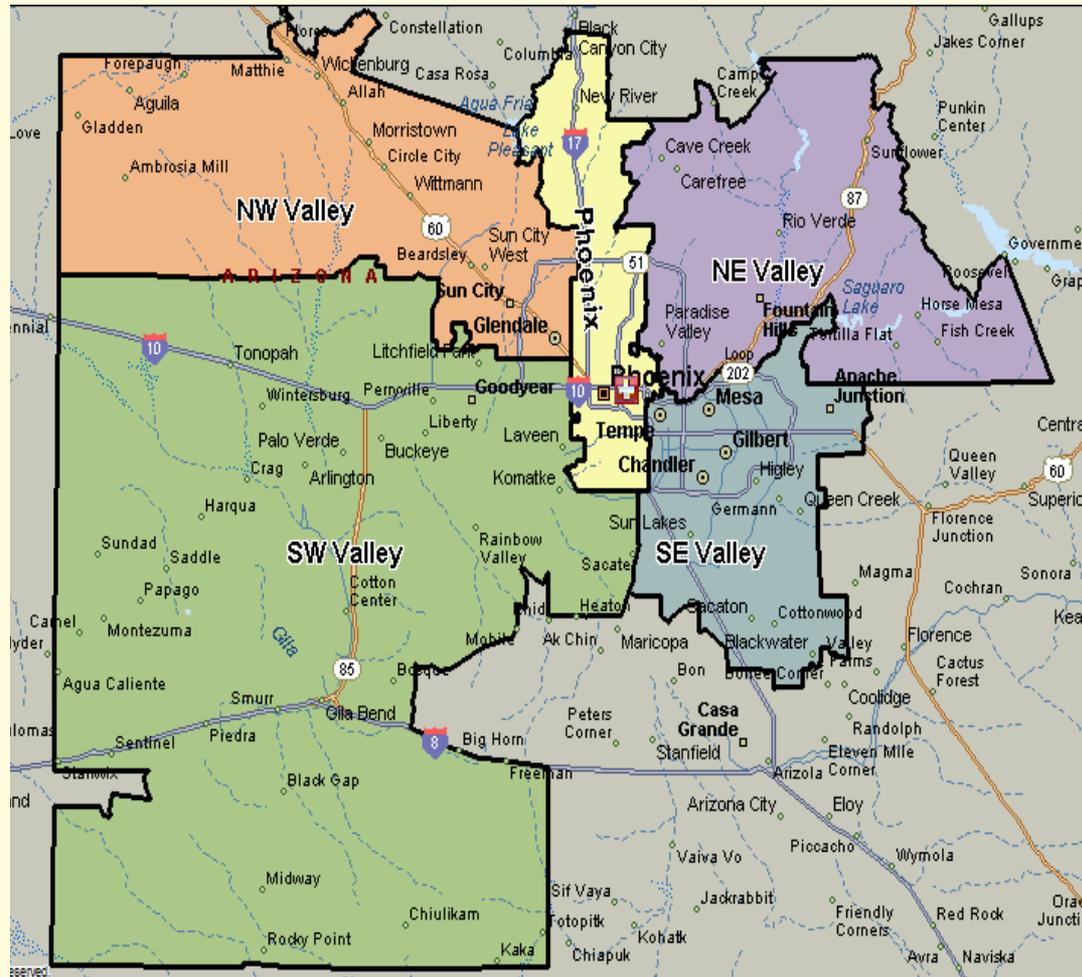
SERVICE AREA DEFINITION AND DEMOGRAPHICS

Service areas are typically defined by ranking the zip codes from which an institution draws its patients in descending order of patient volume and categorizing the zip codes that account for at least 50% and up to 75% of an institution's patients as the Primary Service Area (PSA). The zip codes that account for the next 10-20% of the institution's patient volume are labeled as the Secondary Service Area (SSA). The SSA is often further subdivided based on a variety of factors. Service area definitions should also take into account natural and manmade barriers such as rivers, mountains, and highways.

As shown on the map on the following page, the MIHS service area encompasses Maricopa County and this service area is further sub-divided into a PSA, which is referred to as the Phoenix market area, and four SSAs:

- SE Valley
- NW Valley
- SW Valley
- NE Valley

MIHS MARKET DEFINITION – MARICOPA COUNTY PRIMARY AND SECONDARY SERVICE AREAS



SERVICE AREA DEFINITION

As the table below shows, the PSA accounts for just under 60% of MIHS's inpatient volumes, with the SE and SW Valley SSA submarkets each contributing approximately 13% of MIHS's inpatient volumes. Just under 10% of MIHS patients live in areas outside of the defined service area.

Region	MIHS Discharges			2013	2012
	2010	2011	2012	Annualized	Patient Origin
NE Valley	235	213	206	236	1.5%
NW Valley	992	906	1,062	966	7.7%
Central Phoenix	8,745	7,809	7,918	8010	57.1%
SE Valley	2,074	1,784	1,787	1734	12.9%
SW Valley	1,855	1,759	1,751	1824	12.6%
Total	13,901	12,471	12,724	12,770	91.7%

SERVICE AREA DEMOGRAPHICS

The service area population was approximately 3.9 million people in 2012 and is projected to increase by more than 7% by 2017 as shown in the table below.

MIHS Market Area	2017 Population Size	% Growth 2012 - 2017	2012 Population
SE Valley	1,226,412	7.00%	1,146,179
Phoenix	1,159,132	3.30%	1,122,103
NW Valley	787,360	9.00%	722,349
SW Valley	627,265	15.10%	544,974
NE Valley	368,375	4.50%	352,512
Total	4,168,544	7.20%	3,888,567
Source: Census Bureau; Thompson Reuters (obtained from Navvis)			

It should be noted that while the overall service area is projected to experience strong population growth (more than 1% per year), the Phoenix market area (MIHS's PSA) is expected to have the lowest rate of growth (3.3%). However, even this comparatively modest growth rate exceeds that of many other areas in the U.S. Clearly, MIHS will benefit from being located in a high growth marketplace.

SERVICE AREA DEMOGRAPHICS

Navvis also profiled the PSA and each SSA submarket with respect to current and projected population by age cohort, using U.S. Census Bureau and Thompson Reuters data. These analyses are appropriate and the associated data sources are widely accepted and used in healthcare planning.

