

# *CASE* 19

## The Case for Open Heart Surgery at Cabarrus Memorial Hospital

### Situation

It was a clear, crisp October morning in Concord, North Carolina. The board of trustees of Cabarrus Memorial Hospital gathered in the windowless, walnut paneled boardroom for its monthly meeting (see Exhibit 19/1 for board members). Board chairman George Batte opened the meeting saying, "Because we do not have an open heart surgery program, patients needing open heart surgery or coronary angioplasty have to be transferred to another hospital, causing inconvenience to the patient's families and risks from delayed treatment. There are several questions we have to answer in addressing this issue. Should we add open heart surgery to the mix of cardiac services we offer? Does the hospital's existing service area provide adequate patient volumes to support the program? What

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This case was written by Fred H. Campbell, The University of North Carolina at Charlotte, and Darise D. Caldwell, Executive Vice President and Chief Operating Officer, Northeast Medical Center. It is intended as a basis for classroom discussion rather than to illustrate either effective or ineffective handling of an administrative situation. Used with permission from Fred Campbell.

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**Exhibit 19/1: CMH Board of Trustees**

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Mr. George A. Batte, Jr., Chairman (Retired Manufacturing Executive)  
Mr. L. D. Coltrane, III, Vice Chairman (Telephone Company President)  
Mr. Robert L. Wall (President, Cabarrus Memorial Hospital)  
Mr. Dan Gray, Secretary (Executive Director, Charitable Foundation)  
Mr. Durwood Bost, CPA (Retired Manufacturing Executive)  
Mr. S. W. Colerider, Jr. (Retired Manufacturing Executive)  
Mr. Gene Verble (Merchant and Retired Major League Baseball Player)  
Mrs. Margaret C. West (Civic Leader)

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role should the Duke University Medical Center play in the proposed program? Will we be able to obtain the required certificate of need [CON] from the State of North Carolina's Department of Health and Human Services? Will there be opposition to the CON from surrounding hospitals? What costs are likely to be incurred in the required renovation, construction, medical equipment, and staffing?"

He continued, "As you all know, one of the factors pressing a quick decision is the desire of Dr. R. S. "Chris" Christy to return to the staff of the hospital after completing his fellowship in cardiovascular surgery. He is being heavily recruited by other medical centers."

Mr. Batte then asked Bob Wall, president of Cabarrus Memorial Hospital (CMH), to address the board on the issue. Mr. Wall said, "As we all know, our cardiac catheterization service is run by a Duke Medical Center physician. Our intent has been for the surgical portion of the heart program to be provided by Duke. Dr. Christy is completing a heart surgery residency through the Sanger Clinic and wants to return to Concord to practice. Needless to say, we face a dilemma and there are very different points of view in our medical staff as to the structure and relationship involved in developing a full-fledged heart program at CMH. I bring this to your attention now because Dr. Christy has to make a career choice before January 1st."

Trustee Batte reminded everyone, "Dr. Christy grew up in our community and worked part-time in the hospital while in high school and college. After medical school and a residency in general surgery, he practiced here at CMH prior to leaving to complete his fellowship in cardiovascular surgery. Dr. Christy was very popular among the staff and patients and I, for one, very much want to see him return." (See Exhibit 19/2 for Dr. Christy's biography.)

The board had to make its decision about the future of the cardiac program at CMH before offering Dr. Christy a position; however, it was clear that Dr. Christy could not wait too much longer to be offered a position by CMH. He had received multiple offers but, if he delayed, the offers might be withdrawn.

## History of Cabarrus Memorial Hospital

The General Assembly of North Carolina passed legislation in 1935 that enabled Cabarrus County to establish a public hospital. Through the guidance of Mr. Charles A. Cannon, owner of Cannon Mills, the area's largest employer, and

