Poor health puts a significant burden not only on the patient but also on the family and society at large. Diseases can deplete a patient of finances as well as impose stress on healthcare services and work productivity. In cases of chronic disease, the expenditure can be huge and cannot be sustained for a long period of time.

According to a report published by the World Health Organization (WHO) in 2008, the global burden of disease is now shifting from infectious diseases to the non-communicable diseases, with chronic conditions such as heart disease, stroke, chronic respiratory diseases, and diabetes, contributing to the increasing mortality rate. The WHO predicts that chronic diseases will account for approximately 65% of all deaths (over 47 million deaths annually) by 2030.

Figure 1: Projected deaths by cause for high-, middle-, and low-income countries.

The effective management of chronic diseases helps control the disease, slows down its progress, and prevents complications, thereby mitigating the increasing cost of the complex care of chronic diseases. The efforts being made in the management of chronic diseases are seeing a growing emphasis across the globe. To align its responses to the growing challenge of chronic diseases, on 14 December 2010 the U.S. Department of Health and Human Services (HHS) issued its new “Strategic Framework on Multiple Chronic Conditions,” an innovative, private-public sector collaboration. The health reform law (the Patient Protection and Affordable Care Act) provides HHS with new opportunities for addressing the prevention of chronic conditions, as well as enhancing the clinical engagement and improving the health status of individuals with multiple chronic conditions. This law will facilitate these advances through the development and testing of new approaches to coordinate care management, patient-centered benefits, and quality measures.

Undoubtedly, a comprehensive management of disease helps manage the diverse aspects of patient care and aids in the effective treatment of disease, significantly increasing the chances of cure.

This article is an effort by the author to relate the application of project management principles to patient care when it is treated like a project. The article helps us understand the relevance and benefits of such an exercise, which can lead to enhanced quality of care and patient satisfaction.

Diabetes is not an unknown condition anymore and is considered to be one of the leading causes of chronic disease burden on society. Diabetes has spread from epidemic to pandemic proportions, demonstrating an alarming rise in its global prevalence. Diabetes continues to be the leading cause of kidney failure, non-traumatic lower-extremity amputations, and blindness among adults, ages 20 through 74. The high incidence of diabetes has been linked to many factors: a few important factors are sedentary lifestyle, consumption of foods rich in calories and fats, genetic predisposition, obesity,

Table 1: Leading causes of death—2004 and 2030 compared.

<table>
<thead>
<tr>
<th>2004</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease or injury</td>
<td>Deaths (%)</td>
</tr>
<tr>
<td>Ischaemic heart disease</td>
<td>12.2</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>9.7</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>7.0</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>5.1</td>
</tr>
<tr>
<td>Diarrhoeal diseases</td>
<td>3.6</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>3.5</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>2.5</td>
</tr>
<tr>
<td>Cerebrovascular diseases</td>
<td>2.3</td>
</tr>
<tr>
<td>Road traffic accidents</td>
<td>2.2</td>
</tr>
<tr>
<td>Prematurity and low birth weight</td>
<td>2.0</td>
</tr>
<tr>
<td>Neonatal infections and other*</td>
<td>1.9</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1.9</td>
</tr>
<tr>
<td>Malaria</td>
<td>1.7</td>
</tr>
<tr>
<td>Hypertensive heart disease</td>
<td>1.7</td>
</tr>
<tr>
<td>Birth asphyxia and birth trauma</td>
<td>1.5</td>
</tr>
<tr>
<td>Self-inflicted injuries</td>
<td>1.4</td>
</tr>
<tr>
<td>Stomach cancer</td>
<td>1.4</td>
</tr>
<tr>
<td>Cirrhosis of the liver</td>
<td>1.3</td>
</tr>
<tr>
<td>Nephritis and nephrosis</td>
<td>1.3</td>
</tr>
<tr>
<td>Colon and rectum cancers</td>
<td>1.1</td>
</tr>
<tr>
<td>Violence</td>
<td>1.0</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>0.9</td>
</tr>
<tr>
<td>Oesophagus cancer</td>
<td>0.9</td>
</tr>
<tr>
<td>Alzheimer and other dementias</td>
<td>0.8</td>
</tr>
<tr>
<td>Malaria</td>
<td></td>
</tr>
</tbody>
</table>

* Comprises severe neonatal infections and other, noninfectious causes arising in the perinatal period.

and high stress levels. If not controlled adequately, diabetes can lead to permanent disability and a poor quality of life. The following narrative is a representative example of a newly diagnosed diabetic patient and his diabetes management.

Tom, a 42-year-old neighbor of mine, has seemed a little concerned about his health lately. We live in the same locality and have been neighbors for a couple of decades now. Tom’s wife, Emily, is a hospital nurse and his two sons, John and Fred, are in high school. Tom works for a law firm and, like most working people, has erratic work hours and his work schedule entails late nights and frequent travel. He is a smoker and social drinker. Sometimes, I see Tom and Emily with tools in their garden, but such a sight is rare, and Tom doesn’t regularly attend our community sports events either. At times, I hear Emily complaining about his unhealthy habits, so we decided to corner Tom one day and talk to him about having a more organized life, adding some exercise, and lowering his stress levels.