While it appears that the service area definition and demographic analyses used appropriate methodologies and generally accepted data sources, we would suggest that MIHS further refine its service area definition by defining a “Core Service Area” (CSA). Our experience has shown that with the exception of a few high profile providers, most healthcare providers serve a relatively compact geographic market area. Therefore, we suggest MIHS develop a CSA by identifying those zip codes from which it draws a significant percentage of its patient volumes and in which it provides the majority of the healthcare services (e.g., greater than 40% market share). Defining a CSA for MIHS will help the organization focus its business developments on a “go forward” basis.

Utilization and Market Share

UTILIZATION

In projecting healthcare service volumes, two of the most important factors are the rate of utilization (typically expressed as a rate per 1,000 population) and the market share (or capture rate) of the institution. In this section, we examine the methodology and assumptions used to project volumes for inpatient care, emergency care, ambulatory care, and behavioral health.

Inpatient Utilization

INPATIENT UTILIZATION METHODOLOGY AND ASSUMPTIONS

MIHS has a defined set of inpatient service lines that Navvis used as the basis for developing inpatient market demand. These service lines are based on a mapping of all individual MSDRGs to inpatient service lines and product lines within each service line. Navvis subsequently consolidated some service lines into more meaningful groups that align with population health needs and other service delivery synergies.

Navvis used 2012 as the baseline year for the inpatient volume projections and projections were made for 2017 using The Advisory Board data on a service line specific basis. The Advisory Board is a well-known healthcare firm with a proprietary projection model. The table on the following page shows the Navvis/Advisory Board projections for the Phoenix market area as an example (similar analyses were prepared for each of the SSA submarket areas as well). As can be seen, the table includes 2012 total market volumes by service line, a projected 2012-2017 percentage growth rate for each service line, and the projected 2017 total market size. The data we reviewed did not contain any historical data other than 2012 nor did it show historical or projected use-rates by service line.

PHOENIX MARKET AREA INPATIENT VOLUME PROJECTIONS

Inpatient Services	CY2012 MIHS Volume	CY2012 Total Market Volume	2012 MIHS Share	2012 Market Opportunity	12-17 Projected Growth Rate	Projected 2017 Total Market Size
Behavioral Health	1,846	8,988	20.5%	7,142	3.6%	9,313
Burn	117	152	77.0%	35	2.2%	155
Cardiovascular	537	14,228	3.8%	13,691	-9.3%	12,909
Gastroenterology	304	6,961	4.4%	6,657	10.0%	7,654
General & Other Medicine	1,467	17,840	8.2%	16,373	9.4%	19,519
General Surgery	475	7,675	6.2%	7,200	3.8%	7,970
Musculoskeletal	264	9,607	2.7%	9,343	3.3%	9,921
Neurosciences	199	5,795	3.4%	5,596	3.6%	6,002
Oncology	93	1,850	5.0%	1,757	-0.5%	1,841
Other Surgery	177	3,297	5.4%	3,120	5.2%	3,468
Pediatrics	1,212	9,431	12.9%	8,219	1.2%	9,543
Pulmonary	366	7,788	4.7%	7,422	2.7%	8,000
Trauma	148	1,411	10.5%	1,263	0.7%	1,421
Urology/Nephrology	299	5,835	5.1%	5,536	9.0%	6,362
Women's & Infants	2,638	37,451	7.0%	34,813	1.0%	37,809
Total	10,142	138,309	7.3%	128,167	2.6%	141,887

Source: Navvis, Advisory Board, Arizona State Data

INPATIENT UTILIZATION METHODOLOGY AND ASSUMPTIONS

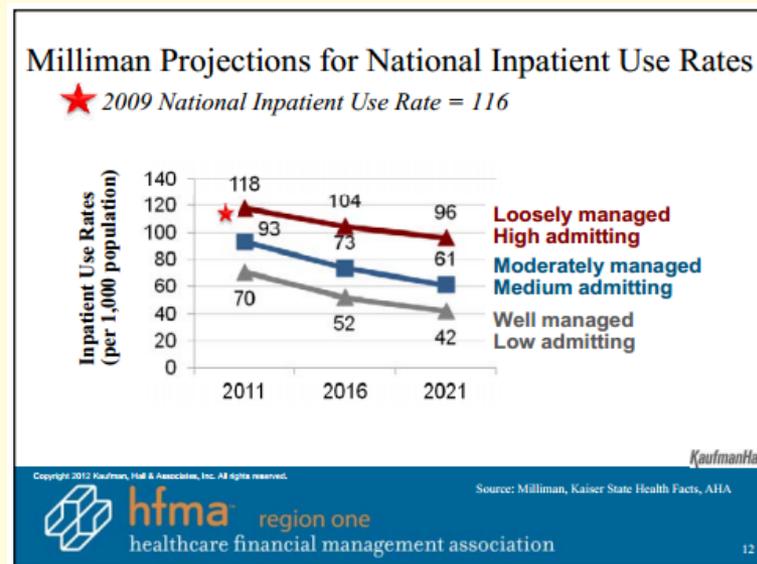
Although the Navvis/Advisory Board data did not include any historical or projected use-rates, we calculated use-rates from the data provided for 2012 and 2017 and compared those to use-rates for the State of Arizona as a whole as well as to the U.S. as a way to assess the reasonableness of the inpatient volume projections. In doing so, we looked at inpatient discharges originating from the PSA and the four SSA submarkets.

When we calculated the inpatient use-rate for the MIHS service area for 2012 and 2017, it came out to be 102.9 discharges/1,000 population in 2012 and 100.3 in 2017 (see the table below). This represents a 2.5% decline during the forecast period.

	2012 Base	2017 Projected	% Change
Total – Market	400,316	418,196	4.5%
Use Rate Per 1,000	102.9	100.3	-2.5%

INPATIENT UTILIZATION METHODOLOGY AND ASSUMPTIONS

Given the current healthcare environment, in which there is extraordinary pressure to reduce inpatient hospitalizations, and the fact that most healthcare experts expect use-rates to decline, we developed a projection that used a 2017 use-rate of 96.0 discharges/1,000 population to assess the impact of a lower use-rate on market volumes. The 96.0 rate was used because it was the rate for the State of Arizona in 2012 and it is cited by Milliman (a well know healthcare actuarial firm) as a future benchmark (as shown in the graphic below).



INPATIENT UTILIZATION METHODOLOGY AND ASSUMPTIONS

As the graphic on the preceding page shows, inpatient use-rates are expected to decline steadily through 2021. Experts are projecting these declines because of a combination of factors, including (but not limited to):

- Macroeconomic conditions (e.g., lingering affects of the “Great Recession”);
- Increase in observation patients (and a subsequent reduction in inpatient admissions);
- Pressure to reduce Medicare readmissions;
- Continued shift of volumes to outpatient settings;
- Growth in high deductible health insurance products, and
- Financial incentives in value-based payment models.