**Exhibit 19/2: Dr. R. S. "Chris" Christy**

Ralph S. "Chris" Christy was born July 26, 1957 at Cabarrus Memorial Hospital. He was one of two children born to Steve and Rachel Christy, hardworking owners of Christy's Nursery in Concord. Chris was educated in the Cabarrus County School system and played football for NorthWest Cabarrus High School. He married Kay Moore, also from Concord, in 1977 and together they embarked on the adventure of Chris becoming a physician. Chris graduated from Davidson College with a BS and the University of North Carolina at Chapel Hill with a medical degree. He then attended a surgical residency program at Memorial Medical Center in Savannah. After his residency, Chris returned to Concord and joined the surgical practice of Flowe, Crooke and Chalfant. Two years later, Chris entered the Cardio-Thoracic and Vascular Fellowship program at Carolinas Medical Center in Charlotte, North Carolina. Under the tutelage of Dr. Frances Robicsek, a well-known and respected pioneer in open-heart surgery, Dr. Christy developed the expert cardiac surgery skills that he wanted to bring to Cabarrus Memorial Hospital.

other community leaders, Cabarrus Memorial Hospital was established and opened for patients on July 26, 1937. The original facility had 50 inpatient beds and a staff of 19 employees. The first addition of 100 beds was completed in 1940. A second addition opened in 1951 and brought the total bed capacity to 339. A construction and renovation program, started in 1969, expanded the total licensed capacity to 350 acute care beds and 30 bassinets. The adult bed capacity was increased to 457 beds through a 1982 construction project that modernized and consolidated many of the hospital's services.

**Duke Medical Center – CMH Affiliation**

CMH had several educational affiliation programs and extensive in-service and continuing education programs, including a unique teaching arrangement with Duke University Medical Center. The formal affiliation with Duke included regular sessions on general and specialty medical topics and patient-directed teaching conferences used as an additional education tool (see Exhibit 19/3). This Duke affiliation had begun to seed many specialists at CMH, including a cardiologist, whose practice was rapidly growing.

CMH was a modern, well-equipped facility. Mr. Cannon, as owner of the large Cannon Mills, had wanted the thousands of Cannon Mills' employees to have the very best health care. His generosity and interest in the hospital had made the Duke affiliation possible. It has been said that he carried the hospital on the mill's books as "plant 13." Certainly his philanthropy had in fact made it a much more advanced medical center than those in other communities the size of Cabarrus County.

**The Cardiac Program at CMH**

For several years, Cabarrus Memorial Hospital had increased the availability of diagnostic and therapeutic cardiovascular services to the community. CMH had as members of the active medical staff one invasive cardiologist and three

### Exhibit 19/3: Cabarrus Memorial Hospital – Duke University Medical Center Education Affiliation

As early as 1966, the United States government launched a series of planning grants for regional medical programs for heart, cancer, and stroke patients. Under this federal proposal Cabarrus Memorial Hospital was to be affiliated with Duke University Medical Center. The Duke–CMH program began in 1968 with Duke faculty members leading training sessions for CMH’s doctors and nurses at Salisbury’s Rowan Technical Institute.

Dr. George Engstrom recalled, “CMH medical staff wanted a more direct educational affiliation with Duke. Dr. Ladd Hamrick, CMH internist, talked with Dr. Eugene Stead at Duke and a stronger affiliation was proposed. After the discussions with Duke, CMH president Wall, Dr. Bob Hammonds, and Dr. Hamrick took the proposal for the expanded educational affiliation proposals to George Batte, chairman of CMH board’s executive committee.” Dr. Engstrom continued, “They presented the program in 15 minutes and Mr. Batte’s response was, ‘Do you think it will work?’ The answer was ‘yes’ and his response was, ‘I think we can get the money . . .’ The critical funding for the program came from The Cannon Foundation through the leadership of Mr. Batte.”

As Dr. Hamrick said, “The affiliation forged in 1972 became ‘a powerhouse.’” The successful Duke–Cabarrus liaison was to become a model program for other health centers, for it brought not only Duke medical specialists to CMH, but also spurred seminars, classes, and studies with other nationally recognized physicians and researchers.

The basic agreement was that fellows “from five of Duke’s divisions of internal medicine began to travel for two 48-hour periods per month to function as educational consultants to the general internists.” Actually, Duke faculty members from other departments began to travel to Cabarrus. The affiliation required that patient contact with Duke physicians be educational for Cabarrus doctors. The Cabarrus activities were to include consultations on educational matters, presenting conferences, reviewing clinical studies, assisting in surgery, and teaching new or different procedures and techniques, among others.

In 1973, Dr. Galen Wagner of Duke’s Cardiology faculty, was appointed Department of Medicine coordinator. In 1974, Dr. Tom Long of Duke’s gastroenterology faculty was named Cabarrus-based coordinator for the Department of Medicine. He ultimately moved to Cabarrus County where he continued his medical practice and affiliation work.

