

Report to the Princeton Health Care Task Force on the University Medical Center at Princeton's Capital Needs and Location Options

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Summary

On 30 July 2004, the Borough of Princeton and the Township of Princeton engaged me to analyze and report on Princeton Health Care System's (PHCS) Strategic Plan from a public policy viewpoint, focusing on the desirability of the proposed expansion and related capital investments for the University Medical Center at Princeton (UMCP). This is my report to the Borough and Township, through their Health Care Task Force.

I was asked to answer three questions:

1. Does UMCP need to expand?
2. If UMCP does need to make substantial capital investments, how, when, and where should these investments be made? (I was not asked to recommend where the UMCP should be located, and have not done so. I have, however, offered information, analysis, and questions that pertain to UMCP's location.)
3. Generally, is the strategic plan sound?

In answering these questions, I have relied on a number of sources of information, including UMCP itself. UMCP was actively helpful through the time of my first visit to Princeton, 23-24 August 2004. Subsequently, though, UMCP declined to provide information to answer questions posed in this report.

UMCP's administration, physicians, and trustees are making a number of difficult decisions about the hospital's future. I think that they are doing so competently and carefully. It is easier to raise questions about UMCP's plans than to answer them. That's partly because UMCP faces tight constraints (including shortage of elbow room at the present site and doubts about financing for relocation), partly because many of the facts are unclear, and partly because some of the hospital's needs or preferences (or those of physicians) may differ from the needs of patients, payers, or the community.

Does UMCP need to expand? Yes, but it is not clear how much expansion is needed or desirable. This depends largely on the number of hospital inpatients and outpatients to be served, how they are served, and the types of services to be provided.

Deciding how, when, and where to build depends greatly on how much square footage should be added. The three main options are incremental and ad hoc rebuilding; substantial, coordinated, and phased rebuilding; and relocation.

If only limited additions are actually needed, it is much easier to accommodate them at UMCP's present site. If much greater additions are actually needed, it becomes more desirable to either acquire land adjacent to the present site or move elsewhere.

It is helpful to begin by listing the core considerations pertinent to each of the three main options. Conceivably, any of the three options might be both acceptable and affordable; still, none of them might be both highly attractive and affordable. While it's sometimes necessary to settle for second-best, searching for second-best can be painful.

a) Incremental and ad hoc rebuilding

This appears to be the least costly alternative, but it also buys the smallest improvement in quantity and quality of space—both for the year 2010 and in positioning UMCP's facilities for future decades. If relocation is inevitable, incremental and ad hoc spending (beyond the minimum needed to sustain safe and effective care until a new hospital is built) would be largely wasted. If substantial, coordinated, and phased rebuilding is an acceptable alternative, how can it be aligned with essential incremental rebuilding?

The answers to these questions rest heavily on how much square footage UMCP requires—at minimum—to function adequately and competitively in the decades ahead. In assessing its space needs, UMCP may have been thinking about the optimal square footage for each important activity. To evaluate all three options, it will probably be helpful to think more about the minimum essential square footage.

b) Substantial, coordinated, and phased rebuilding

Suppose that a great deal of added square footage was actually needed, but that relocation were judged to be unaffordable—too costly relative to available financing. Then, could substantial rebuilding at the current site yield an adequate physical plant, one that was sufficiently attractive to patients, physicians, and hospital employees—and one that was functional in 2010 and in positioning UMCP's facilities for future decades? How many square feet and how many parking spaces would be required? Would the present site be adequate or would additional, adjacent land be needed?

c) Relocation

Suppose that substantial rebuilding on-site—with or without acquiring adjacent land—were deemed incapable of providing an adequate and competitive physical plant, including parking, for 2010 and for future decades. Could UMCP afford to relocate?

Or suppose that relocation were deemed the most attractive alternative but that, to make it affordable, substantial economies and compromises were required. For example, less land might be bought than is now considered desirable, and a smaller facility might be built than is now considered optimal. Would this relocation—the relocation that could actually be afforded—still be superior to the option of rebuilding on site? Sometimes, the second-best choice is not less of the first-best, but rather something different.

It can be expected that building a new hospital on newly developed land will yield the most appropriate and functional facility for 2010, as well as the one best positioned for adaptation or expansion to meet the medical needs of future decades. But it is also the most costly. Looking forward, the challenge is to select the option that provides the greatest improvement at a price that UMCP can afford.

UMCP's decision should rest on a careful assessment of the strengths and weaknesses of each of the three main options. It is my sense that making that assessment requires publicly answering a considerable number questions. These are identified in the report.

For example, it would be helpful to see comparable data on the cost of each of the options (expressed in present value, with a reasonable discount rate) and the financing plan for each. This would greatly facilitate accurate comparison of the three.

Similarly, it would be helpful to see a clear depiction of how well UMCP's main services—ER, inpatient care, outpatient care, laboratories, radiology, operating rooms, and support services—would function under each of the three options. What would patient care be like? What would patients like and dislike about each of the options? What would physicians and hospital employees like and dislike about each?

Considering the steps proposed in the strategic plan from a public policy viewpoint means thinking about

- patients' medical needs and where they can best be met;
- the hospital's needs for space, both today and tomorrow;
- what physicians need from a hospital in order to deliver health care; and
- the hospital's and the community's capacity to raise revenue to pay for investments in buildings, equipment, and new programs.

Too many questions remain unanswered to allow me to state that the UMCP's strategic plan is sound. One reason is that the strategic plan was formulated to respond to dire financial circumstances prevailing earlier in this decade. In the plan's view, the hospital was losing market share and losing money, and the solution was to rebuild, add intensive services, add resident physicians, and take other steps to compete more vigorously. Today, though, the hospital is doing much better financially even though it has not undertaken any large-scale construction or other substantial initiatives.

Second, unfortunately, UMCP has not yet made a compelling case that extensive additions, rebuilding, or relocation—or major programmatic changes—will bolster the hospital's competitive position in the years ahead. UMCP has not shown that these are affordable. Nor has UMCP shown that these changes are essential to address unmet clinical needs in its service area. What the hospital wishes to do is not necessarily the same as what patients require.

Third, the serious risk of a weaker national economy, the growing trade imbalance and federal deficit, and emerging pressures for health care cost controls (such as cuts in Medicare payments to hospitals) threaten the financial feasibility of a large building project. Between 2000 and 2005, soaring health costs absorbed one-quarter of the nation's economic growth. This can't and won't continue.

Fourth, rebuilding is offered as a way to improve UMCP's attractiveness to patients and physicians. But other nearby hospitals can be expected to respond with their own building projects. An arms race—in which hospitals compete for well-insured patients, particularly those who have problems that are profitable to treat—is unaffordable. Hospitals need to cooperate to meet all patients' needs at the lowest possible cost.

Fifth, UMCP has not sufficiently substantiated the clinical or financial advantages of its core strategic thrust—to become a more sophisticated hospital, providing more complex high-tech services, and training more residents—in sum, to become more like a teaching hospital. Are these services needed, or would a very-high-quality and low-cost community hospital be more useful to the residents of Princeton and surrounding communities?

Introduction

In the pages that follow, I address the two broad questions that should be answered to assess UMCP's proposed expansion from a public policy viewpoint.