Things haven’t been the same with Tom and ever since noticing the increased appetite, thirst, and the wound on his shin that wouldn’t heal, he has been concerned. He visited his physician, Dr. Allen, who ordered a battery of blood tests to diagnose the problem. The worst of Tom’s fears turned out to be true when he was diagnosed with diabetes mellitus! Tom lapsed into a state of depression. Dr. Allen preformed a detailed assessment of Tom’s health and then discussed the risks, complications, treatment plan, and management of the condition with him. He informed Tom of the complications that diabetes can cause to his nerves, blood vessels, and eyes. Dr. Allen prepared a medical record for Tom and advised him to make a note of the details of subsequent visits in that record. This would ensure that all his reports would be updated and maintained in one place, whenever anyone needed to see them. Dr. Allen prescribed a couple of anti-diabetic medications to Tom and recommended a comprehensive care management plan for the next six months, after which time he would be reassessed.

The next few months were hectic for Tom and his family. Dr. Allen referred Tom to a specialist to assess the condition and its complications. Dr. Allen scheduled Tom’s appointments with various physicians for additional tests and checkups. Emily had to talk to Tom’s health insurance company to check for the necessary coverage and benefits for the costs that he would incur. Dr. Allen planned a counseling session with a psychologist to educate Tom and his family about the condition and ways to avoid complications that may arise. He advised Emily to make modifications in the family’s diet that would suit Tom. A physical therapist introduced an exercise routine to help Tom get started on some form of exercise regimen. Dr. Allen also planned counseling for smoking cessation for Tom.

In order to make suitable changes to accommodate Tom’s new disease management regimen, Emily informed his law firm manager of his diabetes. This would mean changes in his work schedule, responsibilities, and less frequent travel.

Dr. Allen suggested to Tom that he meet a couple of his patients also living with diabetes. Emily arranged discussions with these acquaintances and Tom had regular discussions on diabetes care management with them. Such interactive sessions seemed to help Tom immensely as he discussed his condition with those in the same situation.

Thus, the management of Tom’s diabetes began. We observed the family making all efforts to help Tom come to terms with the condition that psychologically devastated him. Dr. Allen and Emily were the cornerstones of this care management plan as they orchestrated the interventions so efficiently, and Fred and John were also very supportive. It has been six months since Tom was first diagnosed with diabetes, and the couple has just returned from a visit to Dr. Allen. I see smiles on their faces. Emily and Tom are beaming with happiness. Tom’s blood sugar levels and other blood parameters are lower than what they were originally and his shin wound has healed too. Tom seems much more motivated to manage his condition, and is already talking about increasing his exercise and giving up smoking completely. He plans to share his experiences with others with similar problems and wants to set up a support group.

Now, isn’t this an ideal management plan for Tom’s condition?

Managing a disease is easier said than done, with multiple key players other than just the patient and the physician. Managing the disease becomes increasingly difficult as the complexity of the medical condition increases. A good and coordinated management of the patient and his or her disease helps in providing timely care and successful treatment. Patient care encompasses all efforts and activities toward a holistic management of the patient and the disease by the various stakeholders involved in the care. Tom’s story is representative of the complexity that entails managing a disease that has multiple ramifications. A coordinated care plan for chronic conditions such as diabetes can help control the condition, thereby ensuring a good quality of life for the patient.

**The Relevance of Project Management in Healthcare**

The principles of project management, as defined in *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* prove beneficial, irrespective of the domain of application (information technology, manufacturing, construction, energy, and so forth). This article is an effort...
by the author to demonstrate how the universal principles of project management from the PMBOK® Guide add value to healthcare projects and patient care in particular.

Based on the involvement of the physician and the key care coordinators, healthcare projects can be of two types: “physician-independent” and “physician-patient centric.” Physician-independent projects are those in which the physician is just one of the stakeholders. Examples of such projects are: Starting a new diagnostic laboratory for a hospital, a hospital funding a research program for communicable diseases and their patterns, a hospital authorizing a project for quality accreditation (e.g., Joint Commission accreditation in the United States) and so forth. These projects are generally handled like those in a non-healthcare domain.

Physician-patient centric projects involve managing patients and their conditions as projects.

This article is a comparative study that examines the details of the patient’s disease management activities and understanding its relevance to patient management when treated like a project. The article maps the various stages in a patient's life and his or her disease, in conjunction with project management concepts as defined in the PMBOK® Guide and brings out the differences and similarities between the two. Note that this comparison is only an indicative list of the various activities that are performed during the management of disease and is not exhaustive.

**Figure 2: The key concepts of project management.**

**Project and Project Management**
As we know, the interplay of the key concepts of project management such as planning, organizing, and managing can bring about successful completion of specific project goals and objectives.

Identifying how a project is authorized, planned, and executed; addressing the various needs and concerns of stakeholders; and balancing the constraints of scope, time, quality, budget, resources, and risk as they relate to a patient’s care process are interesting and helpful in conceptualizing the entire patient care as a project.

The PMBOK® Guide has defined Knowledge Areas, Process Groups, and key concepts for successful project management. Let us look at a few of the key concepts of project management and map them to patient and disease care.

**A: Project**
A patient’s disease or condition has a definite start and end and hence is temporary in nature. Diseases are also variable in their durations. Based on the type of disease and its duration, patient care can be a short-term or long-term process. For example, diseases can be acute (short term, such as the flu or common cold) or chronic (long term, such as diabetes mellitus, heart disease, cancer, immune deficiency disorders, and so forth); hence, the duration of care differs with each of these diseases. Although projects are considered to be temporary, the result can
outlast the project itself. For example, if we imagine a patient's immunization program to be a project, then, the program is temporary and unique, and the result outlasts the project. In this case, the immunity gained by these immunization programs lasts a long time, even lifelong in some cases. Similarly, the control or cure of a disease outlasts the project of patient care. The treatment of each of these diseases, although carried out by a certain repetitive set of people—nurses or physicians—is unique and delivers a unique result, which means that the patient's condition can be controlled or cured or, at times, the result can be a lifelong disability. In Tom's story, the management of his diabetes is a unique and temporary project in which the result of the project outlasts the project itself.