Under the affiliation, visiting medical professors from such highly regarded universities as Harvard, Stanford, Vanderbilt, University of Pittsburgh, and even medical leaders from foreign countries, came to teach and consult at Cabarrus Memorial Hospital.

According to Dr. Long, “By 1992 there had been 14,703 Duke visits to Cabarrus; 55,826 clinical consultations; 7,636 physicians conferences; and 77,792 continuing medical education hours credited to CMH physicians.” He further noted the many benefits to CMH: “Cabarrus doctors received continuing education through Duke conferences; quality physicians were attracted to the community; conferences between Duke and Cabarrus doctors about patients were free; medical expertise and new skills were provided; doctor interest in sophisticated patient care was maintained; and new ‘cutting edge’ technology was developed.”

internists that specialized in treatment of heart diseases. A second invasive cardiologist and another noninvasive cardiologist were expected to join the staff in the next year. Dr. Christy would potentially become the first cardiovascular surgeon on the staff if the board elected to proceed and was successful in receiving the CON.

The scope of the CMH cardiology services included an emergency room staffed and equipped for treatment of cardiac emergencies, an eight-bed coronary care unit, cardiac catheterization, and cardiac rehabilitation. (See Exhibit 19/4 for a

glossary of related medical terms.) In addition, the hospital had capabilities for numerous cardiovascular diagnostic and therapeutic services. Electrodiagnostic services included electrocardiograms, cardiac Doppler studies, echo EKGs, exercise EKG studies, and Holter monitoring. The magnetic resonance imaging (MRI) unit had cardiac imaging capabilities. The nuclear medicine department had equipment for nuclear cardiac and thallium scanning. Temporary and permanent pacemaker insertions, thrombolytic therapy through streptokinase and TPA infusions, and Swan Ganz catheter insertions were examples of the hospital's treatment capabilities.

The new program being considered would include one open heart surgical suite for adult procedures, with the capacity for 400 procedures per year. Angioplasty would be offered in the existing cardiac catheterization laboratory. It was projected that by the end of the third year, three dedicated cardiac surgical ICU beds and seven telemetry beds would be required to support the open heart

#### Exhibit 19/4: Glossary

**Angioplasty** – The insertion of a catheter into the coronary arteries including inflation of a balloon to squeeze coronary artery plaque formation to decrease blockages

**Cardiac Doppler Studies** – An imaging study of the heart using ultrasound that involved measurement of pressures in different chambers of the heart, also used to evaluate the valves of the heart

**Cardiologist** – A physician who attained fellowship training in diseases of the heart and cardiovascular system

**Certificate of Need (CON)** – Authorization by the State of North Carolina, Department of Health and Human Services, Division of Facility Services to proceed with expenditures for new health facility/equipment

**Echocardiography** – Diagnostic heart study using ultrasound technology to demonstrate the physical functioning of the heart

**Electrocardiogram (EKG)** – A trace of the electrical currents that initiated the heartbeat; used to diagnose possible heart disorders

**Epidemiology** – The study of the health and diseases of populations

**Exercise EKG** – An electrocardiogram performed when the patient was exercising, usually on a treadmill

**Holter Monitor** – A diagnostic tool that utilized an extended wearing of an electrocardiogram monitor with which the patient transmitted events telephonically

**Intensive Care Unit (ICU)** – A specialized patient care unit within a hospital utilized by patients who required constant, high level of care

**Invasive Cardiologist** – A cardiologist who performed invasive procedures such as angioplasty

**Noninvasive Cardiologist** – A cardiologist who specialized in medical treatment of heart disease rather than performing invasive procedures

**Nuclear Medicine** – A field of diagnostic imaging that utilized nucleotide particles injected into the patient, then evaluated with a nuclear camera to produce an image

**Swan Ganz Catheter** – A pressure catheter that was inserted into the right side of the heart to measure the performance of the heart

**Telemetry** – The monitoring of the conduction patterns of the heart through radio wave transmission from a remote area to a central location

**Thrombolytic Therapy** – The use of "clot dissolving" drugs to open blocked arteries

surgery program. Existing space would need to be renovated to accommodate the various service components.

