Pioneers Group - UNCC

Virtual Cardiac Rehabilitation Nurse

For Coronary Bypass Surgery Patients

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History:

Version	Date	Changes
1.0	9/5/2013	Initial Draft
1.1	9/10/2013	Revised Draft – Added additional risks, tasks description, special resources, hardware/software resources
1.2	9/12/2013	Revised Draft – Updated Gantt Chart, edited risk, added in resources and task description, formatted
1.3	9/13/2013	Revised Draft- Made document format consistent.

Contents

1. Introduction

Coronary bypass surgery is a procedure that restores blood flow to the patient's heart muscle by using a healthy blood vessel taken from his/her leg, arm, chest or abdomen and connects it to the other arteries in the heart. This diverts the flow of blood around a section of a blocked artery. However, patients are at potential risk to discontinue care after hospital discharge. According to a Brandeis study in *Circulation: Journal of the American Heart Association*, despite strong evidence that cardiac rehabilitation reduces disability and prolongs life, fewer than one in five people receives rehabilitation services after a heart attack or coronary bypass surgery. Cardiac rehabilitation reduces the overall risk of dying from a heart attack, the risk of future heart problems, decreases pain and the need for medicines to treat heart or chest pain, lessens the chance that the patients have to go back to the hospital or emergency room for a heart problem, improves overall health by reducing the risk factors for heart problems and improves the quality of life, making it easier for the patients to work, take part in social activities, and exercise. An absence of appropriate care and monitoring can lead to deterioration of the patient's health and safety, hospital readmission, and excessive costs to the health care system.

Technology can be utilized to contend with the nursing shortage and improve the quality of care. Virtual nursing can provide services for multiple facilities or individuals, and provide accessible, low cost nursing interventions for the patients, anytime and anywhere. The key objective of this technology is to provide the patients with guidance and information whenever they need it during their daily lives and not just during their scheduled visits. The patients can benefit from this application which offers a cybernetic nurse system at a relatively lower cost.

1.1. Project Overview and Statement of Proposal

Virtual Cardiac rehabilitation nurse will be a web based system. It will store the patients' data (medical and health history - medications, vital signs: blood pressure, heart rate, respiration rate, activity tolerance and exercise, sleep patterns) in a database before the surgery. Patients will have the ability to update data after the surgery, as per the planned rehabilitation interventions. The application will compare and track the patients' progress as they complete the recovery plan. We will create a web application where a patient will login with the username, password and ID (which is his/her file number at the hospital). The web application will allow patient to access his/her cardiac rehabilitation plan and have various

categories like exercise, diet, medication, sleep, smoke cessation, skin care, self-assessment cardiac rehabilitation knowledge tool etc. Each category will have instructions which should be followed by the patient according to the calendar set for him. If he/she follows the instructions then after completion of calendar patient and his doctor will get the feedback related to his health condition compared to the patients data before the surgery and through continuing the plan. If the patient is not following instructions the application will generate alert for the patient and doctor as well. There is a self-assessment cardiac rehabilitation knowledge tool where the patients can assess their rehabilitation plan knowledge based on the rehab instructions and get feedback. To implement the application we will create dummy rehabilitation plans and health data in database.

Statement of Proposal: *We propose to create a web application for patients undergoing cardiac rehabilitation after coronary bypass surgery.*

1.2. Project Scope and Objectives

The objective of the project is to provide virtual nurse services to a patient who has undergone a cardiac or coronary bypass surgery. The patient will be able to receive advice through the online system of the medical institution where he/she underwent surgery. The advice will be given to the user after collecting historical and current information of the patient.

The scope of the project is proposed as below.

1. Patients will have online access to their medical center/hospital website where they had surgery through a secure access system, that uses their user name, password and patients ID number (file number stored at the center). We plan to create an imaginary hospital website, database and patient data as model for this purpose.
2. When the patient logs in, he/she goes to his/her personal rehabilitation plan page which has been designed by nurses and physicians who are responsible for the patient's rehabilitation plan. The plan includes exercise and activity, medication, diet, smoking cessation, sleep, vital signs assessment, skin care. When the patient clicks on each item he/she can see the specific instructions. Below the instructions there is a calendar for each item; for example weekly schedule, week1, week2, and the patients enters what she did based on the rehabilitation plan instructions, getting feedback on a weekly basis as to their progress. The feedback icon under each week rehabilitation plan for each item will

detail if he/she completed that part of the rehabilitation plan successfully or what areas need improving to optimize recovery. There will be an alert and reminder system too if the patient did not follow the instructions or her health conditions needs to be reported.

