Market Demand Analysis for a New Dialysis Clinic: Monroe County Hospital, Monroe, KY.

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Objectives

Monroe County Hospital administration has been charged by the hospital staff and other community members to evaluate the possibility of establishing a dialysis unit within the hospital. Monroe County Hospital would like to estimate the demand for dialysis services and determine the feasibility of integrating a dialysis unit within its current line of medical services. The objective of this study is to estimate the demand for dialysis services for Monroe County Hospital.

The study is structured to provide information about diabetes, the leading disease leading to dialysis treatment, dialysis treatment, Monroe County health status and the demand methods and results. These results will assist Monroe County Hospital in undertaking a full feasibility or financial analysis regarding investments in a new dialysis clinic.

Renal Function

The Kidneys are paired bean-shaped organs located at the back of the upper abdomen on either side of the spinal column. The Kidneys maintain proper fluid homeostasis within the body by filtering and eliminating excess fluid and metabolic waste material from the blood. This filtrated waste results in the formation of urine and the excretion of metabolic waste byproducts. Besides playing a vital role in excretory and regulatory processes, the kidneys are responsible for numerous endocrine functions. Renal production and regulation of hormones results in direct and indirect control of body functions such as blood pressure, renal blood flow, red cell simulation, and bone formation (Bishop, et al.,1992; Mayo 2001). When the kidneys stop functioning properly, there is an increase in metabolic waste byproducts within the body. This build up of waste and water results in extracellular fluid volume, which leads to peripheral edema, hypertension, and chronic heart failure.

Acute renal failure results from sudden toxic insult or injury to the kidneys causing a sharp decline in renal function. Unlike chronic renal failure, acute failure may be reversible, thus restoring normal renal capacity. Chronic Renal failure results in irreversible renal damage. "Chronic renal failure is a clinical syndrome that occurs when there is a gradual decline in renal function overtime (Bishop, et al.,1992)." Unfortunately, symptoms of chronic renal disease are not apparent until kidney function is at or below twenty-five percent of normal capacity. Chronic renal disease is a slow insidious process that ultimately results in end-stage renal disease (ESRD). ESRD is marked by less than ten percent of normal renal capacity (Mayo Foundation, 2001). Patients with ESRD must receive dialysis on a regular basis to remove metabolic waste from circulation to sustain life.

Dialysis

Dialysis may be performed by either hemodialysis or peritoneal dialysis. The most common procedure is hemodialysis, which filters the blood through a dialysis machine, and ultimately through a membrane filter that removes metabolic wastes and extracellular fluids. Hemodialysis has been an effective treatment for renal failure and ESRD since the 1960s. Patients on hemodialysis must receive dialysis treatments two or three times per week with each treatment lasting up to 4-6 hours (NIH Publication No. 01-4666, 2001).

Peritoneal dialysis uses a catheter to fill the abdomen with a dialysis solution. Waste byproducts and bodily fluids diffuse from the blood into the dialysis solution and through the peritoneum membrane of the abdominal cavity. The metabolic waste byproducts and fluids are

excreted from the body when the dialysis solution is drained. Peritoneal dialysis gives ESRD patients some freedom by allowing patients to treat themselves at home (NIH Publication No. 01-4688, 2001). Although, peritoneal dialysis requires the patient to have good eyesight and motor skills. The choice in treatment is dependent upon the patient's preference and health status. The majority of ESRD patients use hemodialysis as the method of choice. Regardless of the type of procedure, ESRD patients must depend on dialysis to remove excess fluid and metabolic waste from the blood in order to sustain life.

Diabetes Mellitus

More than 16 million Americans suffer from diabetes and the medical consequences of diabetes with approximately 5 million people being undiagnosed with diabetes (HHS, 2001). According to the Centers for Disease Control (CDC), insulin-dependent diabetes mellitus (type 1diabetes) is the leading cause of chronic renal failure. Approximately forty percent of type 1 patients will develop progressive deterioration of renal function that results in ESRD. Consequently, diabetes is a major cause of death for ESRD patients. According to the Mayo Clinic, "approximately five to ten percent of patients who are diagnosed with non-insulin-dependent diabetes mellitus (type 2 diabetes) for at least twenty years will develop kidney disease." Because of the high prevalence rate of non-insulin–dependent diabetic patients, type 2 diabetes accounts for a large majority of ESRD patients.

Monroe County

In 1999, Kentucky ranked eighth in the US in terms of diabetes prevalence with approximately 6.1 percent of the adult population diagnosed with diabetes. Diabetes is a leading cause of chronic renal failure, End-Stage Renal Disease (ESRD), non-traumatic amputations, and death in Kentucky. According to the Kentucky Department of Public Health, fifty percent of Kentucky's adult population is at risk for diabetes due to aging, obesity, and sedentary lifestyles. In Monroe County, 164 Medicare diabetic patients being tracked by Health Care Excel, a Medicare Peer Review Organization for Kentucky.

Citizens of Monroe County who are diagnosed with ESRD and currently on dialysis must travel outside Monroe County to receive this life sustaining procedure. These patients are commuting approximately 60 miles to either Bowling Green or Glasgow, Kentucky for dialysis treatment and bypassing Monroe County Hospital. Through a telephone survey, it was determined that approximately twelve patients from Monroe County are receiving dialysis as treatment for ESRD. Dialysis patients from surrounding Counties such as Allen, Cumberland, Clinton, and Wayne must also commute to Bowling Green, Glasgow, or Somerset, Kentucky for dialysis services since the procedure is not available within those counties.