A. Is the expansion needed? How much square footage needs to be added? Does UMCP need to undertake substantial capital investments, provide all routine inpatient care in private beds, increase case mix, and increase the number and size of its residency programs in order to

- continue providing needed, safe, and high-quality clinical services, and
- remain financially successful in the decades ahead?

B. If UMCP does need to undertake substantial capital investments in order to provide safe and high quality services, and to remain financially successful in the decades ahead, how, when, and where should these capital investments be made? Three ways to undertake the capital investments are:

- incremental and ad hoc repairs and improvements on the current site,
- substantial, coordinated, and phased rebuilding at the current site—with and without adding adjacent land, and
- complete relocation to a new facility on a new site in or near Princeton.

A. Does the University Medical Center at Princeton (UMCP) need to undertake substantial capital investments, increase case mix, and increase the number and size of its residency programs in order to

- continue providing needed, safe, and high-quality clinical services, and
- remain financially successful in the decades ahead?

Providing needed, safe, and high-quality clinical services might be thought of as the hospital's mission. Remaining financially successful might be thought of as generating the margin required to pursue the mission. Hospital executives and trustees throughout the nation often assert, "No margin, no mission."

Gauging whether UMCP must undertake substantial capital investments to continue providing safe and high-quality clinical services requires assessments of at least six aspects of the existing physical plant:

- age and condition,
- adequacy (square footage availability)
- flow and functionality,
- expected costs of maintenance,
- attractiveness of space to physicians and patients, and
- adequacy of space for needed existing functions and needed new functions—net of space freed up by ceasing to discharge old functions.

Gauging whether UMCP must undertake substantial capital investments to remain financially successful in the decades ahead also requires assessments of

- what general factors make for financial success today and in the future,
- the place of capital investments in advancing financial viability and success, and
- the place of increasing the case mix and the importance of teaching in advancing financial viability, and in improving quality of care.

Providing these answers will require addressing a number of questions. For convenience, in the text that follows, *I've italicized the questions on which I have sought—but not received—additional information from the UMCP.*

1. Gross square footage, total

How many gross square feet does UMCP now operate, both on-site and off-site, and how many would be required in the future?

- *I've heard that it's now roughly 500,000 square feet on-site and 150,000 off-site? Is this accurate?*

- *I've heard projected need for between 650,000 and 1,000,000 square feet in the future? What is the correct number? How was it projected?*

What gross square footage is operated currently by hospitals similar to UMCP in size and case mix?

How much is operated currently by hospitals similar to what UMCP proposes to become, in the Strategic Plan?

2. Space required for various functions

To begin, it would be helpful to know how many ER bays, operating rooms, and other specific facilities would UMCP require to provide expected volumes of care in 2007, 2010, 2015, or another suitable planning horizon, under rebuilding options a, b, and c?

While touring the UMCP late in August, I saw several departments that seemed or were said to be crowded or otherwise deficient. Some cases, such as that of the laboratory, seemed to speak for themselves. It is hard, though, to generalize to an entire hospital from a few examples.

What is the current size (gross square footage) of each important department or function? What are the recommended or standard sizes, for new construction, of each such department or function? What are the sizes for good-practice hospitals, similar to UMCP, today?

Specifically, which services, functions, or departments now experience shortages of space? What evidence or standards support the conclusion that space is now short? Please discuss laboratory space, operating rooms (numbers and square footage), the emergency room, and other specific services, functions, or departments.

In addressing this question, it is helpful to consider two targets—what the optimal space desired and the reasonable minimum space required.

For example, I was told that the main laboratory now has about 8,000 square feet but needs an additional 3,000 square feet. This is being obtained at a cost of about \$1 million by taking a parking deck located roughly above the existing lab and thereby displacing parking for some 20 physicians.

I am told that the operating rooms are considered too small to house all of the equipment required today or expected for the future. *Would it be possible to combine four OR's into three, and make up for the lost OR by running the remaining rooms for more hours per day? Would physicians, nurses, and other professional staff accept this? How long would the construction take? What would be its cost?*

I am told that the ER was built to care for some 25,000 patients annually but that it now treats about 36,000 yearly. *Is this correct?*

According to the Strategic Plan, p. 48, the hospital hopes to increase ER volume from 35,464 in 2002 to 42,000 in 2007. *Can this be accommodated in the existing space? If not, how much additional space would be required?*

What is the distribution of ER average waiting times by day of week/hour of day currently? What share of patients elope now? How many hours each month is the ER on diversion?

When the ER is on diversion, what are the main reasons? What share of the time on diversion is attributable to lack of available ICU beds? What steps—such as re-scheduling elective surgery slots—have been taken to make ICU beds available in order to reduce time on diversion?

What increases in waiting time in the ER or elopements from the ER might result? What plans might the hospital make to reduce ER gridlock, such as re-scheduling of elective surgery when the ICU risks saturation?

There are, doubtless, other specific examples of space problems. It would be helpful to know what they are.

Similarly, what services, functions, or departments currently have adequate space but are expected to suffer shortages of space within the current decade? Again, what evidence or standards support the expectation that space will be inadequate? What assumptions about volume of care help to support that expectation?

As well, do any departments currently enjoy surplus space? Might any services or programs be discontinued in the next few years? Might any services or functions be transferred off-site without material diminution of functionality?

Finally, if incremental improvements or a complete rebuilding at the current site were undertaken, how much swing space would be needed to temporarily house functions, services, departments, or nursing units while their space was renovated? If this space is not now available, how would it be freed up? Or would temporary structures have to be moved on to or adjacent to the present site?

3. Functionality

UMCP has not undertaken large-scale rebuilding for many decades but has instead resorted mainly to incremental improvements. This suggests that some or much of the present facility may be inadequate, judged in light of many of today's functional needs and rule-of-thumb standards.

Still, given that UMCP still owes bond-buyers some \$57 million borrowed to finance the cost of existing buildings and equipment, it is reasonable to infer that the current facility is not useless.

What aspects of the current physical plant impair clinical functions or raise costs of providing care?

For example, during a visit in August of 2004, I was shown the distance and difficulty associated with moving a patient from the ER to the CT scanner. *Does the current care configuration necessitate other time-consuming arrangements like this?*

What is the condition of the current UMCP physical plant? Are the buildings essentially sound? Are the HVAC and electrical services sound? What replacements, renovations, or major repairs would ordinarily be made or expected to be made in the coming 25 years? Can replacement boilers, AC units, emergency generators, and others be accommodated in the existing buildings?

What savings (reduced occupancy cost) and costs (lower morale, greater inconvenience or communications problems) are now associated with maintaining some 150,000 square feet of back office activities off-site?

4. Parking

How many parking spaces does the hospital now provide to physicians, staff, and patients, distinguishing on-site and off-site spaces? How many spaces are needed now, and how many will be needed in (say) five-ten years, on reasonable assumptions about volumes of care and staffing levels?

Is it correct that some 300 employees now park off-site, and that the cost of renting those spaces and providing transportation is some \$325,000 yearly?

Could UMCP acquire one consolidated parking site for employees, located within one mile of its present site, and provide very frequent shuttle bus service to that site?