The additional cardiac service being considered would provide patients of CMH with a full-service cardiology program consistent with programs available at other community hospitals and with service areas comparable in size to the CMH service area. The programs and large expenditures would assure continuity of care for patients who received initial cardiac care at CMH. If the board decided not to commit to expanding the cardiac program, CMH patients needing open heart surgery or coronary angioplasty would continue to be transferred to another hospital in the region, such as Duke.

## Decision Factors

A major part of the board of trustees' consideration was whether or not there existed a large enough service area to sufficiently support open heart surgery and the expansion of the existing cardiac services. They wanted to know what population threshold would be required. Did they have enough population in the hospital's existing service area? The trustees, in making their expansion decision, looked at a number of factors. They included: (1) the primary and secondary service areas based on historical data; (2) population growth; (3) population epidemiology; (4) availability of existing open heart surgery medical centers; (5) accessibility to cardiac surgery programs; (6) continuity of cardiology care; and (7) rate of demand for open heart surgery. The hospital's planning staff, directed by vice president Glenn Reed, provided data on each of the areas.

### 1. Primary and Secondary Service Areas

To determine the service area for the proposed heart program expansion, the existing service area for the hospital was identified by examining the hospital's patient database and noting the patients' residential addresses, particularly zip codes. Second, they mapped this service area and evaluated the road and transportation network, travel times, and other hospitals in the region. (See Exhibits 19/5 and 19/6.)

In board discussions, president Wall advised the trustees that hospital planners had looked at patient origins for an existing tertiary program – radiation oncology. This study showed that its major source of patients had been Concord and Kannapolis, with the remainder widely spread over 23 other communities. Mr. Wall asked, “Does this give us reason to believe we can expect referrals to CMH for open heart surgery to come from a wider service area than the hospital average?” (See Exhibits 19/7 and 19/8.)

To further look at the question of patient origins, CMH studied zip code origins for its cardiac catheterization patients. Again, a large number of patients had Concord and Kannapolis zip codes and generally reflected patient origins

Exhibit 19/5 Cabarrus Memorial Hospital Patient Origin

County	% Patient Origin
Cabarrus	80.1
Rowan	9.4
Stanly	7.2
Other	3.3
<b>TOTAL</b>	<b>100.0</b>