INPATIENT UTILIZATION METHODOLOGY AND ASSUMPTIONS

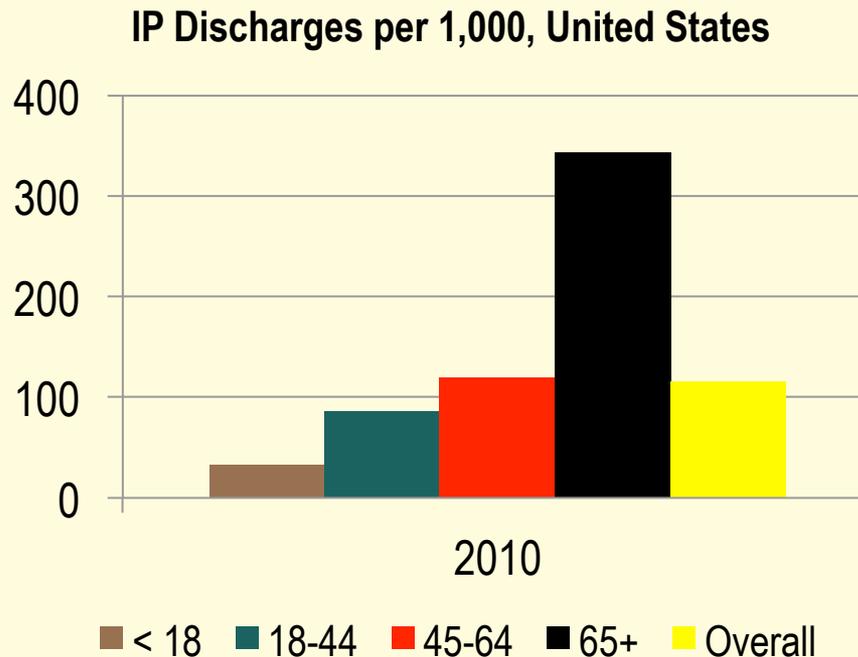
Applying the lower use-rate to the market area population results in a lower projected market volume in 2017 of approximately 400,180 discharges compared to the 418,196 projected by Navvis/Advisory Board. Based on the assessment of use-rates, it is possible that projected market volumes may be overstated by approximately 18,000 discharges, or about 4% as shown in the table below.

	2012 Base	2017 Projected (Navvis Projections)	2017 Projected (at AZ State Use Rates)
Total – Market	400,316	418,196	400,180
Use Rate Per 1,000	102.9	100.3	96.0

The impact on MIHS of this lower market volume would be a reduction in its projected 2017 discharges of just under 700 (at projected market share levels). At a 4.4 length of stay, this would equate to about 3,080 patient days, or an average daily census of just over 8.

INPATIENT UTILIZATION METHODOLOGY AND ASSUMPTIONS

In addition, generally accepted planning protocols typically look at age-adjusted utilization rates, since the rates of healthcare utilization vary widely by age cohort, as shown in the table below.



Sources: CDC's "Health, United States, 2012", Claritas, and Navigant Analysis

INPATIENT UTILIZATION METHODOLOGY AND ASSUMPTIONS

The other key assumption variable we reviewed was the expected market share for MIHS. As noted in the Navvis material, three scenarios were developed regarding market share:

- **Market Rate Growth**
- **Moderate Growth** (partial implementation of the MIHS Plan including one of the new Health Centers)
- **Strategic Growth** (full implementation of the MIHS Plan)

It is our understanding that the third scenario (Strategic Growth) was used to develop the volume projections used in the facility planning work. In this scenario, MIHS total market share increases modestly from 3.4% in 2012 to 3.7% in 2017 as shown in the table on the following page.