Patient care can be conceptualized as a project. The best practices of project management can be applied to patient care for an end-to-end understanding and management of the same.

The project of diabetes management is referred to and discussed in the following sections.

B: Project initiation
A patient's project is initiated with the need and desire to get better or, in some instances, planned visits to a physician's office for a wellness and preventive health check up. Here, the patient is the sponsor who conceives of the need for a project and also has the ability to fund it. An example of a need to get better is an episode of the common cold or flu that necessitated medical intervention (an immunization visit to a physician is an example of a preventive health check up). Strategic considerations that authorize a project could be many, such as a market demand, a customer request, or a technological advance, and so forth. The patient care need as mentioned above can be seen as a type of customer request that initiates the project in which the patient is a customer. The pulse polio program by the Government of India is another example of project initiation in which the project is authorized to meet a regulatory demand. According to the Global Polio Eradication Initiative (GPEI), India remains a polio-endemic country along with four other polio-endemic countries around the world. In accordance with the World Health Assembly resolution of 1988 to eradicate polio, the Government of India launched the pulse polio immunization project in 1995-1996. The immunization project aims at immunizing all children under the age of five years with two drops of oral polio vaccine on specified dates in a month. This project has helped reduce the cases of polio in India and globally. The nature of project initiation has a significant bearing on the subsequent activities that can follow. The eventual outcome of the patient's disease management depends on a good understanding of the context in which the project of patient care is initiated.

In Tom's case, we note that he visited Dr. Allen to satisfy his concerns based on his symptoms. This necessitated blood tests that indicated that Tom was a diabetic. Thus, the project of diabetes care management was initiated by Tom.

C: Project manager
A project manager is the key resource in the entire project management cycle. From a patient care perspective, a physician can be considered a project manager. A physician possesses specific domain (medical) knowledge and general management skills (such as motivation, leadership, decision making, political and cultural awareness, strategic planning, knowledge of health safety practices, and, above all, relationship building and reporting) and is capable of handling most or all aspects of the patient and his or her illness. He or she applies knowledge, tools, and techniques to the patient's disease care and is central to all the coordinating activities during the care delivery. A physician understands the needs of the patient and identifies the key resources to manage his or her acute or chronic condition in a timely way.

The physician needs to keep in mind and track some of the key activities during the care delivery, such as ordering of tests, referrals to specialists, referral to a hospital for inpatient care, and discharge management. His or her efficiency in managing a team of healthcare professionals who come with specific objectives and goals in their minds and aligning such goals to the ultimate objective of patient care are crucial.

The physician's role as a project manager is crucial in driving the project toward success. Physicians need to view themselves in this position to take control of the patient's care from all dimensions. A physician's project management skills may need to be honed to achieve this objective.

Dr. Allen can be considered to be a project manager managing Tom's diabetes project. He had an insight into the disease pattern and Tom's needs and was able to plan and manage his care efficiently.

D: Enterprise environmental factors
Each project operates in a unique environment. There are several environmental factors that can have an impact on a patient's health. In Tom's case, the availability of healthcare facilities (clinics, hospitals, and pharmacies), management of his health records, availability of medications, and resources for his physical and psychological well being can be considered as enterprise environmental factors that have
a significant positive impact on the ultimate outcome. An example of enterprise environmental factors that could have a negative outcome could be the lack of care centers (hospitals or nursing facilities) to take care of contagious diseases such as swine flu. In the case of swine flu, in which there is a demonstrated human-to-human transmission of disease, hospitals need to take adequate measures to quarantine the afflicted patients and have the exclusive infrastructure to deal with such patients. A few examples of enterprise environmental factors are:

• **Healthcare infrastructure availability:** This is crucial in the treatment of patients. A variety of facilities (services and equipment) are available in a tertiary care center as opposed to a primary health center. A patient’s disease needs can vary and, in some instances, there is a need for a tertiary care facility to treat the patient; the patient’s outcome depends on this to a significant extent. The availability of human resources with required skill sets, knowledge, and capabilities is important. For example, the availability of a surgeon and an anesthesiologist at a facility for an emergency surgery is crucial in saving the patient. The availability of a specialist for certain specialties is important in the treatment of complex disorders. Similarly, the availability and presence of allied medical branches, such as a psychological counseling center, physical therapy center, and long-term care center go a long way in treating chronic diseases.

• **Geographical/political climate:** Diseases such as swine flu and severe acute respiratory syndrome (SARS) can be impacted by the geo-political climate, with significant impacts on the spread, diagnosis, treatment, and containment of these illnesses.

• **Information systems:** The Health Information Technology for Economic and Clinical Health act (HITECH) provisions of the American Recovery and Reinvestment Act (ARRA) of 2009 provide an opportunity of an investment of more than US$30 billion for Health Information Technology (HIT) in the United States. The act promises to reward physicians and hospitals that demonstrate a meaningful use of health information technology to improve the quality and efficiency of healthcare services. This step is significant in addressing the increases in healthcare costs and improving patient safety through the use of electronic health records (EHR) for patient care. Information systems are available in healthcare facilities to automate processes in effective and efficient patient care. Several systems, such as patient scheduling systems, billing systems, business intelligence systems, clinical decision support systems, and administrative systems are in use. The advancements in network connectivity and data storage have further enabled the efficient use of these systems toward a continuum of care.