**Note:** "Other" includes Union, Mecklenburg, Davie, Davidson, Iredell, and Lincoln counties.

**Source:** Hospital Patient Origin Report (North Carolina Medical Database Commission).

Exhibit 19/6: Map of CMH Service Area

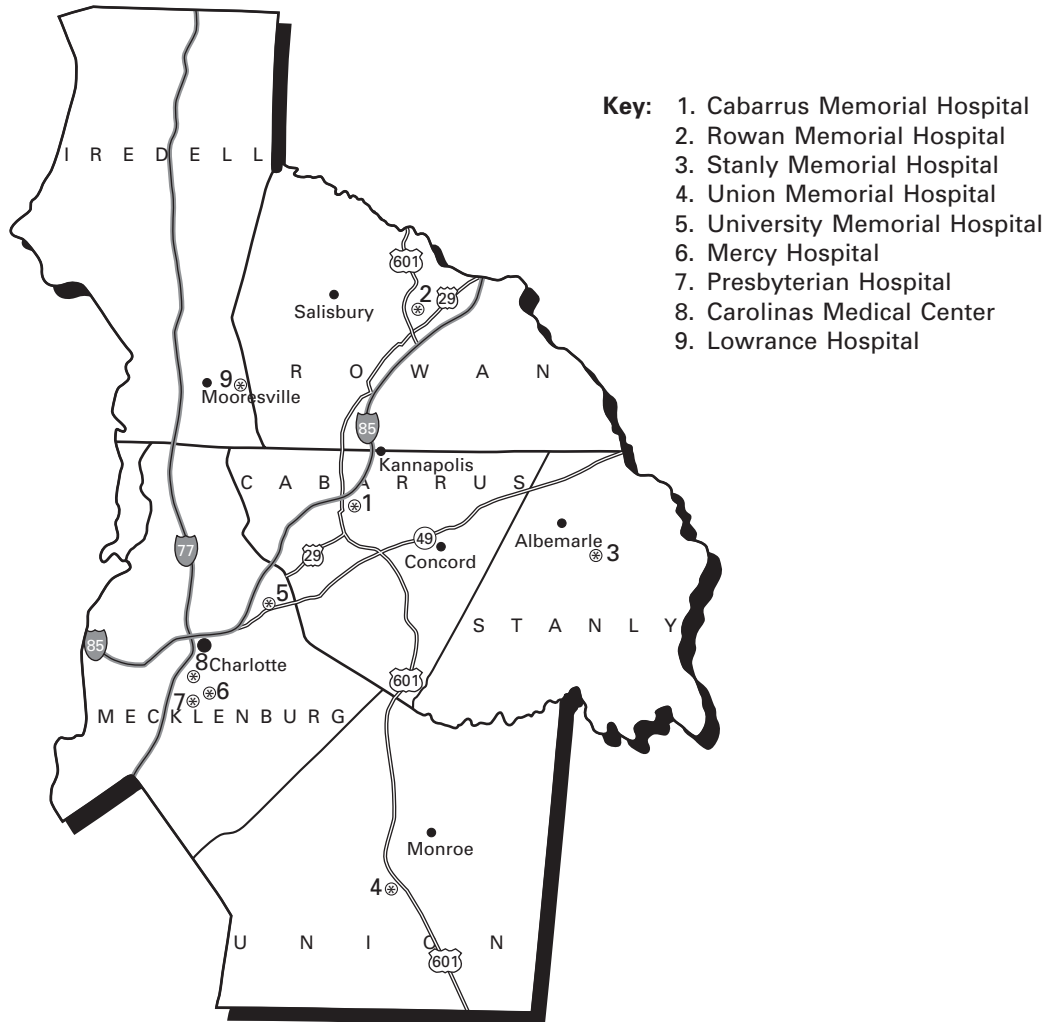


Exhibit 19/7: CMH Patient Origin (%) Previous Year

County	Radiation Oncology	Heart Catheterization
Cabarrus	57.4	59.3
Rowan	16.0	30.4
Stanly	19.7	7.3
Other	6.9	3.0
<b>TOTAL</b>	<b>100.0</b>	<b>100.0</b>

Exhibit 19/8: Proposed CMH Open Heart Service Population

County	Population	Market
Cabarrus	69,255	70.0
Rowan	40,813	36.9
Stanly	7,661	14.8
Union	1,516	1.8
Mecklenburg	1,534	0.3
Iredell	651	0.7

similar to those of the radiation oncology program. Again the board wondered if this indicated the open heart program would draw patients from a service area that would include parts or all of six counties: Cabarrus, Rowan, Stanly, Union, Iredell, and Mecklenburg. The outside boundaries of these counties are within 60 miles of Concord, the site of CMH.

Mr. Wall questioned, "What would further analysis of the historical data lead planners to conclude about the program's primary service area? Could it serve as much as 70 percent of Cabarrus and a third of Rowan County? Would the secondary service area include parts of Stanly, Union, Mecklenburg, and Iredell Counties? What percentage of the population in those counties lived within 40 miles of CMH? Would this comprise a secondary service area large enough?"

A major demographic factor driving the perceived demand for open heart surgery at CMH was population growth. According to the Government and Business Services Branch of the State Library of North Carolina, total population for these six counties was expected to increase 18.3 percent over the next ten years. Therefore, even if open heart surgery usage rates remained constant each year, counties in this service area could have expected at least 18 percent more open heart surgery cases over the ten year period. (See Exhibit 19/9.)

## 2. Growth of At-Risk Population

A second major demographic factor driving the demand for open heart surgery was growth of the at-risk population. According to projections from the recent census, the number of people aged 45 to 64, the population most likely to



Exhibit 19/9: Ten-Year Projection: Service Area Population Growth

County	Year 1	Year 2	Change (%)
Cabarrus	98,935	112,802	14.0
Rowan	110,605	122,268	10.5
Stanly	51,765	55,185	6.6
Union	84,211	99,644	18.3
Mecklenburg	511,433	630,005	23.2
Iredell	92,931	103,820	11.7
<b>TOTAL</b>	<b>949,880</b>	<b>1,123,724</b>	<b>18.3</b>

Exhibit 19/10: Growth of At-Risk Population: Aged 45 to 64

	Previous Year	10 years	Change (%)
Cabarrus	20,419	26,797	31.2
Rowan	22,729	28,348	24.7
Stanly	10,691	12,761	19.4
Union	16,458	23,290	41.5
Mecklenburg	91,747	135,154	47.3
Iredell	19,950	25,504	27.8
<b>TOTAL</b>	<b>181,994</b>	<b>251,854</b>	<b>38.4</b>

suffer occlusive coronary artery disease, was predicted to grow by 38.3 percent in the next ten years, a rate more than twice that of the general population. (See Exhibit 19/10.)