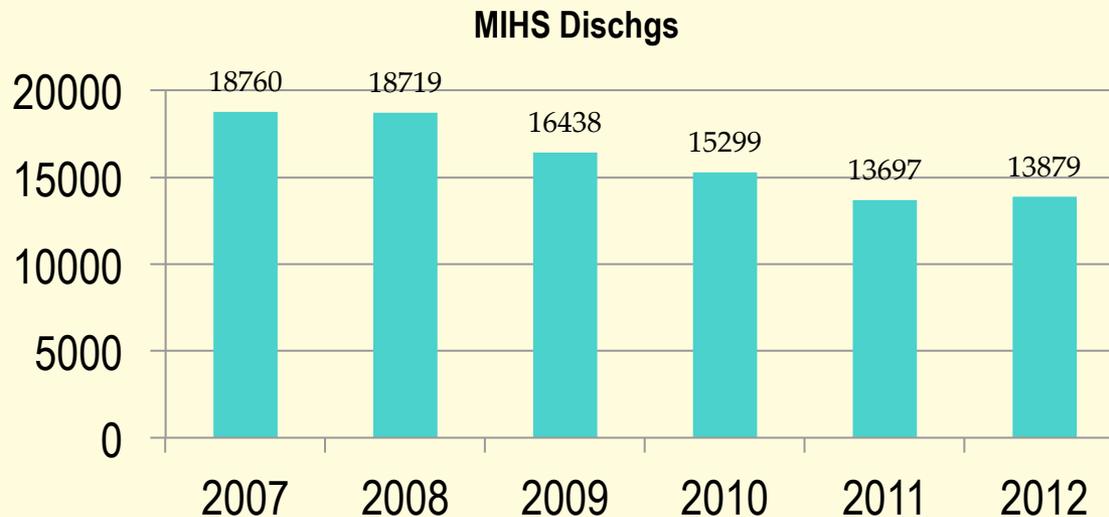
INPATIENT UTILIZATION METHODOLOGY AND ASSUMPTIONS

MIHS Market Share Projections							
Inpt Service Line	2012 Base	2017 Est	Point Chg	Inpt Service Line	2012 Base	2017 Est	Point Chg
Burn	72.8%	72.8%	0.0%	Obstetrics Other	4.6%	5.2%	0.6%
Cardiac Surgery	0.4%	0.2%	-0.2%	Oncology	2.8%	2.1%	-0.7%
Cardiology	1.6%	1.4%	-0.2%	Ophthalmology	3.9%	3.4%	-0.6%
Cardiology - Invasive	1.0%	0.9%	-0.1%	Orthopedics	1.1%	1.5%	0.4%
Dentistry	7.7%	6.9%	-0.9%	Other Medicine	7.6%	6.8%	-0.7%
Dermatology	5.5%	4.7%	-0.8%	Otolaryngology	3.0%	2.4%	-0.6%
Endocrinology	2.9%	3.4%	0.5%	Plastic Surgery	4.6%	3.5%	-1.1%
Gastroenterology	1.7%	2.1%	0.4%	Psychiatry	15.7%	17.4%	1.7%
General Medicine	3.5%	4.1%	0.6%	Pulmonary	1.7%	2.1%	0.4%
General Surgery	2.7%	3.2%	0.5%	Rehabilitation	0.0%	0.0%	0.0%
Gynecology	2.8%	2.1%	-0.7%	Rheumatology	3.6%	3.0%	-0.6%
Hematology	2.8%	2.3%	-0.5%	Thoracic Surgery	1.3%	1.1%	-0.2%
Hepatobiliary	3.4%	3.0%	-0.4%	Transplant	0.0%	0.0%	0.0%
HIV	16.1%	17.8%	1.7%	Trauma	6.2%	7.0%	0.8%
Infectious Disease	4.3%	4.6%	0.3%	Ungroupable	0.0%	0.0%	0.0%
Neonatology	5.4%	6.1%	0.7%	Unrelated	2.0%	1.7%	-0.3%
Nephrology	1.8%	1.6%	-0.2%	Urology	2.2%	1.8%	-0.4%
Neurology	1.3%	1.2%	0.0%	Vascular	1.6%	1.4%	-0.3%
Neurosurgery	1.7%	1.8%	0.1%	Totals	3.4%	3.7%	0.3%
Obstetrics Delivery	4.1%	4.7%	0.6%				

INPATIENT UTILIZATION METHODOLOGY AND ASSUMPTIONS

While the increase in MIHS market share from 3.4% to 3.7% appears relatively modest, it does represent an increase of 1,650 discharges over 2012 levels (to 15,529). This would equate to a net increase of approximately 15-20 FTE physicians (assuming the average physician accounts for somewhere between 85 and 100 discharges per year).

In addition, it should be noted that the increase in volumes represents a fairly dramatic reversal in MIHS volume trends, as shown below.



INPATIENT UTILIZATION METHODOLOGY AND ASSUMPTIONS

If MIHS's market share remains at current levels rather than increasing as projected, its projected 2017 volumes would be somewhere between 900 and 1,300 lower than the Navvis projections (depending on the market volume). This would represent a lower average daily census of 11-15 patients.

Behavioral Health Utilization

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BEHAVIORAL HEALTH UTILIZATION METHODOLOGY AND ASSUMPTIONS

Market Discharges - Psychiatry					
Year	Market	% Change	MIHS	MIHS Share	Point Change
2009	23,390		2,581	11.0%	
2010	25,655	10%	3,122	12.2%	1.1%
2011	26,265	2%	3,748	14.3%	2.1%
2012	26,689	2%	3,918	14.7%	0.4%
2013	26,288	-2%	3,732	14.2%	-0.5%
2009 - 2013 CAGR		3.0%	9.7%		

MIHS Volume Projections					
Inpt Service Line	2012 Base	2017 Est	2019 Est	2023 Est	2012 - 2023 CAGR
Psychiatry	3,644	4,248	4,334	4,512	2.0%

Historical market volumes increased 3.0% per year while MIHS volumes grew by almost 10% per year. Navvis projections call for a growth in MIHS behavioral health discharges of only 2.0% per year during the projection period. Based on historical patterns, it is likely this projection may be understated.

Ambulatory Utilization

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ED UTILIZATION METHODOLOGY AND ASSUMPTIONS

Historical Market Trends

	2007	2008	2009	2010	2011	2012	2007 - 2012 CAGR
Total ED							
MIHS	46,575	45,524	47,081	44,190	50,961	56,956	4.1%
Total	1,047,826	1,089,723	1,145,050	1,143,207	1,221,341	1,276,694	4.0%
MIHS Market Share	4.4%	4.2%	4.1%	3.9%	4.2%	4.5%	

Navvis Projections

ED Visits	2013	2014	2015	2016	2017	2018	13 - 18 CAGR
MIHS	67,154	68,781	70,450	72,160	73,913	75,710	2.4%

As shown in the tables above, MIHS growth rates in ED visits has tracked the growth in the total ED market remarkably closely. The Navvis/Advisory Board projections show MIHS ED volumes increasing at a relatively modest rate of 2.4% per year, which is well below historical growth rates and well below the projected growth in the service area population. Given the growth in retail/urgent healthcare as well as the development of additional MIHS health centers, this more modest growth in ED volumes is appropriate.

AMBULATORY UTILIZATION METHODOLOGY AND ASSUMPTIONS

Navvis developed a series of ambulatory projections by type and market area using The Advisory Board's tool. These projections showed relatively strong market growth, which is reasonably consistent with regional and national trends. Navvis also projected additional growth for MIHS above market rates for selected services and locations. These assumptions appear to be somewhat aggressive in a few instances but overall appear consistent with MIHS's strategic initiatives and are appropriate strategic focal areas.

Section 4: Review of Existing Facility Conditions Assessment Methodology

ASSESSMENT OF EXISTING CONDITIONS: OUR APPROACH

Navigant conducted a high-level desk review of the general methodologies used to perform the facility condition assessment to confirm if they meet industry acceptable standards. Our scope excluded on-site inspections of existing buildings to validate the assessment of existing conditions.

It is our understanding that the evaluation of current infrastructure (HVAC, electrical, water) in the original reports was provided by MIHS staff and that no independent engineering verification of these assessments was performed.

ASSESSMENT OF EXISTING CONDITIONS

- » Three methods were used by KSA to assess existing space:
 - › a survey tool related to infrastructure and functionality;
 - › analysis of basic space and workload metrics for key space elements; and
 - › test layouts of conversion of inpatient units from multiple-occupancy rooms to private rooms.

- » These techniques are generally accepted approaches for this stage of facilities planning. Since we did not conduct on-site verification of the findings, our comments will be limited to the approach and selected conclusions in the study.

The “Facility Condition Survey,” uses a “proprietary” scoring system based on “externally observable attributes” and MIHS facility engineering staff input.

ASSESSMENT OF EXISTING CONDITIONS

As noted in the report, the survey is not a substitute for a detailed engineering study. For the FHC's, much of the low assessment and low rating is due to the rating of the mechanical and IT systems as "not suited for continued current use." Since \$26 million in capital is budgeted in the BAC Report for replacement, rather than remodeling, of six of these sites, we would recommend verification of this assessment as part of the FHC facility implementation strategy.