• **Clinical decision support systems:** These systems, under the umbrella of clinical knowledge management solutions are types of information technology solutions that are commonly used by physicians to support diagnostic decision making and to prevent medication errors. These systems integrate the existing medical knowledge (from disease-specific information, treatment, diagnostic methodologies, and treatment interventions), specific data of the patient, an inference engine to generate patient-specific care management advice at the point-of-care for healthcare professionals, and serve as useful tools in aiding in complex diagnostic decisions.

• **Information technology advances:** Technology has invaded every aspect of our lives. It has broken the barriers of long distances and, with the presence of teleradiology and telemedicine, patients living in resource-poor environments have access to quality and timely healthcare. Mobile telephones have penetrated our lives in many aspects, including healthcare. Mobile telephones are used as a means for communicating patient information in a timely and pervasive manner. This is more applicable in a rural environment, where the availability of trained physicians can be a constraint. Social networking sites, such as Facebook and Twitter are making significant impacts on our daily lives. Health-related data shared in these forums are used to predict diseases and monitor trends. Newer technologies such as simulation software and video games are increasingly being used to help physicians, patients, and healthcare professionals.

• **Health data information databases:** The availability of information on epidemics (Syndromic Surveillance Centers and Disease registries) has further increased our knowledge about the population risk and prediction of disease patterns. Such databases are available, classified by location, and form important resources for epidemic and pandemic information.

A good understanding of enterprise environmental factors is necessary for planning disease management.

Diabetes care can be positively or negatively impacted by the presence or absence of these enterprise environmental factors. Dr. Allen, as a project manager, had the ability to assess the impacts of such factors, independently or
collectively, on Tom’s condition and plan for the subsequent steps in his care plan.

**E: Project life cycle**
Any project follows the following sequence of life cycle structure:
- Starting the project
- Organizing and preparing
- Carrying out the actual project work
- Closing the project

A disease management life cycle, seen as a project, falls into a similar pattern as that of a typical project that has five processes (initiating, planning, executing, monitoring and controlling, and closing) that are sequential and iterative in nature and logically arranged.

The management of diabetes needs an elaborate and well-planned care management plan that encompasses these processes. It is necessary to understand how each of these processes relates to a patient’s disease management so that an efficient plan can be drawn up. Tom’s diabetes management had a complete planned sequence of activities.

Table 2 lists activities that can fall under each of these processes from a patient’s perspective. The list is indicative and not exhaustive.

**Figure 3: Project life cycle.**

**F: Characteristics of a project life cycle**

**Cost and staffing levels:** In a typical project, it is observed that the cost and staffing levels are low at the beginning of the project, increasing as the work progresses, and dropping toward the end of the project. In the case of patient care, the cost and staffing levels for managing the condition can differ from those of a typical project. Specialized staff with high service costs may be engaged in the initial stages of treatment to aid in the diagnosis and disengaged as the patient starts feeling better, thus causing the cost to be higher at the beginning of the project. Cost can get higher toward the end of the project in cases in which frequent hospitalizations are required, especially in chronic diseases needing acute care. In some cases, such as the purchase of a costly medication or performing emergency surgery, the costs are unavoidable and needed to save the patient’s life.

Cost and staffing level changes are inherent in the management of any disease and at times unpredictable. However, it is important to track the patient’s needs to provide for such changes in a short span of time without causing a major overrun on either budget or cost.

Dr. Allen needed to understand the pattern of Tom’s disease and the financial constraints to plan for the diagnostic workup or plan for referrals. Dr. Allen also planned for unforeseen complications during the course of the disease that would incur a heavy expenditure and place a significant financial burden on Tom and his family. Tom and Emily made financial arrangements in the beginning when Tom had to undergo high-end diagnostic tests and also visit specialists. With time, and progress in the course of the disease, there was a reduction in these expenses.

**Stakeholder influence, risk, and uncertainty:** In a typical project, these factors are highest at the beginning of the project and decline as the project progresses. Similarly, in the case of a patient’s treatment, the disease risk and uncertainty, with the possibility of complications, are high at the beginning of the illness, and decline as the disease pattern becomes clearer and treatment is initiated. The prognosis of acute and life-threatening diseases is generally kept guarded until a positive indication in the patient’s parameters (laboratory or general condition) is noted.
<table>
<thead>
<tr>
<th>Process Group Name</th>
<th>Description Source: <em>PMBOK® Guide — Fourth Edition</em></th>
<th>Core Medical Activities</th>
<th>Allied Activities</th>
</tr>
</thead>
</table>
| **Initiating**     | Defines new projects or a phase and obtains an authorization to start the project | 1. Visiting a physician or hospital  
2. Registering at the office (the front office manager documents the demographics of the patient or checks the insurance eligibility)  
3. Meeting the physician | 1. Visiting a physician for initiating an immunization schedule |
|                    | These are activities in which a patient is authorizing the project. |                        |                  |
| **Planning**       | Defines project scope, refines objectives, and charts out a roadmap of actions that need to be taken. | 1. Listening to the patient’s concerns for the need of the visit and drafting a care plan  
2. Creating the patient’s case sheet or a medical record (containing documentation of his or her symptoms and findings and noting a plan of treatment)  
3. Planning for activities related to a diagnostic workup or a procedure to arrive at a care schedule  
4. Prescribing the necessary medications  
5. Planning for referral to a specialist  
6. Planning for surgery, if needed  
7. Planning for a hospital admission or follow-up visits, if needed  
8. Planning for the cost of care and complications/inpatient admission if anticipated  
9. Planning for the team of healthcare professionals (nurses, specialists, physical therapists, and so on) for coordinated care  
10. Establishing appropriate communication among members of the team | 1. Planning financial support activities  
2. Planning long-term care support with required specialty care (physiotherapy, chemotherapy, radiotherapy, etc.)  
3. Long-term care planning for chronic diseases |
| **Executing**      | Describes the actual work to be done to complete the project specifications | 1. Following a treatment plan as per the physician’s consultation  
2. Dispensing of medications by the pharmacy  
3. Patient undergoes a diagnostic workup or procedure  
4. Hospital stay for the course of illness or surgery (if any)  
5. Sending communication on the patient’s status to those involved in the care process or a reporting agency  
6. Acquiring a core team for the patient’s care management  
7. Sending of timely communication on the patient’s status to team members. | 1. Receiving immunizations  
2. Physiotherapy schedule visits  
3. Psychological counseling visits  
4. Procuring medical devices for diagnostic workup/surgery |
| **Monitoring and Controlling** | Takes care of tracking and reviewing the project performance and also identifying areas of change and initiating these changes | 1. Follow-up visits to laboratories  
2. Follow-up visits to a physician’s office or hospital  
3. Physician monitors the development of complications  
4. Physician changes the plan of treatment on viewing a laboratory or radiology report  
5. Tracking and controlling the costs incurred during the care  
6. Monitoring the care schedule in line with the patient’s progress  
7. Reporting the patient’s progress with a prognostic indication | 1. Follow-up visits to physiotherapy  
2. Follow-up visit to a psychotherapist  
3. Monitoring the treatment plan periodically for medication compliance |
| **Closing**        | Finalizes all activities of a project, thus bringing a project to a logical closure. | 1. Discharge from the hospital following treatment of an acute episode  
2. Completion of the patient’s visits to the physician | 1. Completion of all immunizations  
2. Capturing lessons learned for better handling of patients |