3. There is another icon, self-assessment cardiac rehabilitation knowledge tool, which she/he answers list of questions related to each item, such as exercise, diet, medication, and smoking. The answers are compared to the rehabilitation instructions. If the patient followed the instructions and answered the questions correctly, she/he gets positive feedback which she/he is on the right path otherwise for wrong answers she/he should re-read the instructions and do the test again.
4. Her/his current health conditions can be compared to the baseline data (before surgery) and feedback can be provided as well. This feedback can be presented on the patient's webpage as text or by animation or diagram.
5. List of additional cardiologists and institutions will be made available to the patient.

2. Risk Management Strategy

The risk management strategy consists of brainstorming, evaluating, and doing market research in order to document, categorize, and rank different risks that could potentially be encountered throughout the project lifecycle and use of the coronary bypass surgery rehabilitation application. The below risks have been identified, documented, and given a probability/impact score based on our SME's experiences.

2.1. Risk Table

Risk ID	Risk Title	Category	Probability	Impact
RISK01	Scope of the project can become elaborate for the given time.	RE	4	2
RISK02	Team members may not have the required domain knowledge to understand the requirements	PE	3	3
RISK03	Project may overrun because of misunderstanding the requirements	ES	2	2
RISK04	The advice given by the application may not always be suitable for all the cases of the patients	OR	1	3
RISK05	The application may not be able to capture all the symptoms of the patient in special cases	TE	1	3

RISK06	Not all the medical institutions may be willing to participate in the system	OR	1	4
RISK07	If the security of the users information in the application is compromised, it can lead to data breach	TE	1	1
RISK08	Team members may have diverse opinions on the technology to be used	PE	2	4
RISK09	Difficulty in coordinating “team time” can lead to missing project deliverables and deadlines	ES	4	2
RISK10	Open source tools used for the project are liable for security breach	TR	1	4
RISK11	Performance and availability of the open source tools used for development of the project is not guaranteed	TR	1	4
RISK12	The database and application will store and transmit confidential information	OR	4	1
RISK13	New requirements are added or additional functionality is wanted outside of scope causing scope creep	RE	3	2
RISK14	Old versions of technology that have known vulnerabilities might have to be used and there is no support team to patch the technologies or upgrade	TE	3	2
RISK15	Time Management Issues	PE	3	3
RISK16	Strict Deadlines might not be met due to inexperience and inaccurate estimation of level of effort	ES	2	3
RISK17	Resource Limitations	PE, TR	2	3
RISK18	Outages or downtime could limit the availability of critical information or business processes	TE	2	1
RISK19	Project exceeds budget (if applicable)	ES	3	2
RISK20	Patients will not want their information in the application or find a different doctor who doesn’t use a web application	OR	2	1
RISK21	Potential data integrity and data loss issues	OR	3	1
RISK22	Requirements are not clearly defined or vague causing misinterpretation	RE	3	3

RISK23	Patient might not trust new technology and virtual care	PE	4	4
RISK24	Patients might not have required responsibility and commitment to new technology and virtual care	PE	2	4
RISK25	Patients might not have access to the required technology to use the virtual care	TE	2	2
RISK26	Patients might not have required health and technology literacy to use virtual care	PE	2	2

Probability of Occurrences		
Definition	**Meaning**	**Value**
Frequent	• Occurs frequently • Will be continuously experienced unless action is taken to change events	**5**
Likely	• Occur less frequently if process is corrected • Issues identified with minimal audit activity • Process performance failures evident to trained auditors or regulators	**4**
Occasional	• Occurs sporadically • Potential issues discovered during focused review.	**3**
Seldom	• Unlikely to occur • Minimal issue identification during focused review	**2**
Improbable	• Highly unlikely to occur	**1**

Category values:

TE – Technology Risk

PE – People Risk

OR – Organizational Risk

TR – Tool Risk

RE – Requirements Risk

ES – Estimation Risk

Impact values:

1 – catastrophic

2 – critical

3 – marginal

4 – negligible

2.2. Risks to be managed

Every action, even no action has risk associated with it. The ability to identify risks and put together management strategies to predict the probability, or associated impact, and decrease the likelihood of occurrence is critical to the success of the project. In total 26 risks were identified, ranked, and categorized. The risks with the highest impact score involve the storing or transmitting of confidential data. Many of these are Organizational risks that come

from the technologies used to bring the application to life and make it user friendly to the patient. In order to manage risks associated with the data it is important to educate developers and ensure security best practices and compliance requirements, such as HIPAA, are met as part of the requirements. Taking nightly backups of the database and performing security tests on the application after any major change will ensure data loss, data breaches, and vulnerabilities are kept to a minimum. This will ensure our brand is held at the highest standard and protect our patient's confidential data.