The assessment of the Main Tower hospital building shows sufficient or strong asset for the technical components (structure, HVAC, overall condition), but rates most of the acute inpatient beds as "insufficient capacity for current activity." The use of a 10% variance from general planning standards as a target for categorization as "insufficient capacity", assumes an unrealistic level of precision in this approach. Establishment of a higher threshold for this category would be more consistent with the method used. Some of the metrics used in the analysis are questionable. For example, there is no variance between the DGSF/bed and NSF per bed in the NICU, and the ratios for other units do not look feasible.

ASSESSMENT OF EXISTING CONDITIONS

Much of the lower ratings of the existing acute inpatient units focuses on the limited number of single patient rooms, the size of the existing private rooms, and the compromises that would result from conversion of existing multiple patient to a higher ratio of private rooms. Supplemental material provided by KSA illustrates the complexity and functional compromises that could result from the conversion of existing patient rooms. These findings appear logical and appropriate.

The evaluation of diagnostic and treatment services identifies Surgery, Cardiac Cath, and Emergency with significant space problems. This conclusion is reached due to insufficient support areas and the size of procedure rooms. From a statistical perspective, we would concur with the DGSF/treatment space assessment of Surgery, Endoscopy and Emergency. The other diagnostic and treatment areas fall into “within” target, or “exceeds” target categories. Based on the information provided we would concur with these findings.

ASSESSMENT OF EXISTING CONDITIONS

The Behavioral units appear to be assessed using acute care "standards" for net and departmental gross areas per bed. This is not the norm in behavioral. It is true that the industry is going toward a private room model, but 228 NSF is more than adequate for a semi-private room. Private patient bedrooms in new construction would normally be 120-140 NSF and double occupancy rooms in the 200-220 range.

Several of the units also appear to have adequate DGSF. The 2916 Building DGSF of 451 per bed is adequate for dedicated on-unit space (i.e., with treatment areas off unit and shared) in an all-semiprivate model).

It would appear that from a simple space-per-bed in the nursing units perspective, the 2916 Annex and portions of the Desert Vista facility are fairly adequate. As the existing treatment and therapy spaces were not identified and evaluated, it is not clear what the overall adequacy is for those areas.

Section 5: Space Program and Cost Review– Acute Care, Ambulatory Care and Behavioral Health

SPACE PROGRAM AND COST REVIEW: OUR APPROACH

This section summarizes a review of the space estimates, planning concepts, and budgets developed as part of the Maricopa County Special Health Care District recommendations approved in February, 2014.

Our high level desk review was limited to a detailed review of material provided by KSA, interviews with the consulting team, and comparison of recommendations to our experience with similar health care systems, facilities and best practices.

The format of this review will divide the overall capital project into its three major components: Acute Care Hospital, Ambulatory Care, and Behavioral. For each component we provide a summary assessment, a review of the method/approach, the metrics used in the original study, the resulting space and capital cost estimates and any major issues that warrant further consideration.

Acute Care Space Program and Cost Review

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ACUTE CARE SUMMARY

The largest single element of the proposed development is the replacement of the existing acute care hospital, accounting for almost half (\$498 million) of the total capital budget.

The replacement recommendation is the result of the evaluation of the existing facilities utilizing a set of technical criteria, assessment of the match to strategic goals and mission, and planning principles including buildability, minimizing sequencing, and retaining/reusing existing buildings when possible. These principles are appropriate and reasonable.

The study proposes a 633,700 Gross Square Foot replacement hospital, supporting 264 beds. The ratio of gross square feet per bed (2,400) is feasible, but low in comparison metrics for hospitals of similar scope (2,600 to 2,700 BGSF). Reuse of the existing warehouse and administrative space may account for this low ratio.

The use of an average 2013 construction cost at \$390 per square foot appears high. Based on benchmarking other recent similar projects, we recommend budgeting \$360 per square foot in 2014 dollars. We also recommend using 3% escalation through 2016 and 4% thereafter.

In addition, given the potential for unknown site conditions when re-configuring an existing site, we recommend increasing site work/parking to 10% vs. 7% used in the KSA cost models.

ACUTE CARE SUMMARY

There are a number of other issues that should be addressed prior to commitment to a final plan:

1. The cost model assumes all components of the hospital will be built at hospital unit prices. Many institutions are separating administrative and support (material managements, clinical laboratory, maintenance), housing these functions in lower cost buildings adjacent to the acute hospital. The proposed plans anticipate renovating the 2619 building for some administrative functions. There may be additional opportunities to lower the initial construction costs.
2. In our judgment, the allocations for equipment understate the probable costs. Major medical equipment, furniture, and IT infrastructure typically account for 40% or more of the construction budget. The current model assumes 25%. Although it is reasonable to assume salvage of components from the existing hospital, the reality of maintaining operations while replacing facilities limits the implementation of this approach.
3. Likewise, a 10% allocation for professional fees does not reflect the full costs for professional fees and other soft costs that are typically required to execute a project. In our experience, an allocation of 20% for soft costs is more appropriate (exclusive of financing costs).

ACUTE CARE SUMMARY

4. In our experience, when all of the other recommended allocations above are factored into the budget, a 10% owner's contingency is adequate at this stage of planning.
5. As a teaching hospital, the implementation of new techniques and technologies may affect the utilization targets for operating rooms, imaging and other diagnostic and treatment areas. Pressures to reduce readmissions and reduce inpatient days as a result of capitation model may make observation care a more significant element of the hospital than currently experienced. Design considerations for consolidation of initial observation capacity, and the potential conversion of inpatient to observation beds over time should be considered.
6. For the Education Building, the \$128/BGSF (2013 costs) used for budgeting construction of the Education Building is low. We recommend increasing the budget to \$220/SF. We also recommend using a 20% allocation for FFE/IT vs. 25% used in KSA's cost models.
7. Although we do not have recent comps for laundry facilities since other clients have moved to outsourcing this function, the construction costs used in the KSA cost model seemed reasonable. MIHS should study the cost benefit of outsourcing laundry.

ACUTE CARE SUMMARY

8. The demolition budget at \$7M seemed low. We recommend budgeting \$15/BGSF for demolition and asbestos abatement plus allocation for soft costs and owner's contingency.
9. Navigant had insufficient sizing/capacity and cost data assumptions to quantitatively evaluate the Power Plant cost methodologies used in the BAC Report; nevertheless we are skeptical \$12M is an adequate budget due to concerns with the age of existing equipment and its compatibility with new energy efficient systems. Therefore, based on benchmarking recent replacement hospital projects, we recommend budgeting up to \$20M which assumes limited re-use of existing plant & equipment.

