IST 654

Business Requirement Document

(CLAIM PROCESSING SYSTEM)

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Meeting Time: Tuesday (8pm-9pm)
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Claim Processing System Requirements

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Revision History				
Version	**Author**	**Reviewed By**	**Review Comments**	**Modified By**
1.0	TEAM ANALYZERS	Team Members, Mentor	- Should be more Specific and granular in nature. - Merge according to requirement headings and not use cases. - Business Process requirements are with respect to the process involved in the claim processing system.	Team Members
1.1	TEAM ANALYZERS	Team Members, Mentor	None	Team Members

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Use Case Name	**Author**
1. Enrollment Check, Plan and ICD Conversion	Sai Pravindar
2. Claim Amount Calculation & Billing	Saurabh Jape
3. Claim Settlement	Will Bianchini
4. ID Card Generation and alerts	Dhvaja Shikare
5. Accumulator	Sargam Gupta

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Health Care Ltd. – *A brief Overview*

In today's health care scenario, when a customer is hospitalized or visits a doctor to get treatment, he/she submits a claim with the health provider company. The company then checks if the customer is insured with the company. The company then goes on to check the coverage that the employee is under. Ex: Some treatments like dental treatments are not covered. After checking the coverage, companies check for how the coverage may apply i.e. did you go in network or out network? This is then followed by checking and matching the ICDM-9 () diagnosis code currently ICDM-9 to the CPT (current procedural terminology). Each of these assign numbers to diagnoses and medical procedures.

If the claim has broken toe proximal phalanx great toe code as the diagnosis and the procedure is open reduction internal fixation of the humerus as the procedure the claim will be refused. You simply can't treat a broken toe by operating on the arm. So the diagnosis must match the treatment.

The claim that the patient submitted is verified by the claim processing system and if successful the amount is deducted since the patient's employer had registered the patient while availing the self insured health plan.

The steps involved in the claim process can be summarized as follows:

1. The insured individual seeks medical attention from a healthcare provider including affiliated hospitals or nursing home etc.
2. The hospital submits charges to the insurer using a health insurance claim form.
3. Claim forms are sent electronically using a series of codes. The charges are received by the insurance company with each claim having a dedicated date and code to ensure timely payment.
4. The health insurance company reviews the charges to make sure they follow their policy guidelines.
5. Once the claim is verified, the selected claims are paid and notified to the customer.

The various services offered by the claim processing system include-

- Verification of claims submitted
- Claim code identification
- Claim code conversion
- Processing of claims
- Sending alerts to individuals about the claim status
- Calculating final claim amount
- Tracking claim status
- Claim report generation

1.0 Business Objectives

The various business objectives of the Health Care Centre Ltd. claim processing system are as follows:

- To design a smooth user experience for customers to access claim portal
- To design a smooth user experience for health care centers to access claim portal
- To build a system that is efficient, effective and has high performance
- To process claims quickly, smoothly and efficiently
- To ensure claims are ICD10 compliant using efficient conversion techniques
- To accurately calculate the final claim amount to be paid by the member on successful processing of the claim.
- To accurately calculate the final claim amount to be paid by the insurance company respectively on successful processing of the claim.
- To verify the claim submitted and process it accordingly
- To ensure smooth and transparent process of providing claims submitted information to employers
- To comply with the latest industrial standards and compliances
- To offer variety of plans to customers to choose from
- To ensure accurate calculation of out of pocket expense, deductibles, and accumulator family plans according to plan selected by customers.
- To provide notifications and update on the status of the claims throughout its lifecycle
- To provide an analysis on the health of the employees by checking the claims submitted by the employees and the pattern of the claims submitted
- To provide value based care by integrating with value based systems to provide discounts to the customer
- To provide discounts according to the customer plan, health details and claim submitted integrating with the re-pricing system

2.0 Stakeholders Objectives

The various stakeholders involved in the claim processing system are:

1. **CUSTOMERS:**

   Customer can submit their claims at any point of time after treatment. The customer health details are saved by hospitals/ clinics/ physicians. After a claim is submitted the claim is sent for processing which involves verification of ICD status, ICD conversion, verification of submitted claim, repricing of claim, calculation of final settled claim amount and sending claim for financing. The claim status is provided to the customer at every step. The customer will get alerts as a text message and an email at every step of the claim processing and also on their web portal.

   There are 2 types of customers:

   a. **In Network –** Customers that get treatment done from a medical practitioner that comes under the insurance providers network.
   b. **Out of Network –** Customers that get treatment done from a medical practitioner that falls outside the insurance providers network.