Other major risks are categorized as people risk or resource limitations. Team members often times have very different visions, interpretations of requirements, priorities, and strengths or weaknesses. It is critical to identify these strengths and weaknesses and leverage them throughout the project. Having a clear understanding of the scope of the project, detecting or monitoring gaps early on through discussions or documentation, and clearly defined detailed requirements will help mitigate or avoid some of the associated risks that come along with people risk. Having a clear understanding of the requirements and what needs to be done will assist in gauging the level of effort required to complete all the associated tasks and minimize the probability of the risk being exploited. It will be important to keep team members and stakeholders or end users involved in every phase of the project, document any changes, and make a team decision as to if the change is in scope or out of scope (nice to have). This will help prevent scope creep.

Technology risks are another big area of concern. Technologies can often times simplify and make designs more efficient, but can potentially also impact or destroy a project. To mitigate some of the technology risks: such as outages, outdated versions containing vulnerabilities, and performance issues it is important to perform stress testing, created detailed test plans, and ensure there are SME's to configure and implement those technologies based on best practices. Choosing software that developers are familiar with and technologies the team understands will allow for a more successful implementation and reduce the likelihood of an outage as configuration issues will be reduced.

Additional details related to each risk, their classification, and mitigation/monitoring/ management plan can be found in the below table.

2.3. Risk Mitigation, Monitoring and Management Plan

Risk ID	Risk Title	Mitigation	Monitoring	Management
RISK01	Scope of the project can become elaborate for the given time	Detailed requirements discussions are to be held and the required time for implementation is to be estimated appropriately	Monitor the project plan , not to miss any milestones	Revisit the scope and optimize the requirements
RISK02	Team members may not have the required domain knowledge to understand the requirements	Detailed discussions regarding the domain and requirements are to be held at the requirements phase	Team members to verify the perception of the requirements with the domain expert at every stage	Hold detailed discussions on the requirements and the solution
RISK03	Project may overrun cause of misunderstanding of the requirements	Project plan is to be monitored closely and the deliverables cross verified by the domain expert	If the project milestones are missed, validate the exact reasons behind the lag	Hold detailed discussions on the requirements and the solution
RISK04	The advice given by the application may not be always be suitable for all the cases of the patients	Detailed discussions regarding the domain and requirements are to be held at the requirements phase	Continuous testing of the application with various scenarios needs to be conducted	Alternative options for the patients should be made available for ex. Contact number for a nurse etc.
RISK05	The application may not be able capture all the symptoms of the patient in special cases	Foresee special cases or circumstances during the requirements phase	Continuous testing of the application with various scenarios needs to be conducted	Alternative options for the patients should be made available for ex. Contact number for a nurse etc.
RISK06	Not all the medical institutions may be willing to participate in the system	Provide transparency into how their data is used and handled. Require users to sign a privacy policy and implement secure applications	Get feedback as to why they are hesitant and get recommendations from institutions using it	Focus on one institution and scale as needed
RISK07	If the security of the users information in the	Security measures should be adopted and implemented in the	Continuous testing of the application with	Reconcile the login attempts or send emails

	application is compromised, it can lead to data breach	design phase	various scenarios needs to be conducted	to the user every time the password changes
RISK08	Team members may have diverse opinions on the technology to be used	Pro's and con's for each technology along with the knowledge and ease of implementation to be considered	-	Use the 5 fingers technique to vote and discuss until an agreement is met
RISK09	Difficulty in coordinating "team time" can lead to missing project deliverables and deadlines	Since weekends are the only time when everybody is available, team should come prepared to turn the limited time productive	Monitor the project plan, not to miss any milestones	Revisit the team meeting plan in case the milestones are missed
RISK10	Open source tools used for the project are liable for security breach	Make sure no private information is posted using open source and each team member to have a backup copy of the deliverables	Make sure that the deliverables are backed up at every milestone	Use Moodle as the second back up for the deliverables
RISK11	Performance and availability of the open source tools used for development of the project is not guaranteed	Each team member to have a backup copy of the deliverables	Make sure that the deliverables are backed up at every milestone	Use Moodle as the second back up for the deliverables
RISK12	The database and application will store and transmit confidential information	Store and Process confidential data in a secure manner using SSL and recommended encryption standards	Penetration Test and audit the storage and data flow of confidential information	Leverage security best practices and understand where the confidential data is stored and how it is transmitted. Contract a Third Party if necessary
RISK13	New requirements are added or additional	Clearly Define the Project Plan and scope. Label	Constantly review the scope and adjust to	Get sign-off that the scope is clear, precise,