Note: Navigant's recommendations for soft cost, owner's contingency, escalation and site work allocations also apply to the Behavioral Health Hospital, CHC's and FHC's.

ACUTE CARE – INPATIENT BEDS

Projected space requirements for beds are based on the projected patient days, occupancy targets, and the assumption of an all single-rooms bed model.

The 80% occupancy target for Medical/Surgical beds is appropriate, resulting in a projection of 176 beds. This occupancy is below a best practice target of 85% frequently used in planning these units, but the inclusion of pediatric beds typically creates high census variability, limiting the ability to achieve the higher goal.

The occupancy target for Burn beds – 75% is reasonable, resulting in a projection of 16 beds.

The 80% occupancy goal for the Neonatal ICU is lower than frequently experienced in these units. There may be additional capacity in the proposed 30 beds above the projected 9,151 patient days.

ACUTE CARE – INPATIENT BEDS

The 50% occupancy target for the Obstetrical unit is difficult to assess. The summary report proposes 32 post partum beds and 10 LDRP beds. Our interpretation of this recommendation is a flexible model that would shift between LDRP to LDR based on demand and capacity. An overall bed occupancy of 50% for a 7,900 delivery service appears low. It may be appropriate to model this service in more detail to verify the bed demand.

The departmental gross area per bed used to project total space requirements range from 600 DGFS/bed for the NICU to 1,200 DGFS/bed for the Burn unit. These ratios are consistent with our experience with recent hospital designs.

ACUTE CARE – DIAGNOSTIC AND TREATMENT SERVICES

The approach used to estimate space needs for diagnostic and treatment areas is similar to the inpatient bed method – the projected workload was used to estimate key components (operating rooms, CT scans, etc.). The annual capacity of each key component was used to estimate the number of units and then used to estimate total departmental square feet. This is a common approach for master planning prior to the development of a space program.

The capacity target for surgery – 900 cases per O.R. appears aggressive and may not reflect capacity limitations of specialized operating rooms such as Hybrid O.R., MRI or robotic assisted procedures. The future required number of rooms may be higher than estimated.

The ratio of Departmental Gross Square Feet per key areas are appropriate and consistent with current goals.

No space allocations were made for new technology. If this approach is used, design strategies for allowing adaptation and expansion of areas will be critical to adjusting to changes over time.

Ambulatory Care Space Program and Cost Review

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AMBULATORY CARE SUMMARY

Expansion of ambulatory care is envisioned as a key element in the growth and financial viability of the Maricopa Integrated Health System. There are currently ten Family Health Centers located throughout Phoenix and surrounding communities along with a Comprehensive Health Center on the main campus.

Development of two new Comprehensive Health Centers, along with expansion of the facility on the main campus reflect the largest ambulatory component of the proposed plan (\$102 million), with \$26 million proposed for replacement of six Family Health Centers.

The primary metric used to estimate space needs is the projection of exam room requirements. The base assumption of five visits per exam room per day is consistent with current teaching clinic service patterns.

As pressures increase for efficiencies in care delivery, and as the aggressive growth in visits require accommodations of patient preferences, the assumption of a traditional clinic schedule should be reviewed. Expansion of clinic hours on week days and weekends would allow accommodation of the projected volume with fewer exam rooms and resulting building area.

AMBULATORY CARE SUMMARY

For example, if the visits per exam room could be increased from five per day to six, the net reduction in exam space would be 56 exam rooms over the current estimate of 374 across the CHC's and FHC's. Using the KSA ratio of 650 DGSF per exam, this would represent a potential savings of over one million dollars in project costs.

The current construction cost used for the new East and West CHC's is low at \$240/BGSF (in 2013 dollars). Navigant recommends increasing to \$260/BGSF (current 2014 dollars).

The current construction cost used for the additional ½ floor to the central CHC is low at \$182/BGSF (in 2013 dollars). Navigant recommends increasing to \$210/BGSF (current 2014 dollars).

The factors used to convert DGSF to BGSF are high for the CHC's. We believe this factor could be reduced to from 30% to 20% for the East and West CHC's.

COMPREHENSIVE HEALTH CENTERS

The plan proposes three Comprehensive Health Centers – one located in the East, one in the West, and the expansion of the existing CHC on the main campus. Each of the new facilities would have 44-49 exam rooms and 2-5 dental stations. In addition to the clinic elements, the cost models for each site include space allocations for imaging, ambulatory surgery, dialysis, pharmacy, laboratory, PT and Cardiac Rehabilitation. Administrative and support spaces compose the balance of the buildings.

The clinic space allocations of 32,000 DGSF equates to 592-650 DGSF per treatment space. This is consistent with our experience with ambulatory teaching environments for a major teaching site and with the functional assessments of existing space summarized in the report.

Assuming 250 days of scheduled clinics per year, the ratio of visits per exam rooms equates to 4.7-4.8. This is consistent with traditional clinical models. As noted in the summary, expansion of clinic hours into the evenings and weekends could reduce the number of required rooms.

COMPREHENSIVE HEALTH CENTERS

The scheduled days for the dental service is not known. Using the same 250 day assumption, the ratio of visits per station is low: 4.6-4.9. The anticipated mix of check-ups and procedures anticipated for the dental service would affect the capacity.

Space allocations for the clinical support services (imaging, laboratory, pharmacy) could not be assessed with the information available.

FAMILY HEALTH CENTERS

The plan proposes the replacement of six clinics and maintaining the McDowell facilities for an estimated cost of \$26 million. Assuming 250 scheduled days per year, the visits per treatment space are fewer than 5 visits per exam per day for most proposed clinics. As noted in our summary, it would be reasonable to assume that the primary care focus of these facilities, combined with extended clinic hours, would increase the visits/exam, requiring fewer rooms.

The base allocation of Departmental Gross Square Feet per exam room is 650, consistent with the CHC planning. Support diagnostics vary by size of each site, with smaller clinics (fewer than 16 exam rooms) getting a small lab and pharmacy. Larger clinics have an imaging area. These areas are not included in the 650 DGSF per exam.

Our experience with community clinics environment indicate that 650 allocation per exam room (excluding diagnostic and support components) is high and could be reduced by potentially 100 DGSF per room, which reduces total required space by approx. 12,000 BGSF.