**Table 2: Project management Process Groups and patient activities.**
Stakeholders such as the physicians, hospital staff, patient’s relatives, and employers exert their maximum influence at the beginning of treatment, with their influence becoming less as treatment progresses and the treatment outcome becomes more evident.

Stakeholder management can be a daunting task and it is important for the project manager (i.e., physician) to gauge and monitor stakeholder influence, keeping patient care as the ultimate objective.

In Tom’s case, knowing that diabetes is a notoriously chronic disease that causes lifelong disability, the uncertainty about him getting better and being complication-free was highest in the beginning, after the initial diagnosis. In such a situation, the influence exerted by stakeholders such as Tom’s family or his employer was high; however, as time went by, with periodic follow-up visits to Dr. Allen and other specialists, Tom’s condition improved and the ability to have an impact on the eventual improvement of Tom’s condition decreased with time.
Cost of changes: “A stitch in time saves nine.” This applies to a patient’s treatment as well. The costs of changes and resource requirements for changes go up as treatment progresses. A sound diagnosis based on a diagnostic workup and upfront knowledge about the disease is crucial in mitigating the risks related to such changes. The cost of surgery could be less than the cost involved in fixing the complications arising from surgery; not just the cost, but treating these complications may also consume valuable time and resources, along with the accompanying psychological distress.

Physicians need to take adequate measures to mitigate the risks that will involve high costs in changes. In the case of unavoidable circumstances, such as complications, the communication of these added costs and planning for them go a long way in successfully completing the project.

Upfront understanding of diabetic complications and communicating them to Tom were prudent moves made by Dr. Allen. This increased Tom’s awareness of the disease and helped him transform into a more responsible patient, thereby managing his own condition. Dr. Allen’s planning for specialist referrals and periodic follow-up visits demonstrated his understanding of the added costs of changes that could be incurred.

G: Project phases
Project phases provide better control and management capability. A disease can have multiple phases, and an effective treatment plan created by the physician should take these phases into account to attenuate the risks involved. For example, a disease or treatment plan can have remissions and relapses. This means that the condition is dormant without clinical or laboratory evidence of the disease in the remission phase and a positive laboratory and/or clinical evidence in the relapse phase. The treatment patterns for each of these phases are different, with an emphasis on medications and the control of symptoms in the relapse phase and maintenance therapy in the remission phase. The costs incurred to the patient in various phases, as well as the need for specialized healthcare professionals to manage these phases of care, are crucial in the end-to-end disease management process. Diabetes mellitus can also be divided into logical phases for better control of the condition.

Phase Relationships
There are three phase relationships. Each of the phase relationships (sequential, overlapping, and iterative) is unique to a project and the operating environment. From the perspective of a patient care as a project, these relationships are unique to each patient and the type of disease. Each of these patterns poses a unique scenario to managing the patient’s condition.

- In a **sequential relationship**, the second phase starts only after the first phase is complete. In the treatment of most diseases, the phase of maintenance treatment starts only after the treatment of acute care is complete.
- In an **overlapping relationship**, there is an overlap of phases, and the second phase can start before the first phase is complete. An example of this could be a scenario in which the physiotherapy for an injury or an illness begins while the acute phase treatment is being tapered down. This means that there is a time period during which both the treatment and the physiotherapy take place at the same time.
- In the case of diseases, in spite of the upfront assessment by the physician, the progress can be uncertain if there is a rapid change in the patient’s status. In cases in which the initial diagnosis is not clear at the outset, the physician chooses to do an **iterative planning** of the treatment as symptoms and signs unfold. This helps present a clearer picture of the disease as it progresses and helps the physician make the right decisions for treatment. For example, when the disease pattern is uncertain or undefined, as in most acute cases, an empirical treatment is begun and as the serial laboratory or radiology reports unfold the possible diagnoses, a definitive treatment planning is begun. Iterative planning may also require core resources for patient care to be available around the clock to tackle any emergency.