	functionality is wanted outside of scope causing scope creep	requirements as required or necessary and nice to have	ensure work being done is not out of scope	and contains enough detail to move forward. Get executive buy-in
RISK14	Old versions of technology that have known vulnerabilities might have to be used and there is no support team to patch the technologies or upgrade	Implement Secure Coding methodologies and perform penetration testing prior to the application going into production	Run vulnerability scans and performs tests after any changes or modifications are made to code. (Not practical for class but in real life we would have additional tools)	Provide the resources and tools to perform such tests and ensure business needs go hand in hand with security best practices. Go through the Change Advisory Board and document changes
RISK15	Time Management Issues	Ensure task management is distributed evenly among members, everyone is in touch with the project and can help when needed	Monitor the work-load and evaluate team needs during the phases of the project lifecycle	Devise a management strategy to execute and ensure project is staying on task and resources are available
RISK16	Strict Deadlines might not be met due to inexperience and inaccurate estimation of level of effort	Draft all tasks and estimated level of effort. Prioritize tasks and ensure the major functionality and requirements are top priority	Revisit schedule and adjust accordingly based on unexpected events or terms	Prioritize tasks, prepare for hurdles in advance, and eliminate distractions.
RISK17	Resource Limitations	Discuss each team member's strengths and weaknesses. Select technologies team members are familiar with	Keep open lines of communication and reach out for help prior to critical deadlines if needed	Bring in special resources to aid in overcoming trouble areas
RISK18	Outages or downtime could limit the availability of	Perform Stress testing, document and execute a test plan	Monitor hardware and software to ensure thresholds	Plan and Implement a DR plan in case of emergencies

	critical information or business processes		are not exceeded	
RISK19	Project exceeds budget (if applicable)	Give a best guess estimate at costs related to technology and support. Devise a communication plan if more budget is required to avoid surprises to management	Keep open lines of communication and document costs associated with project	Give executive management heads-up if budget is running low and get sign-off
RISK20	Patients will not want their information in the application or find a different doctor who doesn't use a web application	Provide transparency into how their data is used and handled. Require users to sign a privacy policy and implement secure applications to earn patients trust.	Continuous testing of the application with various scenarios needs to be conducted	Allow for an opt-out plan for the patient.
RISK21	Potential data integrity and data loss issues	Backup the database nightly	Verify backups were completed and document when they were taken. Communicate to stakeholders	Create a DR plan bi-annually. Keep physical backups handy
RISK22	Requirements are not clearly defined or vague causing misinterpretation	Keep stakeholders and users engaged throughout the project lifecycle. Ask questions when needed to get additional details	Document which requirements are vague and communicate to stakeholders	Focus on scope and put yourself in the user's shoes
RISK 23	Patients might not trust new technology and virtual care	Provide precise information related to the nature and processes, security, applications and benefits of virtual care	Assess patients concerns, and issues related to virtual care	Review and get the patients feedback related to security issues, consistency and quality of care
RISK 24	Patients might not have required responsibility and commitment to new technology and	Clarify required commitment and responsibility to have the benefits of virtual care and risks related	Assess the patient's perception of responsibility and commitment	Review the patient's perception and behavior and get feedback

	virtual care	to negligence	to virtual health care and self-care	related to responsibility and self-care
RISK 25	Patients might not have access to the required technology and authentication to use the virtual care	Provide and facilitate the accessibility to requirements for virtual care	Assess the available and required technology and accessibility such as computer, internet, user name, password, ID number, …	Make sure technical support team is available for providing and maintaining virtual care requirements
RISK26	Patients might not have required health and technology literacy and knowledge to use virtual care	Provide required health and technology knowledge and training for patients	Assess level of health and technology knowledge and skills of patients in virtual care	Make sure the patients are suitable for virtual care and are following the instructions and use them properly by self-assessment tools and getting feedback

3. Plan

Our plan to manage tasks and distribute the workload is to leverage each team member's strengths and improve on weaknesses. Certain team members have a background in programming and others have design and documentation experience. We believe by leveraging each team members strengths and assigning tasks based on these strengths will produce a better end design. At the same time we want to partner with each other and teach each other to improve our weak areas allowing for personal growth. This will be a living document and additional tasks will be added as we prepare for each section. Resources may change based on availability, strengths, or issues that arise during the project lifecycle to mitigate risks and ensure deadlines can still be met.

See Attached Gantt Chart (Virtual Cardiac Rehabilitation Nurse Project Plan v1.3.mpp)

3.1. Timeline Chart

See Attached Gantt Chart (Virtual Cardiac Rehabilitation Nurse Project Plan v1.3.mpp)