The all-in cost/BGSF in the cost models we reviewed seemed low. We recommend using \$260/BGSF for construction plus escalation, soft cost, FFE/IT, site work, and owner's contingency allocations.

FAMILY HEALTH CENTERS

A factor of 1.25 is used to convert the DGSF clinic space estimate to a building gross. Given the small scale of these projects this factor is reasonable for the mechanical, lobby and other support elements.

No land acquisition cost was noted in the BAC Report for relocation to new sites.

No recapture of funds from the sale of old sites is assumed in the BAC Report.

Behavioral Health Space Program and Cost Review

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HEALTHCARE

BEHAVIORAL SUMMARY

The Behavioral Health Hospital is projected to require 240 beds. The model of care also includes expansion of behavioral services into the community health clinics and development of a large clinic service with the Hospital.

The strategies defined in the study for Behavioral Health are:

1. “Consolidate the behavioral health programs on a single campus that enables the program to serve rising demand more effectively and efficiently by December 2017.
2. Integrate outpatient behavioral health into the community health clinics to grow convenient access to needed mental health and substance abuse services by December 2014.”

The study recommends replacing the scattered behavioral programs and consolidating in one location. The recommendation is based upon the assessment of the adequacy of the existing facilities and the strategic goals. This and expansion of ambulatory services should improve access while reducing inpatient operating costs per patient day.

BEHAVIORAL SUMMARY

The options evaluated included new construction and renovation of the existing acute care facility. Renovation of existing behavioral facilities was deemed infeasible.

The space estimate for the consolidated behavioral services is a total of 354,000 Building Gross Square Feet. The inpatient component is 303,240 for an average of 1,264 BGSF/bed. The cost estimate for replacement in new construction is \$247 million. The space allocation may be adequate in total under the assumption of substantial sharing of logistics and support space; if the facility were completely freestanding, 1,400 BGSF/bed (*excluding* Clinic) would be the appropriate metric at this stage of the planning. The project costs referenced above are high.

Throughout the assessment of the behavioral program the criteria used appears to be the same as that for acute care. This is skewing the evaluation of existing conditions, the feasibility of reusing the existing hospital, and the overall space and costs.

BEHAVIORAL SUMMARY

Displayed below is a chart comparing the hospital space estimate per bed (*excluding Clinics*) to other newer behavioral facilities. Again, the space has been estimated as if this were an acute care facility. It results in space allocations in incorrect categories for planning and costing.

	MIHS	Example 1	Example 2	Example 3	Example 4	Example 5
DGSF per bed: Inpatient units	850	578	477	410	584	427
DGSF per bed: Treatment	17	263	237	376	119	151
DGSF per bed: Administrative	47	123	114	205	204	127
DGSF per bed: Logistics	37	135	78	110	157	128
Total BGSF per bed	1,264	1,360	1,145	1,422	1,277	1,040

BEHAVIORAL SUMMARY

There are several issues that we feel may need additional investigation going forward:

1. The existing facilities evaluation and the projections of space should reflect a distribution of space more appropriate to behavioral. The units need less space on-unit and more in shared and consolidated treatment/activity.
2. The bed projection is based on 80% occupancy. It is our understanding that the ALOS is approximately two weeks. A behavioral facility with all private rooms should be able to run at a higher occupancy level.
3. The assumptions on the amount of support and space provided from the acute care facility/campus should be clarified.
4. The projections for the workload in outpatient behavioral on the main campus needs to be clarified. 72 exam rooms is an extremely large capacity. At 5 visits per day per room, the Clinics would accommodate 90,000 annual visits...and this does not include the planned decentralization of the ambulatory care into the community settings.

BEHAVIORAL SUMMARY

5. The cost model assumes an average current (2013) cost @ \$348/BGSF. This may be overstating the actual costs for the lower intensity space and therefore recommend a lower 2014 current cost @ \$300/BGSF be used.
6. The equipment budget of 25% may be high for behavioral and should be evaluated further. An allocation of 20% should be adequate.

BEHAVIORAL WORKLOAD PROJECTIONS

The projections of patient days need to reflect the expansion of outpatient services into the community setting and on campus (which might include day-hospital services to help provide care and to keep some patients out of the inpatient setting). The study appears to assume the same percentage increase in patient days for all services. In addition, 80% occupancy is fairly low in an all private room behavioral model and may be overstating the bed need for the patient days cited.

The outlying clinics' projections provided do not separate out the behavioral component or describe what, if any, outpatient behavioral is currently provided by the system.

The historical data and projections for the psychiatric urgent care are missing and the space estimates do not identify any space as such a program.

There is a large number of projected Clinic rooms in the Behavioral Health Hospital space projections, but no workload is cited. The projections include a 40 exam room walk-in clinic, 6 intensive outpatient group rooms, a 20 exam room resident clinic and a 12 exam room faculty clinic.

These projections are somewhat aggressive and some historical context would assist in understanding the feasibility.

BEHAVIORAL SPACE PROJECTIONS

The projections provided in the model are using standards that are the same as acute care. Behavioral nursing units do not need and should not have 850 DGSF per bed. Behavioral patient rooms are usually built close to the minimums, in the 120-140 NSF range. New construction would not use a racetrack layout (which can affect circulation space and grossing factors) because of issues of visual monitoring of spaces.

Given the apparent assumption of substantial reliance on the main hospital for support, the space projection for behavioral appears to be adequate. In addition, the space needs to be configured differently with more allocated to shared access treatment/group rooms and centralized therapy and recreation areas.

BEHAVIORAL SPACE PROJECTIONS

Displayed below is a comparison of the space per bed by type allocated in the study and five freestanding psychiatric hospitals. These examples reflect a variety of bed complements, patient mixes and care philosophies. Only one is an all-private room facility.

	MIHS	Example 1	Example 2	Example 3	Example 4	Example 5
DGSF per bed: Inpatient units	850	578	477	410	584	427
DGSF per bed: Treatment	17	263	237	376	119	151
DGSF per bed: Administrative	47	123	114	205	204	127
DGSF per bed: Logistics	37	135	78	110	157	128
Total BGSF per bed	1,264	1,360	1,145	1,422	1,277	1,040

BEHAVIORAL SPACE PROJECTIONS

The total space projected is:

	DGSF	BGSF
Inpatient Units	204,000	271,320
Treatment	4,000	5,320
Administrative	11,200	14,896
Logistics	8,800	11,704
Total Hospital	228,000	303,240
Clinics	46,000	50,806
Grand total	274,000	354,046

These projections appear to assume that the Behavioral Health Hospital is co-located with the Acute Care and uses the logistical and support departments of the other facility. The space which normally would be tallied as treatment or therapy space is included in the nursing unit totals. The difficulty with this approach is that it obscures the desired configuration of space when looking for planning solutions.