A physician’s assessment of the patient’s progress is valuable in determining the phase relationships for treatment planning.

Diabetes mellitus or similar chronic diseases can be considered as multiple-phase projects in which no definitive phase relationship can be defined. If the disease progress is straightforward, a sequential relationship is a best-suited option, with the diagnostic phase starting after the initial evaluation phase and the treatment phase beginning after the diagnostic phase. However, in the presence of complications, an unpredictable disease course, and uncertain prognosis, the iterative relationship could be the best option. Not uncommonly, there can be multiple-phase relationships during different phases of the patient’s treatment.

Dr. Allen needed to assess Tom periodically to note his progress and plan for subsequent care activities.

H: Organizational process assets
A patient’s project encompasses all disease stages and also the communication and assets created during such encounters.
Such assets can be parts of the patient’s records or the hospital and/or physician’s clinic. Assets such as prior discharge notes, laboratory result reports, health check-up details, disease management protocols and evidence-based guidelines, directories of hospitals and healthcare providers, specialists, medical device providers, drug allergy databases, discharge management protocols, alert protocols for communicable diseases such as polio myelitis or plague (which are considered eradicated), and hospital registration forms can serve as organizational process assets from a patient’s care perspective. These assets can be used for future care episodes to speed up the process of care delivery.

Understanding the presence or absence of organizational process assets is important for planning and speeding up the patient’s treatment. It is important to document the lessons learned with each patient care episode to have a repository of such valuable information at the point-of-care for future needs.

Dr. Allen had various assets for a diabetes care plan at his disposal, which he could use for Tom’s needs. Dr. Allen used assets such as lists of specialists, pharmacies, and directories of his clients, who were afflicted with similar conditions, to manage Tom’s treatment efficiently. A critical asset for the patient’s disease management is the valuable clinical expertise and the “lessons learned” from treating similar cases. Such tacit knowledge is a part of a physician’s clinical acumen and difficult to document or transfer.

I: Stakeholders

Stakeholders are the key resources in any project. In a patient’s scenario, there could be multiple stakeholders who are involved in his or her care and get affected significantly (in positive and negative ways) by the patient’s condition. They can also have a significant influence on the eventual outcome of the patient’s condition. In the case of a patient, medical staff (physicians and nurses), hospital management staff, professional staff (occupational therapists, radiologists, laboratory personnel), and caregivers are considered key stakeholders, each with their unique goals and objectives. For example, the medical staff’s expectations are primarily related to high-quality clinical care and adequate support services, whereas patients are concerned about clinical quality, service quality, and the cost of care. Early identification and involvement of such key stakeholders are crucial in key decision making, thus facilitating recovery, especially in cases of chronic diseases. The patient’s family is a key stakeholder and is significantly impacted by the patient’s disease outcome. The involvement of specialists and healthcare support staff (in the case of chronic conditions)
through the physician is a valuable step in a patient's care delivery. At times, it is difficult to identify all resources early in the course of the disease; however, as the disease progresses and the needs unfold, identifying additional resources is possible.

Tom’s diabetes management involves multiple stakeholders: Tom, Dr. Allen and his staff, the case managers, Emily, Fred, and John formed a core team. The other stakeholders were the specialists, the counselors, Tom’s neighbors, the self-help group members, the diagnostic laboratories, the pharmacies, communication channel partners, health insurance company staff, and Tom’s employer. Each of these had an influence on and a stake in Tom’s care. Tom’s family exerted a significant influence in decision making and was positively affected by his diabetes control. Dr. Allen had identified and involved these resources while making decisions about Tom’s care.

**J: Knowledge Areas**

Knowledge Areas, as defined in the *PMBOK® Guide* have a unique significance in patient care in its entirety and can be viewed as specific areas of patient care.

**Conclusion**

With their significant health and economic burdens on society, diseases have the potential to substantially disrupt a patient’s life. This is more likely in the case of chronic diseases, in which financial constraints and a sustained need for coordinated care are required throughout the progress of the disease. In the form of a treatment plan, a tailored approach to suit the patient’s disease management is planned and executed to provide for either a cure or control of the disease. This article compares a patient’s disease management activities and processes in conjunction with the principles of project management and its processes. It also demonstrates the relevance of project management in the healthcare domain, especially by conceptualizing a patient’s disease management as a project.