Can parking spaces be added on top of the existing on-site parking structure? If so, how many? If so, how many spaces would be taken out of services during construction, and how long would construction last?

5. Beds

I understand that UMCP has 291 beds under license, and that some 215 are staffed. Is this correct? Does this 215 include all services—adult medical-surgical, ICU/CCU/other special units, obstetrics, pediatrics, psychiatry, and any other services?

How many acute beds are licensed, by service (adult medical surgical, pediatrics, obstetrics, psychiatry)? How many are actually set up and staffed, by service? How many of these are located on the main UMCP campus?

Could we please see the complete data for 2003 (and annualized data for 2004) for the hospital volume characteristics listed on p. 24 of the 6 January 2003 data compilation (also p. 32 of the Strategic Plan)? Please include figures on average numbers of beds actually set up and staffed, by service.

How would the hospital project these volume numbers to 2007, 2010, 2015, or another suitable planning horizon, under rebuilding options a, b, and c, as discussed later in this report?

How many beds would be required to provide this much care?

Would the hospital need to become bigger if takes on more high-case-mix patients? One thought is that 300 beds would be enough, particularly as some patients who are now admitted to the hospital are likely in the future to be treated as outpatients (continuing a long-term trend).

I understand that approximately 60 percent of adult medical-surgical beds are in double-bed rooms. Are these rooms essentially large enough to conveniently allow needed equipment to be brought to bedside when both beds are filled? How does the 60 percent share compare with the pattern for new construction in markets like UMCP's? Do market tests show that patients in the Princeton area would prefer single-bed rooms? What share of medical-surgical beds at hospitals competing with UMCP are in single-, double-, and other-bedded rooms? What evidence supports these assertions? What is the construction cost per bed for single- and double-bed rooms? What are the nursing and other staffing levels, and total staffing costs, associated with single- and double-bed rooms?

If we assume that UMCP now has 200 adult medical-surgical beds under license, and if 60 percent are in double-bedded rooms, that would mean 120 beds in 60 double-bedded room and 80 in single-bedded rooms. This would allow the hospital to admit 140 patients without requiring anyone to share a room. How does this compare with the current adult medical-surgical average daily census?

The general question of single- versus double-bedded rooms is salient. ***Is the hospital's call for all-private beds sound?***

The main arguments for double-bedded rooms include:

Construction cost is lower. And, by shifting patients by gender and diagnosis, it is possible to maintain the same occupancy rate as can be achieved with all-private rooms. Doing so adds somewhat to administrative complexity and cost of bumping patients from room to room.

Some math is helpful in this regard. With 50 percent of beds in private rooms, a hospital can achieve a 75 percent occupancy rate without asking even one patient to share a room. In 2002, the average state-wide occupancy rate in New Jersey was 70 percent across the entire year.¹ Winter months almost invariably see somewhat higher-than-average occupancy rates, making it somewhat less convenient, in that season, to assign patients to the right double-bedded room.

It is hard to predict the UMCP's own post-expansion/rebuilding occupancy rate. In 2002, UMCP reported an overall occupancy rate of 59 percent, but this included Merwick, mental health, and other beds (392 beds in total).²

Nursing cost is lower also. Since more rooms could be fitted into a given thousand square feet, nurses would need to walk less and could attend to more patients in a given time. This is particularly consequential in today's nursing market.

Patients have greater opportunity to socialize, thereby boosting morale and speeding recovery.

The main arguments³ for single-bedded rooms include:

While construction cost of single-bedded rooms is higher, a greater share of those beds can be used on a given day because there is less need to worry about infection control and no need to match roommates by gender. South Jersey Health Care's new hospital in Vineland is all single-bedded, partly in response to patient preferences and partly to reduce nosocomial infections, said a speaker for the hospital.⁴ Besides, construction cost averages only about seven percent of total hospital spending.

Nursing cost would probably be greater but, to partially offset these, there is less need to move the patient to obtain dialysis or certain other procedures; these can be done in the room. When U.C.L.A. medical center rebuilt in the late 1990s, all of its 525 rooms were private. The hospital's director said that most rooms could be adapted to function like intensive care units.⁵ Of course, doing so requires moving equipment, which is costly in itself and risks damaging machinery or disrupting its calibration. It will probably also be necessary to purchase more duplicates of each piece of equipment.

One expert asserts that the added costs of private rooms—for construction and personnel—equal only 0.5 percent of average operating costs.⁶ But that is not a trivial share. For a hospital with \$100 million in annual expenses, 0.5 percent of expenses equals \$500,000 per year.

The average patient is more sicker than a decade ago. This may make private rooms more appropriate clinically.

Patients have much less opportunity to socialize during recuperation in acute care hospitals currently than they did two decades or even one decade ago. This is partly because today's average inpatient in the average hospital bed is much sicker or more disabled than formerly. Ambulatory care is used whenever possible. Despite the shifting of many simpler and short-stay surgical procedures to the outpatient side in recent years, average length-of-stay for those patients admitted to acute care hospitals has nonetheless dropped considerably. In New Jersey, average length-of-stay in acute care hospitals was 5.4 days in 2002, down from 7.9 days in 1992. That was a drop of 32 percent.⁷

It is easier for family members to room with patients. This, in turn, can boost patient morale, enhance access to nursing and other services, and facilitate "cooperative care," family members' help to patients.

Perhaps most important from the standpoint of patient care, single-bedded rooms may be quieter and calmer, thereby facilitating sleep. It can be hard to sleep in many hospitals; this is a problem, since more sleep and more restful sleep facilitate recover.⁸

6. Survival, rebuilding, financing, programs, and space needs

The hospital's operating margin dipped substantially in the late 1990s, as shown in the following exhibit.

Exhibit

**UMCP's and Peer New Jersey Hospitals' Operating Margins,
1999 - 2004**

	UMCP	N.J. mean, 150-200 ADC
1999	- 3.4 %	- 0.6 %
2000	- 4.7	- 4.3
2001	- 2.8	- 0.7
2002	- 4.6	
2003	0.1	
2004	2.0	

Notes:

ADC is average daily census.

2004 is part-year only.

Please note that the hospital apparently had an average daily census of about 142 patients in 2002, so the identification of the appropriate peer group should be reconsidered. (I calculated this from the 51,747 patient days reported for 2002 on p. 32 of the plan, divided by 365 days, yielding an average census of 141.8 patients.)

Would it possible to obtain data on other hospitals with average daily censuses between 125 and 175? Would it be possible to obtain data on nearby competitors, those within, say, 20 or 25 miles? The latter is really more important, isn't it?

Is the hospital able to provide peer data for the 150-200 ADC group for 2002 and subsequently?

The UMCP apparently broke even in 2003. This represents a substantial improvement, one that suggests the hospital might be able to generate substantial operating surpluses in the years ahead. These might be essential to financing needed capital improvements.

In its Strategic Plan, the hospital asserted that "without a material change in direction, it is anticipated that UMCP's operating losses will continue to escalate." (p. 3). *Is this still true? Why?*

And, since the hospital is doing so much better financially, does this weaken the case for extensive rebuilding? After all, if the hospital is doing so much better,

does it still need to undertake substantial capital investments, act to increase average case mix, and increase the number of residents and residency programs?