### 3. Population Epidemiology

Based on the latest available data, all the proposed service area counties, with the exception of Union and Mecklenburg, had evidence of a heart disease mortality rate higher than that of the state as a whole (see Exhibit 19/11). According to the data that had been recently reported by the North Carolina Database Commission, open heart surgery usage rates in Cabarrus County were higher than that of the entire state. The previous year North Carolina had experienced a procedure rate of 1.39 per 1,000 population.

### 4. Availability of Existing Services for Patients in CMH Service Area

North Carolina had 16 open heart surgery programs located in 11 counties. None of these programs was in the proposed CMH primary service area. Those closest to the CMH service area were located in Charlotte. They were Mercy

## Exhibit 19/11: Heart Disease Mortality Rates: Two Years Previous

County	Death Rate/1,000 Population
Rowan	375.8
Cabarrus	320.7
Stanly	326.0
Union	246.5
Mecklenburg	225.0
Iredell	325.2
North Carolina	288.6

Hospital, Presbyterian Hospital, and Carolinas Medical Center, all located about 25 miles from CMH.

Only one of the state's 16 programs had claimed Cabarrus County in its primary service area. That claim had been made eight years earlier by Carolinas Medical Center when it opened its service. Since that time, Carolinas Medical Center had drawn only 5.6 percent of its patients from Cabarrus County, suggesting to the CMH board that Cabarrus patient volumes at Carolinas Medical Center did not warrant being included in Carolinas Medical Center's primary service area.

The three Charlotte programs had reported previous year operating room utilization for cardiac surgery as follows: Mercy Hospital, 36.3 percent; Presbyterian Hospital, 78.5 percent; and Carolinas Medical Center, 84.5 percent. Procedure volume had increased yearly at both Presbyterian and Carolinas Medical Center. Presbyterian, with its two open heart surgery suites operating at 78.5 percent of nominal capacity, apparently needed its operating rooms.

Carolinas Medical Center, with its six rooms classified as combined "open heart surgery/thoracic suites," had submitted a CON application for an additional open heart surgery room. However, earlier in the year, it had subsequently withdrawn its application for a CON. For the Department of Facilities Services to award a CON, the existing utilization rate for the cardiac surgery suite was required to be at 80 percent or higher.

Procedure volume at Mercy Hospital had not followed a year-to-year growth pattern. Room utilization had been well under 50 percent each year for the previous ten years. Moreover, Mercy did not appear to reach the proposed CMH open heart service area. In the previous year only 9 percent of the 174 people from Cabarrus County, and none from Rowan County, had received open heart surgery at Mercy. The pattern indicated a perceived or real barrier to access at Mercy by people in the CMH area counties. Generally, Mercy appeared to serve a population that was more south and east of Charlotte.

## 5. Accessibility to Cardiac Surgery Programs

The existing open heart surgery programs in Charlotte, Winston-Salem, and Greensboro were 25 to 60 miles from the service population. Although this seemed

relatively close for a one-time procedure, it was inconvenient for persons traveling repeatedly for diagnosis, family support, and follow-up care.

“Driving to Charlotte is becoming more and more of a problem,” commented a board member. “I am often asked why we can’t provide more care in Cabarrus County.”

Heart patients from the CMH area had to travel to existing services along combinations of country roads and heavily congested traffic arteries. Travel time was from one to two hours. Congestion and delay were expected to further increase the time as the Charlotte metropolitan area continued to grow 3 percent per year, a rate triple that of the state.

Moreover, to many residents of the CMH service area, Charlotte was a big city and confusing for drivers from out of town. Its perceived distance was farther than its actual distance because of the delays in city travel. This had been noted with the opening of radiation oncology at CMH. Patient volumes were much higher than expected. Surveys of patients and families cited distance, lack of transportation, and fear of the city as reasons for not having obtained radiation treatments at distant sites that had been recommended by their physicians.