3.2. Task Descriptions

Task #	Description	Deliverable/Milestone	Designated Resource
1	This task involved brainstorming ideas independently and as a team, discussing team strengths and weaknesses, and deciding on a project idea and best time to meet.	Yes - Proposal & Plan - Initial Draft Document	Elham Mahmoudi - Team
2	Form Project team meeting – discuss schedule and pick a timeslot to schedule weekly meetings which will focus on next steps related to project and review previous work done.	No	Rajini - Team
3	Set available time for all members. Book reoccurring meetings for Sunday after 4. Book any additional meetings that might be required or formulate a contingency plan to mitigate risks associated with strict deadlines and availability of team members if emergency meetings are needed.	No	Team
4	Discuss and book the place meetings with occur. Reserve the room. Decided to meet in library for Sunday meetings and use Skype for emergency meetings.	No	Team
5	Form project team and communication Means. This task was designed to select the best means of communication and technologies in order to store work.	Yes – Software Resources	Aneesh - Team
6-9	Based on discussion and decisions of above tasks we needed to all create accounts and ensure proper access to	No	Team

	google.docs, whatsApp, GitHub, and exchange email address or phone numbers.		
10	Provide Project Idea – after previous meetings and brainstorming sessions list all ideas and have discussions on each.	No	Team
11	Brain Storm if project is doable, potential risks associated, originality and get Tolone's Feedback or recommendations.	No	Team
12	Document ideas and list out pros and cons of each along with any additional details explaining the idea.	No	Team
13	Choose an idea – agree and vote on what project idea we think is best after discussing pros and cons.	No	Team
14	Provide project introduction, overview, statement of purpose	Yes – Introduction and Project Overview	Elham - Team
15	This is a high-level task which requires a deliverable. The next 7 sub-tasks outline the tasks needed to complete this milestone.	Yes – Proposal & Plan – Full Document	Evan McClure - Team
16	Brainstorm about risks associated with the project idea, how to mitigate, monitor, and manage the risks and document these for next team meeting. Also, document any hardware and resources needed.	No	Team
17	Team Meeting – this meeting is designed to clarify the scope of the project and ensure the team has the same vision so we can move forward. Discuss and classify risks as well as create the mitigation strategies and start thinking about tasks with level of effort.	No	Team
18	Document Risks, Project Plan, Project Resources, and	No	Rajini – WBS, Project Plan, Risks

	Appendices – These sections were broken down and distributed among the team. Once completed they were communicated out and feedback was provided.		Evan – Risks, task description Elham - scope statement, overview, risks, introduction Team – revisions and feedback
19	Revise project introduction to give additional details on project idea and ensure team understands background of project idea.	Yes – Section 1 of Project Plan - Introduction	Elham - Team
20	Revise project overview and statement of proposal to provide an overview of the project and explain what the purpose of our application is.	Yes – Section 1.1 of Project Plan - Project overview and Statement of Proposal	Elham - Team
21	Develop Project Scope and objectives. This tasks defines the scope of the project, lists basic functionality and business computation which the application will perform.	Yes – Section 1.2 of Project Plan – Project Scope and objectives	Elham - Team
22	Develop Risk Management Strategy. Compile a list of risks and potential mitigation, monitoring, and management plans.	Yes – 2 of Project Plan – RMMM	Rajini & Evan - Team
23	Provide task descriptions. This details what work needs to be completed for the deliverable and who is responsible.	Yes – Section 3.2 of Project Plan	Evan – Team *Rajini and Elham did Gantt Chart
24 - 25	Provide Resource Table lists the resources involved in the project.	Yes – Section 4 of Project Plan	Rajini - Team
26	Provide resource hardware and software lists out what technologies are needed in order to develop and built a working application.	Yes – Section 4.2 of Project Plan	Phil & Aneesh - Team
27	Provide Special Resources – reached out to nurse and identify sources to obtain additional information about coronary bypass surgery rehab plans.	Yes – section 4.3 of Project Plan	Evan - Team

28	Provide appendices – lists any additional documentation needed during the project.	Yes – Section 5 of Project Plan	Elham - Team
29	Document and finalize the Project Plan – In this task revisions were added in, formatting was added, and a more complete document was created.	No	Rajini, Evan, Elham -Team
30	Team review of the document – discuss to ensure everything listed is in scope, brainstorm what documentation or research we need to gather on the topic, revise document.	No	Team
31	Changes to the Deliverables – This task revolves around clarifying what is required when it comes to the deliverable, identifying potential gaps, and revising the document for submission.	No	Evan - Team
32	Document Submission – submit finalized document to Dr. Tolone for review and feedback	Yes – Proposal & Plan – Full Document Completed	Evan with Team approval
33	This is a high-level task which requires a deliverable. The next 9 tasks outline the tasks needed to complete this milestone.	Yes – Requirements Specification Initial Draft	Elham - Team
34	Document individual thoughts on functional and non-functional requirements. Reference scope often to determine if requirements are in-scope or out of scope.	No	Team
35	Team Meeting to discuss previous deliverable and lessons learned. Distribute work for next deliverable and continue planning to ensure project is on target to meet deadline.	No	Team
36	Document draft of functional and nonfunctional requirements related to project scope. Ensure basic functionality is included	No	Team