Alternatively, would the hospital assert that annual operating gains are essential to finance rebuilding, which remains—in the hospital’s view—necessary to securing UMCP’s long-term survival and flourishing. In this view, UMCP’s financial turn-around might be only temporary. A new building with more space for ER, ORs, and greater volumes of more profitable high-case-mix services; more residents; and more private rooms would bolster the hospital’s attractiveness and keep revenues flowing. Yes, in this view, costs would be higher, but revenues would be higher still.

To understand the desirability of these actions, it may be helpful to consider the causes of the hospital’s financial problems, and their solutions.

UMCP’s Strategic Plan identified six causes of financial problems (p. 4)

1. shortage of labor resources
2. inflation of supply and drug expenses
3. growth in pension plan expense
4. loss in market share
5. management transition expenses
6. revenue increases not keeping pace with expenses

A list supplied me in August of 2004 included only the first four items. The first three of these remaining four items afflict all—or almost all—hospitals. UMCP can try to respond to these causes of financial difficulty, but it will be hard for any one hospital, acting alone, to do much about them.

Only loss in market share is a cause of financial difficulty that UMCP can attack on its own.

It is therefore reasonable that the Strategic Plan focuses considerable attention on boosting UMCP’s patient volumes. It asserts (p. 56) that program development and marketing are essential to growing volume. Further, “Recapturing the market share lost is meaningful because PHCS has the physical plant capable, with modifications, of accommodating this increased volume.” The Strategic Plan identifies a number of discrete Key Strategic Initiatives (pp. 48-50) and Supporting Strategies and Tactics (pp. 54-60) that seem oriented to increasing volume. These initiatives include:

- Marketing to improve the UMCP’s visibility
- Increasing access to UMCP physicians and facilitating physician contracting with all major managed care plans
- Increasing the number of active medical staff physicians throughout primary and secondary service areas
- Establishing “university affiliate” status with UMDNJ/RWJ Medical School
- Leveraging this relationship to obtain physician subspecialty expertise at UMCP
- Expanding the number and depth of residency training programs.

- Increasing the complexity of cases that UMCP can treat—raising the all-patient case mix index from 0.96 to 1.10 by 2007.
- Raising surgical volume of high-case-mix procedures—in orthopedics, neurosurgery, and vascular surgery.
- Increase surgical volume (inpatient and outpatient) from 2,178 to 3,600 yearly by 2007.
- Providing comprehensive cardiovascular services, excluding open heart surgery, but including angioplasty and stent insertion.
- Developing centers of excellence in breast health, cancer, stroke (to support ER program growth), vascular center, comprehensive weight management, and kidney stone treatment.
- Boosting ER volume from 35,464 in 2002 to 42,000 in 2007.
- Rebuilding UMCP, including an ambulatory care center and physician offices, on an expanded campus or at a new location—on a site that can accommodate programmatic and customer service needs, as well as future development opportunities.
- Improving facility design—access, parking, waiting areas—to accommodate patients and families.
- Expanding and enhancing facilities to provide a caring, pleasant, and safe environment.

Understanding the financial case for rebuilding should become clearer after these questions are answered:

First, why did the hospital suffer low operating margins in 1999, 2000, and 2001? Given its favorable payer mix and low case mix-adjusted cost, the low operating margins seem hard to understand.

Second, how did the hospital turn around its financial condition in 2003 and 2004? Can the separate effects of different actions be teased out?

- *How important was cost cutting, extracting additional operating efficiencies? Indeed, how was it possible to extract additional efficiencies, given the hospital's traditionally low average cost per adjusted discharge, controlling for case mix? If cost cuts were important, how were they achieved?*

The Operations Improvement Imperative, Summary – Savings & Descriptions of Opportunities that I was sent on the 20th of August (Tab 1, attachment 3) shows a total savings of \$5.9 million.

✓ *Over 90 percent of the savings were P&L savings rather than cash savings. Please explain this distinction and its practical significance.*

✓ *Will any of that 90 percent translate into—or enable—future cash savings?*

- *How important was increasing revenue? To what extent was revenue boosted through price increases, improved collections, higher volume, increases in average case mix index, and other methods? If any of these were important, how were they achieved? If volume increases were important, were they associated with increased market share in the primary service area or with other factors?*

- How important were overall improvements in payment rates from Medicare, HMOs, and other payers?

In this connection, could I please have either revised Hospital Cost Report data or audited financial reports for 2002, 2003, and 2004 (half-year for 2004, if available), from which I can calculate operating margins and total margins? (I have audited reports for years ending 31 December 2000 and 2001 that provided a breakdown for the hospital only, but the reports for years ending 2002 and 2003 are for the PHCS as a whole, without a breakdown for the hospital only. I do have Hospital Cost Report data (G series) for 2000 through 2003, but there seem to be missing data and inconsistencies with other data sources.

Third, is the hospital expected to continue to be substantially more efficient than its peers, other New Jersey hospitals with average daily censuses between 150 and 199? Is it more efficient than its nearby competitors?

In this connection, the rising gap in 2002 and 2003 between UMCP's cost per admission and that of its peers is surprising and noteworthy.

- ✓ *How would the hospital explain this?*
- ✓ *Does the hospital's declining cost of care, relative to its peers, point to an opportunity for UMCP to distinguish itself competitively as a high-quality and low-cost hospital?*
- ✓ *Given the likelihood of growing pressures to contain health costs and hospital costs in the U.S. in coming years, has the hospital considered adopting a low-cost strategy?*

Again, please note that the hospital apparently had an average daily census of about 142 patients in 2002, so the identification of the appropriate peer group should be considered. (I calculated this from the 51,747 patient days reported for 2002 on p. 32 of the plan, divided by 365 days, yielding an average census of 141.8 patients.)

Exhibit

UMCP's Cost per Admission versus Peer Hospitals, 1999-2003, Adjusted for Case Mix

<u>year</u>	<u>UMCP</u>	<u>Peers</u>	<u>UMCP % below peers</u>
1999	\$5,840	\$6,384	-8.5%
2000	\$5,519	\$6,141	-10.1%
2001	\$5,782	\$6,224	-7.1%
2002	\$6,003	\$7,089	-15.3%
2003	\$6,602	\$7,993	-17.4%

Note: Peers are considered to be New Jersey hospitals with average daily census ranging between 150 and 199.

Would it possible to obtain data on other hospitals with average daily censuses between 125 and 175? Would it be possible to obtain data on nearby competitors, those within, say, 20 or 25 miles?

Fourth, is the recent improvement in operating margin expected to be sustainable in the years ahead, absent major initiatives by UMCP? If so, why? If not, what forces will threaten the improvement?

7. Specific space needs and financial aspects associated with rise in average case mix

The Plan posits that a substantial rise in average case mix will be essential to increasing and sustaining UMCP's operating margin.

✓ *Are high-case-mix patients indeed more profitable?*

This question is so important that it should, I think, be answered using both relevant secondary data, from Advisory Board and others, and primary data on UMCP's own projections of its incremental revenue and incremental cost associated with specific new high-case-mix programs.

UMCP has provided a brief analysis of the hypothesized effects of higher case mix. As summarized in a spreadsheet dated 24 August 2004, UMCP posited certain revenue increases associated with higher Medicare case mix indices, but it did not show any added costs associated with caring for these more intensely ill patients or more complicated procedures.