As part of the affiliation between Duke University Medical Center and Cabarrus Memorial hospital, two Duke open heart surgeons, Jim Lowe, MD, and Peter Smith, MD, participated in monthly conferences at CMH and consulted on patient candidates for open heart surgery. Those patient consultations became referrals to Duke when surgery was indicated. The medical staff suggested that the patient trip of 120 miles to Duke would be eliminated if open heart surgery of equal quality could be performed at CMH, as was being proposed. However, it was expected that a few cases needing specialized care would still be referred to Duke (or other medical centers) after the CMH program was opened. Approximately 40 percent of CMH cardiac catheterization referrals were going to Duke.

## 6. Continuity of Cardiology Care

Continuity of care for the cardiology patient was critical. Quality was enhanced when patient transfers were minimized, medical and nursing staff were constant, and staff and technology for diagnostic and therapeutic interventions were maintained. To obtain the desired level of care, CMH patients were being transferred to other facilities when cardiac surgery was indicated. This transfer disrupted continuity.

According to the North Carolina Database Commission, for the previous year, 174 Cabarrus County and 118 Rowan County residents received open heart surgery in one of the following hospitals: Duke University Medical Center, Presbyterian Hospital, Carolinas Medical Center, NC Baptist Hospitals, and a few others. For many of those 292 patients, a CMH-based open heart surgery service would have avoided transfers and ensured continuity of cardiology care. (See Exhibit 19/12.)

Exhibit 19/12: Where Cabarrus-Rowan Residents Received Open Heart Surgery: Previous Year

Destination Hospital	Cabarrus Residents	Rowan Residents	Total
Duke University Medical Center	28	16	44
Presbyterian Hospital	68	25	93
Mercy Hospital	9	0	9
Carolinas Medical Center	66	44	110
NC Baptist Hospitals	0	28	28
Unknown	3	5	8
<b>TOTAL</b>	<b>174</b>	<b>118</b>	<b>292</b>

The scope and comprehensiveness of cardiology services at CMH had expanded yearly. Two years previously, CMH had initiated its cardiac catheterization program. In the past year, the CMH program referred 117 patients to open heart surgery and 82 to angioplasty. In addition, Rowan Memorial Hospital, located in Salisbury (a half-hour's drive to the north), had opened a cardiac catheterization service and could have been considered another referral source for the proposed CMH program. The next logical step in the continuity of cardiac care was argued to be the open heart surgery program. Availability of open heart surgery and angioplasty would have provided invasive options for treatment of coronary artery disease and reduced outside referrals to a small percentage of patients. A physician board member commented, "It is time this becomes a full-service hospital. Cabarrus County deserves it and cardiac surgery will be just the beginning."

## 7. Growth in Demand

Over the previous ten years, North Carolina open heart surgery volume had increased an average of 26 percent a year. Moreover, statistical forecasts had predicted continued increases in use rate per 1,000 population for the next five years. The rate of 0.43 open heart surgeries per 1,000 population ten years ago had increased to 1.39 per 1,000. Cardiac catheterization was the major diagnostic procedure that resulted in a recommendation for open heart surgery. Changes in cardiac catheterization volumes were, therefore, important to predict open heart demand at a particular location. North Carolina cardiac catheterization volume had grown at an average annual rate of 16.2 percent over the prior nine years. Although the rate of growth was slowing, anecdotal projections and trended forecasts predicted continued growth for the next five years.

The state's cardiac catheterization to open heart procedure ratio had also increased annually. Over the past year, the ratio had increased to 4.54 adult catheterizations for each open heart procedure. Similar to the annual growth rate for open heart surgery procedures, this ratio was also growing.