The article underscores that, by conceptualizing patient care as a project and understanding the relevance and benefits of such a conceptualization, applying the globally renowned best-practices enunciated in the *PMBOK® Guide* will result in a successful completion of the specific project (patient care) goals and objectives (successful cure or control of the disease in most cases). Physicians are cornerstones in the patient’s care continuum and a single point of contact for coordination of care. These practices will help physicians and healthcare professionals adhere to the schedule and planned budget and, in turn, provide a complete patient care plan that can result in improved health outcomes. This article encourages physicians and healthcare professionals to visualize an end-to-end spectrum of a patient’s care plan and embrace the *PMBOK® Guide*’s best practices of project management in their daily activities as they relate to a patient’s care. Such an application of the best practices to the project will help enhance a physician’s decision-making skills, a patient’s confidence, and the reputation of the healthcare center.
<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Medical Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scope Management</strong></td>
<td>Includes processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully.</td>
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<td></td>
<td>Understanding and analyzing the patient’s disease, its complications, and managing it with necessary visits, laboratory tests, or related diagnostic workups. It includes knowing the needs and concerns of all the stakeholders involved in the patient’s treatment, developing a detailed description of the patient’s illness, breaking down the treatment plan and phases to smaller and manageable components, and monitoring the progress of these activities. Progressive elaboration of project scope is inherent in the patient’s diagnosis-in-making. As the signs and symptoms of the disease evolve, the list of possible diagnoses increases and this can necessitate taking additional tests to arrive at one possible diagnosis and understand the spectrum of care needed. This phenomenon can be related to progressive elaboration of the scope of the patient’s disease plan. The scope in the case of Tom’s diabetes care was to understand his concerns, diagnose and manage his condition, as well as prevent the complications that may arise. A carefully drawn-up plan with regular follow-up visits with the physician, along with the necessary laboratory tests were parts of the scope. It was also necessary to follow-up and track Tom’s progress for any additional care needs. Dr. Allen, being the project manager for Tom’s diabetes care, was in control of this scope management to ensure the completion of all patient care activities.</td>
</tr>
<tr>
<td><strong>Integration Management</strong></td>
<td>Includes processes and activities needed to identify, define, combine, unify, and coordinate the various processes and project management activities within the project management Process Groups.</td>
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<tr>
<td></td>
<td>This Knowledge Area encompasses documenting an initial consultation note describing the patient’s signs and symptoms, differential diagnoses, possible laboratory workup, and creates a comprehensive treatment plan. It also takes care of documenting a treatment plan for the patient, monitoring the patient’s progress with the changing of treatment plans based on the clinical condition. The physician tracks and monitors the activities to note any deviations from the care plan. In the case of progressive elaboration of scope or an acute complication, he or she reacts with the necessary changes to his or her treatment plan. This can be life saving for the patient. Integration management, in the case of a patient, includes the integration of all activities of the patient’s care. Diabetes is a complex condition and requires a coordinated orchestration of multiple resources to formulate a strategy for management. Tom’s condition necessitated a comprehensive integration of all the factors and continued monitoring to assess the condition. Dr. Allen was responsible for identifying, defining, unifying, and coordinating all the care processes to meet Tom’s needs.</td>
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<tr>
<td><strong>Time Management</strong></td>
<td>Includes the processes required to manage timely completion of the project.</td>
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<td></td>
<td>Diseases vary in their timelines for response to treatment. Acute and self-limited diseases such as the common cold take a few days to resolve, whereas chronic diseases, such as stroke or heart disease take longer. This determines the duration of care needed for the patient. Diseases are also notoriously unpredictable in terms of their progress and it is difficult to estimate a time for their resolution or control. The physician understands these uncertain timelines, communicates them to the key stakeholders, and manages the treatment to achieve results in a given time frame. Time management also includes understanding various patient management activities (scheduling diagnostic tests, specialist visits, etc.) and their durations, their dependencies on each other, the resources required for such activities, and drawing up a schedule for managing the problem. Visiting the specialists and diagnostic centers for the tests requires timely scheduling of visits and follow-ups, which could contribute to a timely diagnosis. This is particularly important for conditions such as diabetes, in which complications can start insidiously. Time management for diseases with a potential for chronicity is very important. Dr. Allen prepared a schedule for Tom’s care activities, with a sound understanding of his needs and followed it up with planned visits to monitor the care progress.</td>
</tr>
</tbody>
</table>

**Table 3: Project management Knowledge Areas and patient activities.**

Please note that the list of medical examples is indicative and not exhaustive.
Like every service, healthcare comes at a cost and, beginning with the physician consultation, hospital admission, medications, laboratory tests and procedures, and allied services, there are associated price tags. Cost management helps the physician understand the patient's financial constraints and the provision for costs incurred on healthcare. It helps make the necessary financial adjustments, prioritize services, and plan for chronic diseases or long-term treatment that can burden the patient's finances to a large extent. Diseases that are unpredictable in their course entail a risk of increased spending and, at times, such circumstances are unavoidable.

Emily and Tom’s management of the costs and financial constraints was one of the key success factors in managing the condition. The timely availability of finances for the expensive tests and medications is important. The family's budget had to be altered to accommodate for these costs, and care had to be taken to create a delicate balance between being frugal and wasteful. Dr. Allen worked out an approximate budget for Tom’s care and a follow-up treatment plan. He had also accounted for added costs in the case of an emergency or complications. This helped Tom and Emily make the necessary adjustments to their financial plan.

**Quality Management**

Patient care deals with life and leaves no room for compromise in any aspect of patient care. Hence, quality is of utmost importance in such scenarios, be it the quality of physician care, the quality of services in a healthcare setting, or the quality of medical devices used for a patient. Identifying the quality standards that are relevant to patient care is an important step to take at the beginning of care. Strict evidence-based guidelines and disease management protocols guide physicians and nurses in making decisions that are in the best interests of patients. Hospitals are accountable to the government and other regulatory bodies, such as the Joint Commission in the United States, who set forth key quality measures and update them at regular intervals. Quality reporting agencies are responsible for maintaining data for key performance indices. The “meaningful use” act under ARRA in the United States has mandated physicians to report quality measures to the Centers for Medicaid and Medicare (CMS) to monitor the quality of clinical care. The act goes a long way in demonstrating the need for built-in quality in patient care. The cost of changes can be huge if the quality is not ensured and built into the activities and, in patient care, such lapses can be serious.

Tom’s diabetes care plan was a perfect example of delivering healthcare with quality, because Dr. Allen had drafted a suitable disease management protocol for Tom, keeping in mind the multiple risks and challenges as well as the most current evidence-based medicine guidelines for diabetes care. Quality was ensured at every phase, with scheduled follow-up visits and planned sessions with multiple stakeholders.