BEHAVIORAL PLANNING OPTIONS

Ideally, a Behavioral Health facility would be built with all patient access spaces on one level and at grade. Movement of patients horizontally is deemed much safer and more manageable. Juxtaposition of multiple units on the same level also allows quick response time in emergencies and enables sharing of support space. In addition, such a layout can allow access to outdoor space on a more frequent and regular basis. It is likely that only the Greenfield Site option would allow this.

At a minimum, the planning options should be predicated on at least two adjacent nursing units to allow some horizontal sharing of support.

The manner in which the space has been projected skews the ability to evaluate the feasibility of any facility reuse by attempting to find so much space on a nursing unit floor. The actual capacity, arithmetically at least, of the existing Acute Care hospital is higher than is reflected in the planning option. Some of the floors might be able to accommodate two smaller units instead of one larger one.

BEHAVIORAL COST ESTIMATE

The costs for the new Behavioral Health Hospital are based on 264,200 DGSF, somewhat less than the space projection of 274,000 DGSF, with reductions in the clinic area. The total shown in the model is \$247 million (\$934/DGSF).

The cost model for the Behavioral Health Hospital uses the same base cost per square foot as the Acute Care and applies it to all space including the clinics. Because of the allocation of most of the space to the Inpatient Unit category, which is weighted as more expensive than support, the costs are overstated. Rebalancing support into the appropriate categories may be useful.

BEHAVIORAL PLANNING OPTIONS

The model also uses the same 25% for equipment as Acute Care. There is no imaging equipment, surgery suite or other expensive equipment area in the behavioral facility. An allocation in the range of 20% would be more reasonable.

The cost model for renovation of the existing hospital is based on 274,000 DGSF. The same issues of categorization apply as the other model. The primary difference between the two models is that the cost per square foot for renovation is being reduced to 89.5% of the cost for new. The total shown in the model is \$197 million or \$718/DGSF.

Section 6: Population Health & Neighborhood Design Review

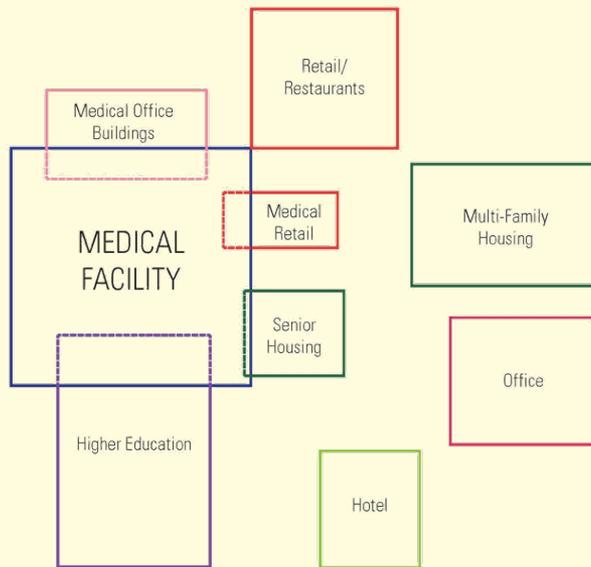
NEIGHBORHOOD INTEGRATION

- » How we design and build our communities impacts whether we are reacting to health problems or forging healthy living.
- » “The built environment—that is, the physical and social environment in which people live—has become inhospitable to physical activity.... Partly as a consequence of sedentary lifestyles, obesity rates have climbed dramatically over the last half-century, leading to increases in diabetes, heart attacks, and other illnesses. Unless something is done to get Americans moving again, their health will continue to decline.” [Robert Wood Johnson Foundation]
- » The locations and physical reinvention of the MIHS facilities should support the goals of active, connected, healthy neighborhood living—a direct opportunity for population health.

AD HOC FACILITIES OR NEIGHBORHOOD-BASED HEALTHCARE VILLAGES

MEDICAL & AD HOC REAL ESTATE

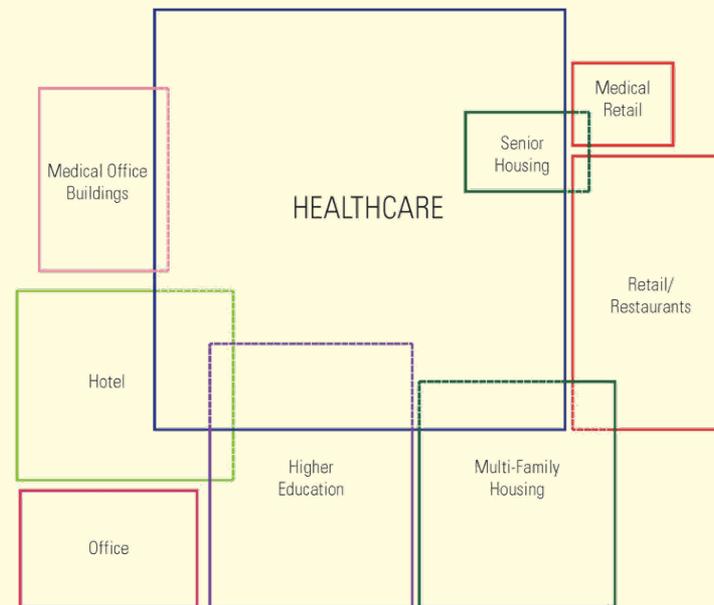
(Program Based)



HEALTHCARE VILLAGE

(Patient Experience Based)

A well-designed medical village utilizes a walkable environment to further the Hospital's mission as a beacon of wellness in the community.



The medical facility acts as an anchor to the surrounding uses. Why not capture the additional value that the anchor creates?



August 03, 2013

EXPANSION THROUGH COLLABORATION

- » Access to transportation options - Joint transportation/healthcare infrastructure land use decisions - Community development – and, Connected housing choices are critical for the future success of MIHS and its collaborative partner network.
- » How can the shift to distributive healthcare under the ACA be harnessed to expand collaborative partnerships among all leading healthcare providers, universities, nonprofits, government and business?
- » Community development has become place-based, “[so] remain flexible regarding the capital project plans during the implementation phase of work so that creative collaborations and partnerships can indeed occur for the benefit of all.” [Bond Adv. Committee Recommendation #7].