✓ *What are the estimated added costs? These added costs should include both direct variable costs associated with higher serving higher case mix patients, and added fixed or indirect costs associated with adding space, equipment, residency programs, and other costs.*

Throughout, in discussions of case mix, please distinguish between case mix indices for all patients hospital-wide and case mix indices for Medicare patients. This has been a source of accidental confusion.

UMCP also provided analyses from the Advisory Board that asserted that a relatively small number of "blue chip" lines of business provided a very high share of the surplus from all surgical procedures.

But this does not necessarily support the conclusion that higher case mix makes for greater profitability. Further, It may be difficult to attract physicians who perform profitable procedures without also serving the same physicians' unprofitable patients (unless the surgeon has a financial stake in a particular hospital⁹). In this regard, it is worth noting that a recent brief report appearing in *Hospitals and Health Networks* asserted that only one-quarter of orthopedic DRGs were profitable.¹⁰

Patient profitability is an area of considerable uncertainty. For example, the Advisory Board spoke of the importance of converting medical patients to surgical patients in order to win higher profits. But the *Hospitals and Health Networks* report asserted that "The most profitable DRGs for orthopedics are medically related."¹¹

Today, it appears that certain cardiac procedures for Medicare patients are highly profitable to hospitals. Given the pressure to contain Medicare costs, can't it reasonably be expected that Medicare will trim the high payments that make for these profits? (Medicare could either retain the savings or use them to pay more money for DRGs that are today under-paid.)

My own analyses of data from 1990 show only a moderate correlation between Medicare case mix index and operating margin at the whole-hospital level. The correlation (R_p) was 0.1623, statistically significant at 0.0001, so squaring this correlation yields an R^2 of 0.026. This means that the variation in case mix index statistically predicts only about two and one-half percent of the variation in operating margin. This finding held for a sample of 569 hospitals in 52 large and mid-sized U.S. cities. These data are not very current. *Is there any reason to predict a tighter association between case mix index and profitability today?*

I also ran a regression on operating margin as a function of medical school affiliation, number of beds, black population share of the surrounding neighborhood, case mix index, and efficiency. The results are displayed in the following exhibit. Case mix index remains positively associated with operating margin, and is the most powerful (beta) and statistically significant predictor. Still, the entire regression equation statistically explains only about 4.0 percent of the variation in operating margin, so it is hard to conclude that there was a powerful association between case mix index and operating margin.

What are the arguments, with supporting evidence (when available), against trying to boost the case mix index appreciably? These might include risks of alienating some or many community physicians, the cost of adding capacity (operating rooms, equipment, specialized staff, and other), the risk that it might be difficult to assure the quality of new specialized services if volumes of care were low, and the risk that Medicare and other payers will realize that they have been over-paying for many types of high-case-mix care and will therefore cut payments for such care.

Exhibit

Predictors of Hospitals' Operating Margin, 1990

R= .21990122 R²= .04835655
Adjusted R²= .03990501 F(5,563)=5.7216 p <0.00004

	Beta	Standard Error	p-level
Intercept			0.008152
medical school affiliation	-0.067303	0.049418	0.173767
beds	0.047557	0.054391	0.382299
area percent black	-0.095236	0.041699	0.022751
Medicare case mix index	0.145543	0.048413	0.002763
efficiency	-0.089421	0.042267	0.034816

If UMCP acts to boost high-case-mix discharges, how will competing hospitals respond? Can they be expected to try to boost capacity, add services, hire more physicians, try to bid away physicians now admitting to UMCP, increase marketing, or take other steps to prevent loss of patients to UMCP?

Is there enough need for high-case-mix care in the region to satisfy all of the hospitals that might wish to provide such care? Or will each such hospital seek more such patients because they share the aim of boosting operating margins, leading to a hospital arms race?

Regardless of risks, need for care, and threat of an arms race, is it important to UMCP's financial future to launch or expand programs for high-case-mix patients? Is it essential to UMCP's financial future?

Without additional evidence, I find it hard to accept UMCP's assertion that attracting patients with a higher overall case mix index will enhance the hospital's financial position.

Adding residency programs and residents

A greater number of residents and residency programs might be generally desirable to support a higher case mix.

Among the Strategic Plan's initiatives are "Establishing university affiliate status for teaching and research purposes with the University of Medicine and Dentistry of New Jersey, Robert Wood Johnson School of Medicine. Leveraging this relationship to provide the Princeton community with access to subspecialty expertise at PHCS site and to expanding the number and depth of residency training programs." (p. 48)

It is expected that doing so would improve quality of care, and that this would cause more patients to be admitted to UMCP. (Strategic Plan, p. 52) It is further expected that stronger residency programs would help to support community clinics.

There is a continuum between pure community hospitals, with no residents, and pure teaching hospitals, with no private attending physicians. The steps just mentioned appear to signal further movement by the UMCP away from being a pure community hospital and toward what might be called a community teaching hospital.

How to describe where UMCP is on this continuum now, and where might it aim to be in a decade?

- We might assign a value of 1 to a 100-bed community hospital, one relying entirely on physicians in private practice, with little sub-specialty care, and probably with a busy ER.
- We might assign a value of 7 or 8 to the UMDNJ-RWJ teaching hospital/medical school complex in New Brunswick.

- We might assign a value of 10 to a very large teaching hospital with 500 to 800 beds, many hundreds of residents, and services as esoteric and costly as could be found anywhere in the world. Think of the Hospital of the University of Pennsylvania or Columbia-Presbyterian.
- Then, UMCP might now see itself as about a 5. *Is that about right?*
- *Where might UMCP be in a decade if it successfully implemented most of the elements of its strategic plan? A 6? A 7? An 8? (At the same time, UMDNJ-RWJ might move to an 8 or 9 in today's terms, while today's 10 might become an 11 or 12.)*

It would be helpful to see a simple chart showing FTE residents and fellows, by specialty, both currently and in, say, 2010. It would also be helpful to see parallel data on the number of medical students on internal medicine and general surgery rotations during the average month.

Exhibit

**Current and Expected FTE Residents and Fellows, by Specialty,
Current and 2007**

residency program	current residents + fellows, FTEs	expected residents + fellows, FTEs, 2007? 2010?
internal medicine	92?	
general surgery	42?	
urology	2?	
emergency medicine	0	
orthopedics?		
diagnostic radiology?		
other?		
other?		
total		

Several motivations for expanding the number of residents and residency programs are possible.

- This change may be motivated in part by an intention to support the sought-after increase in programs to serve high-case-mix patients.
- It may also be seen as a means of providing coverage and care for patients of private attending physicians.
- It may be prompted by a desire to win higher Medicare payments to cover indirect medical education (IME) costs. Currently, Medicare increases each DRG payment to a hospital by approximately 5.5 percent if the ratio of residents to beds is 0.1 (1 resident per 10 beds). If the ratio rises to 0.2 (2 residents per 10 beds), the Medicare payment rises by approximately 11.0 percent, and so on. To the extent that boosting revenue is an aim, it would be important to assess whether Congress is likely to retain the IME adjustment at current rates or continue to cut it, and also to gauge the costs associated with increasing the number of residents at UMCP.
- Other motives might be at work.