**Human Resource Management**

Typically, patient care is team work involving players, such as the patient and family, the physician, specialists, counselors, physiotherapists, radiologists, and hospital staff, depending on the disease. Complex diseases involving multiple body systems require a larger team to take care of the patient as opposed to a short and self-limited disease. Human resource management takes care of forming such teams for treatment, defining their roles and responsibilities, aligning them to the patient’s unique requirement, thereby motivating the team toward success. Progressive unfolding of the disease pattern or a sudden emergence of a complication requires the identification of added team members. Assessing the competencies of each team member in delivering patient care is important in delegating responsibility. A mismatch of competency and responsibility can affect patient care adversely. Diabetes management is also a similar team effort, and tight coordination from all team members is essential in ensuring success.

Tom, Dr. Allen and his staff, case managers, Emily, Fred, and John formed a core team with other resources involved in the care plan. Dr. Allen had a good assessment of the competencies and roles of each of the team members who was a part of Tom’s care. Dr. Allen’s initiated periodic meetings, assessing motivation of the team, resolving conflicts, drawing a consensus on the treatment, and leading these efforts resulted in the success of Tom’s project (i.e., control of the disease).

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**Table 3: Project management Knowledge Areas and patient activities.**

Please note that the list of medical examples is indicative and not exhaustive. (continued)
**Communications Management**

Includes the processes required to ensure timely and appropriate generation, collection, distribution, storage, retrieval, and the ultimate disposition of project information.

Communication is the backbone of any project and patient care projects are no different. Timely care saves patient’s lives. Communication on the patient’s progress is vital so the physician can make timely decisions on continuation or changes in the patient's treatment plan. Identifying stakeholders in patient care early in the course of the disease is critical. A clear, honest, and transparent communication among these stakeholders creates trust and builds patient satisfaction. In the case of life-threatening illness, timely communication is of utmost importance, especially when the patient's clinical parameters are variable and changing. Technology has revolutionized communication, and the availability of mobile telephones and other communication channels has made dissemination of patient information easy. Patient education is considered to be one of the best practices in clinical care, with physicians, nurses, and other healthcare staff spending significant dedicated time to educate the patient and his or her caregivers on the management of disease. Maintaining an updated patient health record is valuable in chronic diseases to assess disease patterns. Involving multiple stakeholders in complex conditions, such as diabetes, necessitates a robust communication plan with timely and updated information on the patient available to all the stakeholders.

Dr. Allen addressed the need for clear and timely communication by maintaining a health record for Tom. The health record had all the details from the laboratories and physician visits. Dr. Allen was responsible for communicating Tom’s progress to all the stakeholders for timely actions.

**Risk Management**

Includes the processes of conducting risk management planning, identification, analysis, response planning, and monitoring and controlling on a project.

Risks are inherent in any patient care plan and they can range from an incorrect diagnosis to major surgical failures. Diseases with evolving symptoms and signs pose a threat to making the right diagnosis and creating an appropriate treatment plan. Risks can be varied, and a few examples of such risks are changes in weather conditions, incompetency of the resources, unrealistic expectation setting at the beginning, and so on. The physician and his or her team understand the risks involved in a particular treatment methodology, whether surgical or medical. The risks are analyzed and responses are planned. Taking consent from the patient before surgery is a type of risk response planning. The physician keeps a close watch over the possible risks during the different phases of the disease and keeps the patient and other stakeholders well informed of the mitigation plans. Risk mitigation plans are created with active involvement of all team members. Sharing of clinical information among physician groups and specialists on the possible risks for a given condition help in analyzing and prioritizing the possible risks that could threaten the disease cure. Risks surrounding patient compliance can be mitigated by providing adequate information to the patient and his or her caregivers. Today, most patients have access to information on health-related issues. They keep themselves abreast of the knowledge and latest developments concerning their disease or therapy. The risks are high in diabetes and planning to mitigate these is important for the ultimate success of the project (disease control or cure).

In Tom’s assessment, Dr. Allen estimated the risks and also planned for the mitigation of those risks. Dr. Allen had anticipated, planned, and prioritized the possible risks in Tom’s disease management plan and had communicated them to Tom and his family, as well as other key stakeholders to ensure a good quality of life.

**Procurement Management**

Includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team.

The procurement of medical devices or allied medical services falls in the purview of this Knowledge Area. This includes procurement of diagnostic or therapeutic machines (ECG, CT scan, and so forth) within an organization as well as procurement of specialists’ services or services from a preventive healthcare firm.

In Tom’s case, procurement meant procurement of medications and instruments to help him with physical therapy; it also meant the procurement of services from physical therapists, counselors, and specialists to achieve success.

Table 3: Project management Knowledge Areas and patient activities.

Please note that the list of medical examples is indicative and not exhaustive. *(continued)*
Needless to say, a project-oriented and well-managed patient care plan triggers a successful cure (deliverable), rewards all parties involved, and instills pleasant memories and certainly good lessons learned!

References


Disclaimer: The story about diabetes management at the beginning of this article is a result of my personal experience treating diabetes patients. The names of the characters and activities are fictional. Any resemblance to a real-life incident or character is purely coincidental.

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Deepa has led teams comprised of healthcare professionals involved in varied projects related to healthcare information technology, clinical decision support, and clinical knowledge solutions. She has been a visiting faculty member in various institutions in the fields of health education and health information technology. Deepa is a certified Project Management Professional (PMP)® credential holder and has conducted several *PMBOK® Guide* training workshops as a member of the PMI Pearl City Chapter (PMI PCC), where she has been involved in their various initiatives to spread project management ideas.

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