	and there is business computation.		
37	Revise the requirements based on team feedback. After each draft communicate out to team and make revisions as necessary.	No	Elham - Team
38	Team Meeting to discuss functional and non -functional requirements. Need to prioritize and list as required or nice to have based on time.	Yes – Requirements Specification	Team
39	Document how decisions were made, items out of scope and which requirements are required.	No	Evan - Team
40	Brainstorm and think about how requirements play into identified risks, document any new risks that might arise or any other gaps.	No	Team
41	Revise document by making corrections or adding in additional risks, plans, or edit requirements based on concerns.	No	Elham - Team
42	Document Submission – submit revised document to Dr. Tolone for feedback.	Yes – Draft of Requirements Specification	Elham - Team
43	Requirements Specification Full – This is a high level task which will require modification of requirements based on Dr. Tolone's feedback and team discussions.	Yes – Finalized Requirements Specification	Evan - Team
44	Document individual concerns on functional and non-functional requirements. Reference scope often to determine if requirements are in-scope.	No	Team
45	Team Meeting to discuss previous deliverable, feedback, and lessons learned. Distribute work for next deliverable and continue planning to ensure project is on target to meet deadline.	No	Team
46-	Revise Requirements to ensure	No	Team

47	there are no gaps and class requirements are met. Determine level of effort for each requirement.		
48	Team meeting to discuss level of effort remaining and next steps, identify additional concerns and evaluate progress thus far.	No	Team
49-51	Make and last changes to requirements and agree that what is required can be met within deadline. No more requirements will be added after this point. Update Document and sent to team to revise and approve for submission.	Yes – Requirements Specification Final	Evan - Team
52	Submit finalized document to Dr. Tolone for Feedback	Yes – Requirements Specification Final	Evan or Elham - Team
53	Technology Demonstration- This is a high level task which will document which technologies will be used, how we will use them, and how the data and application will work. The end result will be a short demo.	Yes – Technology Demonstration	Aneesh - Team
54	Plan on technologies to be used. Reference the project plan and see if any technologies were left out.	No	Aneesh/Phil - Team
55	Team Meeting to discuss risks associated with each technology in order to mitigate as many as possible. Document versions and discuss what we plan to demo and can get configured in this section.	No	Team
56	Finalize technologies – after this point no additional technologies will be used unless it is absolutely critical to the success of the project.	No	Aneesh - Team
57	Prepare the Technology demo – configure and start setting up technologies, document potential gaps or issues holding up the	No	Aneesh/Phil - Team

	project so these issues can be resolved.		
58-59	Revise the demo based on Dr. Tolone and team's feedback. Ensure demo is simple and realistic.	No	Aneesh/Phil - Team
60	Demo the technologies and explain required functional requirements, how we are addressing technology risks, etc.	Yes – Technology Demonstration	Aneesh - Team
61	Initial Design Specification – This is a high level task which will require mock-ups and designs for the user interface, database, backend and give an idea of how the system will be developed.	Yes –Initial Design Specification	Philip - Team
62	Individual design ideas – Each team member should draw up some mock-ups of the UI and incorporate requirements that were previously documented.	No	Team
63	Draft Design based on requirements specification and ideas. This will include mock-ups, use cases, security features to address potential risks, cosmetics, functional requirements, data flow, and how connections or integrations will occur.	Yes – Initial Design Specification	Team
64	Web Pages – draft the user cases and mock-ups for the UI design and style sheets. Begin development if approved.	No	Rajini/Elham/Evan - Team
65	Database – document data points need to be captured, create table schemas/dependencies/inheritance for database design.	No	Rajini - Team
66	Security Aspect – ensure security best practices are being enforced, including secure connections, data encoding, and no vulnerabilities exist such as SQL injection to best of ability	No	Evan/Phil - Team

	to mitigate risks.		
67-68	Cosmetics – goes hand and hand with the UI and other design. Describes the look and feel of the application and user functionality.	No	Rajini - Team
69	Data – Gather test data to be stored in the database. Compile list of sources in which the data was obtained.	No	Elham - Team
70-72	Compile Design Documentation and review to ensure it is in scope, requirements are met, and identify the gaps or risks. Make revisions and changes as needed based on discussions.	Yes – Initial Design Specification	Team
73	Document submission – submit initial design specification to Dr. Tolone for feedback.	Yes – Initial Design Specification	Philip -Team
74	Design Specification Full Document – this is a deliverable which will include all the details, requirements, and functionality of our design based on feedback and team discussions.	Yes – Final Design Specification	Rajini - Team
75	Individual design ideas – Each team member should brainstorm and bring new suggestions to solve issues identified by Dr. Tolone and the feedback.	No	Team
76	Team Meeting to discuss feedback, do a lessons learned, ensure still within scope and on pace to meet deadline. Will also discuss next steps.	No	Team
77	Revise document based on meeting and send to Dr. Tolone for additional feedback. Update risks and gaps.	No	Aneesh - Team
78	Team Meeting to discuss feedback and ensure there are no issues delaying the project.	No	Team
79-81	Revise design document based on feedback and finalize for submission.	No	Rajini/Evan – Team