Exhibit 19/13: CMH Open Heart Staffing Plan

	Year 1 53 Procedures	Year 2 106 Procedures	Year 3 211 Procedures
<b>Operating Room</b>			
Nurse Manager	1.00	1.00	1.00
RN	2.50	3.50	6.00
OR Tech	2.00	2.00	3.00
OR Aide/Transport	0.50	0.50	1.00
CRNA	1.00	1.50	3.00
Anesthesia Tech	0.50	0.50	1.00
Respiratory Therapist	1.00	1.50	3.00
<b>Subtotal</b>	<u>8.50</u>	<u>10.50</u>	<u>18.00</u>
<b>Surgery/Recovery</b>			
Nurse Manager	0.50	0.50	0.50
RN	4.00	4.00	7.00
Ward Secretary	0.50	0.50	0.50
<b>Subtotal</b>	<u>5.00</u>	<u>5.00</u>	<u>8.00</u>
<b>Telemetry Unit</b>			
Nurse Manager	0.50	0.50	0.50
RN	3.00	4.00	7.00
Monitor Tech	3.00	3.00	3.00
Ward Secretary	0.50	0.50	0.50
<b>Subtotal</b>	<u>7.00</u>	<u>8.00</u>	<u>11.00</u>
Nurse Educator	0.50	0.50	0.50
Angioplasty RN	1.00	1.00	1.00
Angioplasty Tech	1.00	1.00	1.00
<b>Subtotal</b>	<u>2.50</u>	<u>2.50</u>	<u>2.50</u>
<b>TOTAL</b>	<b>23.00</b>	<b>26.00</b>	<b>39.50</b>

**Financial Considerations**

In addition to market demand and trend analysis, the board was faced with the financial aspect of the decision. President Wall asked the CFO to present the financial data. An open heart surgery program would incur a number of expenses. In addition to Dr. Christy and his surgical team, there would be a need for 23 additional employees in year 1, growing to 39 in year 3 (see Exhibit 19/13).

It was projected there would be a need for ten beds licensed as acute care beds, not then being utilized, to become operational as coronary care beds. Additionally there would be a need for three intensive care unit (ICU) beds, and the one new open heart operating suite.

A total of 5,811 sq. ft. of hospital space would require renovation. Projected capital costs, including construction and equipment, were \$3,273,180. The hospital had sufficient reserve funds to underwrite the renovation project and the additional equipment without borrowing money.

## Exhibit 19/14: Open Heart Program Costs

	Year 1	Year 2	Year 3
<b>Direct Costs</b>			
Clinical Personnel	\$711,793	\$910,878	\$1,695,457
Administrative Personnel	136,565	147,490	159,289
Support Personnel	52,764	56,985	61,544
Personnel Taxes/Benefits	180,224	223,071	383,258
Medical Supplies	315,947	746,439	1,749,771
Other Supplies	15,950	68,980	75,445
Depreciation, Equipment	243,376	243,376	243,376
Plant Operations and Maintenance	48,087	52,415	57,132
Other Associated Expenses (Angioplasty)	449,965	534,033	615,723
Other Associated Expenses	99,543	99,212	99,212
Contracted Services	110,000	134,860	298,185
<b>Total Direct Costs</b>	<b>2,364,214</b>	<b>3,217,739</b>	<b>5,438,392</b>
<b>Indirect Costs</b>			
General and Administrative	255,966	302,376	416,862
Other Overhead	73,200	88,630	175,473
Depreciation, Building	43,525	43,525	43,525
Other Property, Ownership and Use Expense	2,036	2,402	2,835
Consultant Services	122,740	153,399	154,699
Rowan Community Outreach	6,183	6,739	7,346
<b>Total Indirect Costs</b>	<b>503,650</b>	<b>597,071</b>	<b>800,740</b>
<b>Total Costs</b>	<b>\$2,867,864</b>	<b>\$3,814,810</b>	<b>\$6,239,132</b>

Direct costs for the open heart program were projected to be \$2,364,214 in year 1, \$3,217,739 in year 2, and \$5,438,392 in year 3 (see Exhibit 19/14). Average length of stay per open heart patient was projected to be nine days.

Projected average open heart surgery fees per case were \$13,000 without catheterization and \$15,000 with catheterization. These estimates represented full, nonprofessional fees and the surgeon's fee, as well as other professional components such as anesthesia, pathology, and radiology.

Average room and board charges were estimated at \$826 per day. All ancillaries were projected at \$3,725 per day. Total average projected charge for each open heart surgery procedure was \$40,957.

## The Meeting Draws to a Close

President Wall and various members of the hospital staff had presented the findings to the trustees. The data and information had been collected, tabulated, and analyzed. It was time to make a decision. Should CMH go ahead with an application for a certificate of need for an open heart surgery program? As they sat there waiting for someone to speak, Mrs. West asked, "Mr. Batte, what do you think we should do? Do we go for the CON?"