Please discuss in detail the hospital's motives in expanding the number and size of residency programs; the benefits, costs, and risks associated with the expansion; and the association, if any, between the expansion and other changes (such as increases in high-case-mix patients).

What sort of hospital?

How do the community and the hospital administration describe UMCP today? How do they see it? What are its characteristics, its strengths, and its weaknesses?

If UMCP boosted its high-case-mix discharges, increased the numbers and types of its resident physicians, and rebuilt a few miles away, what sort of a hospital would it be? What sort would it seem like? Would its character have changed markedly? Would it resemble, in its programs and services, any other hospitals we could read about or visit?

The hospital now performs joint replacements, bariatric surgery, and other fairly sophisticated types of care. If many such programs are added, does the overall character of the hospital change?

Is a rise in case mix essential to boost volume and operating margin?

Given the very rapid protected rise in the primary and secondary service area population aged 45-64, an age range during which hospital use trends upward substantially, why does the hospital expect that "growth must come from expanding services area and increasing market share"? (6 January 2003 data compilation, p. 23; also, Strategic Plan, p. 31) Yes, there were drops in patient-days per 1,000 people during the 1990s, as the hospital notes, but haven't these trends largely slowed and even reversed themselves? What is the most current number of patient-days per 1,000 people by the five age groups (0-14, 14-44, 45-64, 65-74, and 75+)?

Is it possible that the UMCP's operating margin could improve substantially through winning continued operating efficiencies and continued improvements in volume (through marketing, physician recruitment, and other techniques)? Or have opportunities for improvements through these techniques largely been exhausted?

Is it reasonable to expect that the growing demand for care from the current primary and secondary service areas (associated largely with the rapid rise in the population aged 45 to 64), combined with the UMCP's on-site renovation or nearby relocation, would be sufficient to leave the hospital with a substantial operating margin—without having to boost the hospital's case mix index?

In this connection, the Strategic Plan noted certain losses in market share of primary service area patients since 1992. Primary service area boundaries expanded and then shrank back during this period. Does the finding of loss of market share persist if service area boundaries are held constant—that is, if the primary service area is defined by zip codes rather than by cumulative share of discharges?

B. If UMCP does need to undertake substantial capital investments in order to provide safe and high quality services, and to remain financially successful in the decades ahead, how, when, and where should these capital investments be made? Three ways to undertake the capital investments are:

- a) incremental and ad hoc repairs and improvements on the current site—business as usual,
- b) substantial, coordinated, and phased rebuilding at the current site—either without acquiring any adjacent properties, or possibly with acquiring some nearby land, and
- c) complete relocation to a new facility on a new site in or near Princeton.

A fourth option—near-complete relocation to a new facility on a new site while retaining a few essential outpatient services at the current site or other central site in Princeton—should be mentioned for the sake of completeness. Because this is only a small variation on the third option, it will not be analyzed in this report.

It is helpful to begin by listing the core considerations pertinent to each of the three main options.

a) Incremental and ad hoc rebuilding

This appears to be the least costly alternative, but it also buys the smallest amount of improvement in quantity and quality of space—both for the year 2010 and in positioning UMCP’s facilities for future decades.

- ✓ *Would this money be largely wasted, if relocation is inevitable?*
- ✓ *If substantial, coordinated, and phased rebuilding is an acceptable alternative, can essential incremental rebuilding be aligned with it?*

The answers to these questions rest heavily on how much square footage UMCP requires—at minimum—to function adequately and competitively in the decades ahead. In assessing its space needs, UMCP may have been thinking about the optimal square footage for each important activity. To evaluate all three options, it will probably be helpful to think more about the minimum essential square footage.

b) Substantial, coordinated, and phased rebuilding

Suppose that relocation (option c) were judged to be unaffordable.

- ✓ *Would substantial rebuilding at the current site yield an adequate physical plant, one that was sufficiently attractive to patients, physicians, and hospital employees—and one that was functional in 2010 and in positioning UMCP’s facilities for future decades?*
- ✓ *How many square feet and how many parking spaces would be required?*
- ✓ *How much land would be needed?*

c) Relocation

Suppose that substantial rebuilding on-site—with or without acquiring adjacent land—were deemed incapable of providing an adequate and competitive physical plant, including parking, for 2010 and for future decades.

✓ *Could UMCP afford to relocate?*

Or suppose that relocation were deemed the most attractive alternative but that, to make it affordable, substantial economies and compromises were required. For example, less land might be bought than is now considered desirable, and a smaller facility might be built than is now considered optimal.

✓ *Would this affordable relocation still be superior to the option of rebuilding on site?*

Generally, it can be expected that option c, a new hospital on newly developed land, will yield the most appropriate and functional facility for 2010, as well as the one best positioned for future adaptation or expansion to meet the medical needs of future decades. But it is also likely to be the most costly. Looking forward, the challenge is to select the option that provides the greatest improvement a price that UMCP can afford.

In doing so, it is helpful to recall that, when the best option is impossible, second-best may not be less of the first, but rather something very different.

UMCP's decision should rest on a careful assessment of the strengths and weaknesses of each of the three main options. Making that assessment requires answering a number of questions.

Generally, it would be helpful to see comparable data on total spending to achieve each of the options, expressed in present value, with a reasonable discount rate. This would greatly facilitate comparing apples with apples on the cost side of the equation.

Similarly, it would be helpful to see a clear depiction of how well the UMCP would function under each of the three options—ER, inpatient care, outpatient care, laboratories, radiology, operating rooms, and support services. What would patient care be like? What would patients like and dislike about each of the options? What would physicians like and dislike about each of the options?

Throughout, the benefits and costs of each of the three options should be considered in light of

- *the benefits and costs associated with alternatives,*
- *both the optimal facilities UMCP desires and the minimum facilities that UMCP requires,*
- *the financial feasibility of each alternative.*

a) Incremental and ad hoc repairs and improvements on the current facility

Unless we can see reasonable guess about the cost of business as usual, it will be hard to gauge the value added by the alternatives (b) and (c). *What are the estimated costs of incremental and ad hoc repairs, additions of usable space, and improvements over the next 25 years, grouped by five-year periods?* This should include spending that has been deferred on the chance that option (b) or (c) might be adopted.

To begin, how much has the UMCP spent yearly on incremental and ad hoc repairs and improvements on the current facility, say from 1995 to-date? I have heard that PHCS has been spending some \$12 million to \$14 million annually, system-wide, on building renovations, major equipment, and the like. Is this accurate? How much has been spent yearly at UMPC? How much of this represents desirable improvements—such as upgrading of imaging equipment—that would ordinarily be undertaken regardless of UMCP’s site?

What essential repairs, additions of space, and improvements are already scheduled and must be performed regardless of whether a major rebuilding or relocation takes place, and how much will these cost?

What essential repairs, additions, and improvements would be scheduled in coming years, if the hospital remains where it is, and how much would these cost?

Functionality of the facility during this period: will it be adequate to support clinical programs safely, efficiently, and effectively?

Functionality of the facility at the end of this period: will it provide a solid physical platform on which to build the hospital’s programs during the years ahead?