82	Document Submission – submit finalized design specification to Dr. Tolone for feedback.	No	Rajini - Team
83	Development – This is a high level task which describes involves implementing and executing the design specifications outlined above. Additional sub-tasks will be added to this section when the time approaches to capture level of effort.	Yes – Working Cardiac Rehabilitation Nurse Application	Rajini/Elham/Evan – front end and database Aneesh/Philip - backend
84	Setup and Configure servers to host the web application. Install technologies and test.	No	Aneesh/Phil - Team
85	Code and document HTML/CSS style sheets for the application based on design.	No	Rajini/Elham/Evan – Team
86	Design and create database instance, test connections, create schema	No	Rajini/Elham/Evan - Team
87-89	Security, Cosmetics, Functionality will come together as the application is being developed based on the requirements specification and design.	No	Team
90	Prepare and sanitize data. Ensure our populace is enough to cover requirements. Populate database and verify data integrity.	No	Team
91-92	Team Meetings will be held several times during this development phase to ensure the right resources are doing the rights tasks, address any issues identified that are holding up the project, and ensure we are all on the same page.	No	Team
93	Test Application – This is a high level tasks which involves creating a test plan to test the functionality of the application and ensure it meets the scope and requirements defined.	Yes – Test Plan	Elham - Team

94-99	Document and execute Test Plan to test UI, connections, functionality works as intended – Identify and document any issues and fix issues. Identify gaps and impact of risks as well as the strategy that we executed to address risks.	Yes – Test Plan/Working Application	Team
100	Team Meeting to discuss lessons learned and to prepare for our project wrap-up and presentation phase.	No	Team
101	Presentation – this is a high level tasks which outlines what we want to present and a summary of technologies used as well as demo of our working application.	Yes – Demo/Presentation of Application	Team
102	Presentation Content Discussion to determine what we want to demo, what needs to be completed prior to presentation, and who will demo what.	No	Team
103	Presentation Preparation – Based on above each team member will prepare the section they will demo and compete write-ups or requirements for presentation	No	Team
104	Revise Presentation – Compile sections, ensure presentation flows and roles/responsibilities are clearly defined.	No	Team
105	Revise Presentation and finalize for submission based on above feedback.	No	Team
106	Submit Presentation to Dr. Tolone detailing our entire project and application.	No	Team
107	Present/Demo – This is where we will show off our final presentation and demo the application.	Yes - Presentation	Team

3.3. Resource Table

Major Tasks, Milestones, and Deliverables	PEOPLE - *denotes team lead	HARDWARE & SOFTWARE	SPECIAL
Proposal & Plan Initial Draft	Pioneers Team – *Elham Mahmoudi	Word, Excel, Project	
Proposal & Plan Full Document	Pioneers Team – Aneesh Garg Elham Mahmoudi *Evan McClure Philip Andrews *Rajini Mamidi	Word, Excel	
Cardiac rehabilitation plan	*Evan McClure *Elham Mahmoudi	Word, Excel, Power point	Contacted Paige Nighland to gather documentation related to surgery and rehab. Based on back ground knowledge(certified bachelor and master degree in nursing in US), and clinical nursing experience and using reliable texts books and other resources: Revising and remodeling the Rehab plan, based on the project requirements Providing normal range of health data. Creating patients list and data because of lack of access to patients' data, due to

			confidentiality and HIPAA rules.
Requirements Specification Initial Draft	Pioneers Team- *Elham Mahmoudi	Word, Excel	
Requirements Specification Full Document	Pioneers Team- Aneesh Garg Elham Mahmoudi *Evan McClure Philip Andrews Rajini Mamidi	Excel, Word, Visio	
Technology Demonstration	Pioneers Team – *Aneesh Garg	Web Server, Database Server, Development Workstations, Windows Server, Apache Tomcat, IIS Version 7.0, Microsoft SQL Server 2008, Eclipse, SQL Server Management Studio	
Design Specification Initial Draft	Pioneers Team – *Philip Andrews	Eclipse, HTML/CSS, Visio, Visual Studio 2012, SQL Server Management Studio	
Design Specification Full Document	Pioneers Team - *Rajini Mamidi	Eclipse, HTML/CSS, Visio, Visual Studio 2012, SQL Server Management Studio	
Development	Pioneers Team – *Aneesh Garg &	All technologies	

	Philip Andrews back-end *Rajini Mamidi, Evan McClure, Elham Mahmoudi Presentation front-end Database Admin - *Rajini Mamidi		
Testing	Pioneers Team – *Elham Mahmoudi	All hardware and implemented software listed	
Presentation/Demonstration	*Pioneers Team	All hardware and implemented software listed	