Methods of Analysis and Results

In order to assess the demand for a new hospital-based dialysis clinic, a number of factors must be considered. The first question relates to the number of people in the community who currently have a disease requiring dialysis related treatment. These diseases include type 1 diabetes, type 2 diabetes, hypertension and other forms of kidney disease. The second question is an assessment of current treatment locations and travel distance relative to the new site. With this

information, the potential demand for a new dialysis clinic can be estimated. It should be noted that potential market demand may differ from actual market demand due to unforeseen effects such as advertising, competitive strategy and patient preferences.

The incidence and prevalence of diabetes in a particular county is difficult to assess. Partly, this is because people may be willing to travel long distances to receive care. Therefore, at the state level, a relatively good estimate of dialysis patients is possible; it is often difficult to break these numbers up into county or regional estimates. Two methods were used to estimate the potential number of dialysis related patients in Monroe County. Each method has strengths and weaknesses that would be recommended under various assumptions. Our approach is to create estimates using both methods in order to determine the likely range of dialysis patients. This estimated demand range can be used in conjunction with other information to undertake a full feasibility or financial study.

The two methods used in this study are: top-down method and survey method. The methods utilized here are partly based on a number of sources of information: The Renal Network, American Diabetes Association, Kentucky Department of Public Health, National Institute for Health and the Centers for Disease Control along with local information.

The first method is called the top-down method. This method uses national and state data on ESRD incidence and prevalence to estimate the potential number of ESRD patients in a particular community or county. The assumption is that the county generally follows incidence and prevalence patterns of the country and state. If there are major differences, the estimate will be off due to an inaccurate top-down procedure. This method is typically useful under conditions where local data is fragmentary or missing.

The following chart provides information on the relationship between disease type, end stage renal disease and dialysis. Approximately, 40 percent of all ESRD patients are diagnosed with type 1diabetes. Type 2 diabetes accounts for 5-10 percent of ESRD patients. Overall, 4 people out of 10,000 people have been diagnosed with ESRD. This figure translates into an estimated 100,00 ESRD patients in the US. For Kentucky, there are an estimated 3,201 ESRD patients. This translates into a prevalence rate of 8 per 10,000 people in Kentucky.

The information collected in the above paragraph must now be used to construct a Monroe County ESRD estimate. The number of ESRD patients in Monroe County, unlike the US or Kentucky figures, does not exist as such. Therefore, the national and state estimates will be used to estimate ESRD patients in Monroe County. In this case, the state data will be used as it is more likely to be relevant to Monroe County's situation. However, the same assumption applies: Monroe County must mirror the state for this method to be appropriate. Monroe County's 2000 population was 11,756 based on the most recent Census data. Using the KY figures, there are 11 ESRD patients in Monroe County.

The second method is based on travel distance and transportation methods. A survey of local transit service and nearby dialysis clinics was performed. The objective of the survey was to determine the number of patients traveling to out-of-county clinics either by themselves or via the bus system. The goals of these two related but separate approaches was to cross-check each other for consistency. The survey methodology is appropriate to fill in the gaps of missing secondary data from state health departments or other agencies. Its weakness is the need to rely on survey participants to be both willing and able to answer questions regarding their patient population.

There were three dialysis clinics contacted within one to one and half hour driving distance from Monroe County. These clinics were asked via a telephone survey to furnish information on the geographic residence of patients utilizing their service. Based on their most recent data, only

one of the three clinics received patients from Monroe County. The other two clinics did not have Monroe County patients. The clinic receiving Monroe county patients had a total of 12 to 15 from Monroe County.

A second phone survey was conducted of a transportation service for dialysis patients. Again, the service was asked about the geographic residence of patients that it was transporting. The service transports 5 patients from Monroe County to dialysis centers in Glasgow or Bowling Green.

Based on these two forms of analysis (top-down and survey), we can begin to assess the range of demand for a dialysis clinic in Monroe County. The demand range for dialysis patients in Monroe County appears to be on the order of 12 to 15 patients. The transportation service likely underestimates the number of patients who are able to find their own transportation to a dialysis clinic. These numbers also appear to be line with national and state estimates based on the prevalence and incidence of dialysis related patients.

Table 1: Monroe County Demand for Dialysis Treatment

	Estimated Potential Market Demand	Average Weekly Visits	Total Annual Patient Visits
Method 1 (Top-Down)	11	3	1,716
Method 2 (Survey)	12-15	3	1,872 – 2,340

Table one presents the estimates from the two methods, combined with an estimate of weekly and total annual visits to the clinic.

Summary

The objective of this study was to determine the potential number of dialysis patients in Monroe County. Based on two methodologies, the estimate range appears to be 12 to 15 patients. This estimate was derived from a top-down procedure and a survey procedure. These numbers appear to provide relatively consistent results. The number of dialysis patients will likely increase over time based on recent trends during the last ten years.

A number of assumptions underlie this analysis that need to be highlighted. The market demand analysis presumes that the hospital actual market share is equal to the potential demand (12-15). This assumption does not take into advertising, competitive response and other factors that will determine the difference between actual market share and potential market demand. Further, this analysis does not take into account the possibility of other county patients traveling to Monroe County to use the newly created dialysis clinic. This would require a more extensive survey of surrounding communities.

References

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US Department of Health and Human Services

Community Health Status Reports; Health Resources and Services Administration.

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