What would be the effects of improvements, if any, on patient care, both during and after construction?

What would be the effects of improvements on neighbors, both during construction (noise, dust and fumes, general annoyance) and after construction (improved appearance)?

What would be the effects of improvements on traffic, both during construction (street closings or constrictions, delays) and after construction?

Probable considerations include:

- Meaningful expansion beyond the boundaries of the current campus is considered unlikely by many or most people. If that is accurate, today’s 7 or 8 acres will be essentially all that will be available to UMCP in the years ahead. *Are there reasons to expect otherwise?*
- Each repair and improvement will require either building temporary swing space or relocating additional functions off-site.
- Some repairs will be emergencies, adding both cost and disruption. Irritation will probably increase for physicians, staff, patients, and neighbors.
- More and more parking will probably have to be relocated off-site, adding to the length of employees’ work day.

b) Substantial, coordinated, and phased rebuilding at the current site

Suppose that relocation (option c) were judged to be unaffordable. Would substantial rebuilding at the current site yield an adequate physical plant, one that was sufficiently attractive to patients, physicians, and hospital employees? How many square feet and how many parking spaces would be required? How much land would be needed?

Two alternative ways to substantially rebuild can be imagined. One is restricted to the UMCP's current land-holdings. The other supposes that adjacent land could be acquired.

1. Using existing acreage only

What is the best-functioning facility that can reasonably be achieved on the current site? How will it compare to the current facility in licensed beds of various types, gross square feet, ER capacity, OR numbers and size, and the like. How will the sizes of various departments in the rebuilt facility compare with present sizes?

I've heard that the hospital would want to add about 100,000 gross square feet if it rebuilt substantially on-site. Is this generally accurate?

How many gross square feet would be required in total?

How would the sizes of the various main departments compare with current sizes and with best practice recommendations for 2010?

Approximately how much would option (b) cost to build, including the cost of renewing structures and HVAC, electrical, and other systems?

How many years would reconstruction require?

At the completion of construction, how adequate would the facility be, as a platform for provision of patient care, and to attract and retain physicians?

What would be the effects of construction on neighbors, including noise, dust and fumes, temporary street closings, and the like?

If the hospital chose this approach, what is the anticipated level of community opposition? Put another way, what is the probability that community opposition and litigation would add more than one year to the phased rebuilding?

What would be the effects of construction activities, noise, and dust on patient care, physicians, and employees?

What would be the effects on traffic?

What would be the total and itemized capital costs? I understand that the total is projected to be some \$165 million—is this roughly correct?

How would this capital cost be financed (current endowment, projected annual operating surpluses, sales of existing parcels of land, fund-raising, bond sales, and other)?

What would be the effects of repaying borrowed money? By how much (absolute dollars and percentage increase) would cost per patient-day and per ER visit rise in, say 2009?

If the UMCP undertook this project, would it still have the money required to invest in other important steps proposed in the Strategic Plan, such as establishing or expanding programs in high-case-mix specialties or expanding residency training?

2. Adding to the UMCP's existing site by purchasing contiguous properties

It might be costly for UMCP to rebuild on-site if limited only to the land it now owns. This type of rebuilding might be expensive owing to lack of swing space, tight quarters for construction equipment, need for costly mitigation actions, and the need to build high. Further, it might be difficult for UMCP to achieve a satisfactory and functional physical plant at its present site owing to simple lack of land for hospital services and parking. And subsequent expansion restricted to the existing site might be impossible or almost impossible. Therefore, it would be helpful to know

What nearby properties could be purchased?

Would the hospital have to pay a premium above market rates or would the Borough or Township be able and willing to employ eminent domain to acquire adjacent land at a more affordable (current market) price? The hospital might be able to acquire land for a new site at, say \$200,000 per acre. If the hospital were obliged to pay at a rate of \$5-\$10 million per acre to acquire adjacent properties, purchasing those adjacent properties would be hard to justify unless the overall cost of constructing a satisfactory facility at the present site were substantially lower than the cost of constructing a relocated hospital.

How much nearby land would the UMCP need to acquire to markedly improve the facility it could rebuild? How much would total construction cost of rebuilding on-site drop owing to easier staging, greater elbow room, and simplified design?

How many more gross square feet of new construction could be added to the project at the current site were more land available? To what extent would this improve the facilities—in ways that would specifically attract patients and physicians, and generally bolster the hospital's finances?

c) Complete relocation to a new facility on a new site in or near Princeton

Suppose that substantial rebuilding on-site—with or without acquiring adjacent land—were deemed incapable of providing an adequate and competitive physical plant, including parking. Could UMCP afford to relocate?

How many beds for the various services would be built at the new site? What is the marginal cost per additional bed, above (say) 200 beds?

How many gross square feet would be required?

How would the sizes of the various main departments compare with current sizes and with best practice recommendations for 2010?

Concerning the projected capital cost of the new facility, is the following summary accurate? What are the costs associated with the three items (with question marks) for which data are lacking? Are any of these included under other items for which data are provided?

Exhibit

**Itemization of Costs of a New Hospital on a New Site
(\$ thousands)**

land acquisition	\$15,000
construction	\$194,000
new equipment	??
architects' fees	??
bond financing fees	??
capitalized interest	\$11,839
total	\$220,839

Source: MCP Model Assumptions, as of 31 December 2003.

Similarly, how do the individual costs and the total cost compare with those of similar projects completed recently, inflated to 2009 costs?

What is the projected cost per bed and how does this cost per bed compare with projections for similar-size new projects in regions with land and construction costs roughly comparable to those of suburban central New Jersey?

(Here are a few yardsticks: I have identified three hospitals that completed new facilities in 2004. Their new beds ranged from 262 to 361, and their total cost per bed ranged from \$449,000 to \$623,000.¹²)

How would this capital cost be financed (current endowment, projected annual operating surpluses, sales of existing parcels of land, fund-raising, bond sales, and other)?

Exhibit

**Sources of Funds for New Hospital on New Site
(\$ thousands)**

Hospital Foundation contribution, through P&L	\$25,000
Capital campaign, through P&L	\$50,000
Sale of land and buildings, cash impact	\$60,000
New debt	\$100,000
less debt service reserve fund, @ 1 year's P+I on total par amount	(\$11,400)
less Cost of issuance @ 1.5 % of total par amount	(\$2,354)
Total net source of funds	\$221,246

Note: the total to be borrowed would be the \$100,000,000 shown here plus some \$57 million to refinance existing PHCS debt.

Source: MCP Model Assumptions, as of 31 December 2003.

Is the expected net cash gain of \$60 million from the sale of the existing land and buildings a realistic figure in light of reasonable expectations about the nature and intensity of the expected and permitted re-use of the land and buildings?

What would be the effects of repaying borrowed money? By how much (absolute dollars and percentage increase) would cost per patient-day and per ER visit rise in, say 2009?

If UMCP financed \$157 million (\$100 million in new debt plus \$57 million in refinanced existing debt) for 20 years at 6 percent interest, I calculate that it would have to repay about \$13.5 million annually for the 20 years (assuming equal monthly payments to amortize principal and interest).