4. Project Resources

4.1. People

1. Aneesh Garg - Developer
2. Elham Mahmoudi – SME Healthcare, Designer, Tester
3. Evan McClure – PM, Designer, Tester
4. Philip Andrews - Developer
5. Rajini Mamidi – PM, DBA, Designer
6. Dr. Tolone - Stakeholder

4.2. Hardware and Software Resources

Hardware:
Web Server
Database Server
Development Workstations

Software:
Windows Server
Apache Tomcat (Version?)
IIS Version 7.0
Microsoft Project
Microsoft SQL Server 2008
Visual Studio 2012
Eclipse
SQL Server Management Studio
HTML/CSS
Visio
Microsoft Word

Services:
Github – Used to store, share, and edit code.
WhatsApp – Used for communication and coordination among team members.
Google Drive – Used to store and share documentation.

4.3. Special Resources

Paige Nighland – Nurse who will help provide contacts and additional documentation related to Coronary Bypass Surgery and Rehabilitation Plans.

Dr. Tolone – Professor who will provide guidance and ensure we have the resources needed to be successful.

4.4. Appendices

Appendix A: Sample 1 : Draft of potential output and ideas

1- We have a website URL : e.g: www.virtualcarolinacardiacrehabplan.com
2- Patients logs in with the user name, pass word and ID(which is her/his file at the hospital)
   Log in
   User name:
   Password:
   Patient ID (hospital file number):
3- It goes to a webpage:
   John Smith with file number? Welcome to your cardiac rehabilitation plan, please click on each category to see your rehabilitation plan
   Exercise
   Diet
   Medication
   Sleep
   Smoke cessation
   Skin care
   Self-assessment cardiac rehabilitation knowledge tool

   (At end of the page)You can contact health care professional who are responsible for your cardiac rehabilitation plan via live chat whenever you need help or any questions, at least one professional is available 24 hours a day.
   In emergency cases contact 911
   Name job title degree

   4-The patient clicked on exercise
   Exercise
   Week 1:

- Do the exercises twice a day for the first 3 weeks and then once a day for the next 3 weeks. Your exercise program will become more strenuous, so you will not exercise as often as you did at the beginning of your program.
- Gradually build up to 5 repetitions on each exercise.
- You may space exercises out throughout the day to avoid fatigue.
- If any exercise causes excessive discomfort, skip it and try it again in a week or two.
- Extend until it feels tight, and hold the position for 10 to 15 seconds. Relax and repeat.
- Do exercises slowly, avoid fast or jerky movements, and do not stretch to the point of pain.

- Do not hold your breath while doing exercises.

Time: Start right after discharge, or within 1 week after surgery
Position: Lying on your back on the bed or floor
Description:
1-Keep your arms flat on the bed or floor. Place your arms at 90º angles to your body. Keep your elbows slightly bent. Move your hands over your head as far as you comfortably can but keep your arms flat on the bed or floor. Hold this position for 10 seconds.

2- Clasp your hands behind your head, and then bring your elbows in so they are above your ears

. Then flatten your elbows so that they rest against the bed or floor. Hold this position for 10

Seconds.

Scheduled exercises: Please complete the calendar if you did the exercises based on the instructions which were provided for you

Mon	Tue	Wed	Thur	Fri	Sat	Sun
(With drop down list) Times of exercises a day 2 Repetitions of each exercise 5 Holding each exercise 1-4” 5-10” 11-15”	(With drop down list) Times of exercises a day 2 Repetitions of each exercise 5 Holding each exercise 1-4” 5-10” 11-15”	(With drop down list) Times of exercises a day 2 Repetitions of each exercise 5 Holding each exercise 1-4” 5-10” 11-15”	(With drop down list) Times of exercises a day 2 Repetitions of each exercise 5 Holding each exercise 1-4” 5-10” 11-15”	(With drop down list) Times of exercises a day 2 Repetitions of each exercise 5 Holding each exercise 1-4” 5-10” 11-15”	(With drop down list) Times of exercises a day 2 Repetitions of each exercise 5 Holding each exercise 1-4” 5-10” 11-15”	(With drop down list) Times of exercises a day 2 Repetitions of each exercise 5 Holding each exercise 1-4” 5-10” 11-15”

Feedback (for each week)

5 -patient chooses Self-assessment cardiac rehabilitation knowledge tool

Self-assessment cardiac rehabilitation knowledge tool

1- How many times a day should you do exercises?
a.3 times a day
b.2 times a day
c.once a day
d.4 times a day

2- How many times should you repeat each exercise?
a.2 times
b.5 times
c.3 times
d.once

3-How much should you hold each position?
a.3 seconds
b.15 seconds
c.10 seconds
d.b and c

4-do you understand the exercises descriptions and do them correctly?
a. Yes
b. No