If 75 percent of the cost were associated with inpatient care, and if UMCP's average daily census were 175 patients (for 365 days, making for 63,875 patient-days annually), then the added cost would be \$158 per patient-day (\$10.1 million—three-fourths of \$13.5 million—divided by 63,875). It is recognized that \$57 million of the \$157 million to be financed is old debt, but it is assumed that this would be paid off fairly soon were it not refinanced.

The added \$158 per patient-day, for an average of 5.4 days (the 2002 average length-of-stay in New Jersey hospitals) means an added cost per admission of \$853.

Since all of the three options require additional capital spending, this figure—\$853 in added cost per admission—should be compared with the costs of alternative methods of providing adequate and appropriate space.

Some considerations in choosing among the three options

To judge among the three alternatives, it would be helpful to know the UMCP's assessment of these opportunities and threats posed by the hospital's financial, political, and competitive environments. These overlap somewhat with questions posed earlier.

1. Boosting the case mix index

If it is believed that certain physical expansions and improvements are essential to make room for a more intense average case mix, please present the evidence supporting this belief. How much more space and equipment would be required, and why?

If it is believed that raising the intensity of the average case mix is essential to improving profitability, please provide the evidence supporting this belief. What would be the higher revenues and costs associated with increasing the intensity of the average case mix? Which are the specific high-case-mix services or diagnoses in which volume increases are sought?

How profitable are these high-case-mix services or diagnoses today?

Why are they profitable today? That is, what combination of changes in Medicare payment and cost of care make them profitable when treating Medicare patients? Do the same calculations essentially carry over to managed care or Blue Cross patients?

Does the UMCP expect that Congress or CMS will continue to permit these high-case-mix services or diagnoses to remain profitable one, three, five, or ten years hence? For example, what is the risk that UMCP (and other hospitals), in seeking to boost volumes of profitable services, will actually increase the chance that Congress or CMS will act to close off this opportunity for profit?

2. Competing hospitals

If these diagnoses do remain profitable, it can be expected that the hospitals that compete with UMCP will fight to gain or at least retain their shares of the market.

Therefore, if UMCP seeks to increase its market shares by making certain investments in building, equipment, and staff, will competing hospitals engage in an arms race and attempt to leapfrog UMCP's own investments? Do they have the capacity to do so?

Alternatively, does UMCP expect that its own planned improvements will be essential and sufficient to put UMCP on a reasonable par with competing hospitals? In other

words, will UMCP's planned improvements be enough to nullify the building/equipment/staff factor, and thereby permit UMCP to recoup, retain, or grow its market share in these profitable diagnoses?

3. Overall volume of inpatient, outpatient, and emergency care

Does UMCP expect that the total volumes of these three types of care, from its primary and secondary service areas, will grow, remain steady, or fall over the coming one, two and three decades?

4. Moving from a low-cost to a higher-cost configuration

Currently, UMCP apparently has a strikingly low case mix-adjusted cost per adjusted discharge, 17.4 percent below the average of its size peers in 2003, as noted earlier.

(Are these peers the right ones? That is, is this an apples-apples comparison of hospitals with the same average daily census or beds set up and staffed? Or even licensed beds?)

If the hospital makes substantial capital investment, how much will its case mix-adjusted cost rise? Will it therefore become less competitive?

5. Hospitals' overall financial environments and capacity to repay money borrowed

Hospital costs (and health care costs overall) have been rising substantially faster than GDP or personal income. Between 2000 and 2005, health costs absorbed one-quarter of the growth in the economy. Do you think this will continue? If payers constrain hospital revenue growth, will low-cost hospitals have a greater competitive advantage?

Even if costs continue to rise, do you expect that Medicare's, HMOs', and other payers' prices will continue to rise quickly enough to keep up with costs?

How does the hospital assess the risk that many or most important payers will cap not only the prices they pay hospitals for individual services but the annual revenue increases they are willing to allow hospitals overall?

If annual revenue increases are capped nationally, statewide, or regionally, how would UMCP respond? What types of costs would it cut?

And would it be able to make annual debt payments on its new bonds?

Considering these three options, how would the UMCP now rank its preferences?

Equally important, how would the people of Princeton and surrounding communities, physicians, insurers and HMOs, and other stakeholders rank the three options?

The following exhibit is one way to summarize the evidence on the desirability of the three options on a number of relevant criteria.

The relevant criteria include

1. quality of care
2. access to care and convenience
3. match between hospital services and capacities, and community needs
4. cost of care
5. hospital competitiveness and financial well-being
6. functionality of new facility—a good investment in the future
7. attractiveness of new facility to patients, physicians, and employees
8. feasibility of financial capital cost
9. feasibility of undertaking construction and minimizing disruption of patient care

The suggested relative importance/maximum points assigned to each is somewhat subjective. Different parties may want to weigh the criteria differently.

Summary Evaluation of Three Options on Nine Criteria

option →	a) Incremental on-site	b) rebuild on-site	c) completely relocate	suggested maximum points
critterion				
1. quality of care				15
2. access to care, convenience				12
3. match between hospital capacities and community needs				12
4. cost of care				10
5. hospital competitiveness and financial well-being				12
6. functionality of new facility—a good investment in the future				10
7. attractiveness of new facility to patients, physicians, and employees				7
8. feasibility of raising the money to finance capital project				15
9. feasibility of construction, minimizing disruption of patient care				7
other? —health care’s financial/economic environment				
Total				100

Notes

¹ American Hospital Association, *Hospital Statistics*, Chicago: The Association, 2003.

² American Hospital Association, *Guide*, Chicago: The Association, 2003.

³ Generally, see Michele Burrington, "Can Private Rooms Be Justified in Today's Healthcare Market?" Houston: Institute for Healthcare Innovation 1999.

⁴ William T. Quinn, "New Designs Break Old Habits," *New Jersey Business News*, 4 October 2004.

⁵ Milt Freudenheim, "Competition for Patients Spurs Some Hospitals toward Providing Only Private Rooms," *New York Times*, 18 April 1999.

⁶ William O. Cleverly, cited in Milt Freudenheim, "Competition for Patients Spurs Some Hospitals toward Providing Only Private Rooms," *New York Times*, 18 April 1999.

⁷ American Hospital Association, *Hospital Statistics*, Chicago: The Association, 1993 and 2003.

⁸ Cheryl Ann Cmiel and others, "Noise Control: A Nursing Team's Approach to Sleep Promotion," *American Journal of Nursing*,

⁹ "MedPAC: Early Data Support Cherry-picking of Profitable Patients by Specialty Hospitals," <http://www.premierinc.com/all/advocacy/issues/108/04/medicare/specialty-hospitals-medpac-1104.jsp>, Access confirmed 3 January 2005.

¹⁰ Lee Ann Runy, "Fix the Spine and the Bottom Line," *Hospitals and Health Networks*, Vol. 78, No. 10 (October 2004), p. 22.

¹¹ Lee Ann Runy, "Fix the Spine and the Bottom Line," *Hospitals and Health Networks*, Vol. 78, No. 10 (October 2004), p. 22.

¹² Susan Levine, "Hospital with Up to 300 Beds Is Proposed for SE," *Washington Post*, 5 Nov 04; William T. Quinn, "New Designs Break Old Habits," *New Jersey Business News*, 4 October 2004.