   Features provided –

   a. Smooth experience to access claim details on portal
   b. View status of the submitted claim
   c. Features and discounts according to plan selected by the user
   d. Health improvement based on incentives provided on the basis of the analysis of claim reports
   e. View to check deductibles and the final claim amount to be paid
   f. Patient health monitoring based on the analysis of claims submitted and the type of treatment the patient is submitting claims for
   g. View and monitoring of Out of pocket, deductible amount remaining for individual customers
   h. Quick, easy and hastle free method of claim submission and processing

2. **EMPLOYER:**

   Employers are the main stakeholders. Health Care Ltd. helps employers manage the health insurance of their employees. The employers register their employees for various types of plans that health Care Ltd. offers. According to the plan that the employee chooses to get enrolled in, the claims submitted by them post hospitalization and treatment, are processed by the system and the status of the claim are provided to the employers as well. This is done through text and email alerts and updates on their web portal.

Features provided –

a. Regular status update of the claims being submitted by the employee
b. Analysis and report generated for employers to view and keep a check on the health of its employees on the basis of the number of claims submitted and the details of the claims being submitted for
c. Smooth and transparent process of claim processing
d. Ensure latest compliances are met
e. Value based claim processing

3. **HOSPITALS/ PHYSICIANS/ MEDICAL CLINICS:**

They are indirect stakeholders. The claim submitted by the employee is updated by the hospitals, physicians and medical clinics. The ICD code verification and inaccurate code updating is done by them to make sure the code is ICD10 compliant.

Features provided –

a. Patient claim detail information
b. Patient health analysis
c. Patient health information, treatment and trend analysis for helping them prepare better according to past information analysis

3.0 Requirements

3.1 FUNCTIONAL REQUIREMENTS

Use case 1: Enrollment Check and Plan Eligibility

Requirement Number	Name	Description	Details
FR001	Network Verification	System should be able to perform Network Verification of the incoming claim	The healthcare provider would forward the treatment and bill details once they are done with their processing. Every claim submitted would contain some information regarding the network, source, contract, amount etc. Once the claim enters Claim processing phase, the system would first verify the network of that claim.
FR002	Source Verification	System should be able to verify the source which has requested for the claim.	A claim might come from a hospital, lab or pharmacy. The system would verify whether the source exist and is a part of the provider network group found earlier.
FR003	Enrollment Verification	System should be able to verify enrollment and plan eligiblity	The self-insurance company has different contracts with hospitals, labs and pharmacies. The system should verify the existence of the contract between the source and insurance company. The system must also verify the eligiblity of the plans.
FR004	Plan Checking	The system must check the enrolled plan of the customer	The system checks for the plan which is associated with the enrollment. There are three types of plans: basic, premium flex , gold and depending upon the plan, the claim calculations would be applied. A plan will have varying deductible limits available.
FR005	Display Message	The system must display appropriate messages based on the result of every backend verification.	

Use case 2: ICD Code Conversion

Requirement Number	Name	Description	Details
FR001	Code Verification	System should be able to perform ICD Code Verification of the incoming claim	The healthcare provider would forward the treatment and bill details once they are done with their processing. Every claim submitted would contain detailed information about the treatment and appointment details. Once the claim enters Claim processing phase, the system would first verify the ICD code of that claim.
FR002	Data Extracts	System should be able to extract the information of the patient.	A claim might come from a hospital, lab or pharmacy. The system would check the patient information and extract the data from the present ICD Code with the information available from the healthcare provider.
FR003	ICD Compliance Check	System should be able to verify the ICD Compliance od the incoming claim.	The system should verify the existence of the ICD code and if the code is ICD 9 then the code is sent to conversion step or if the code is ICD 10 compliant then it is directly sent to the Claim calculation.
FR004	ICD Conversion and Mapping	The system will map and convert the current ICD 9 code to ICD 10 code.	The system maps the current ICD 9 code in ICD 10 code with the help of data extracts retrieved from the patient records. Then the code is converted with the help of general equivalence mapping. There is a medical expert team who will view and update the code incase there are any issues in the conversion and mapping process.
FR005	Alerts	The system must send out an alert to the customer and employer.	The system is required to send out alerts to the patient/employee and the employer after every step of claim processing.

Use case 3: Claim Amount Calculation and Billing

Requirement Number	Name	Description	Details
FR001	Claim source Verification	System should verify the source of the claim submitted.	The system shall maintain a database which maintains all the details of the customer information. It verifies if the incoming claim is legit.
FR002	Claim Processing	System should notify once claim processing begins.	Once the claim is approved the system shall be notified to begin with the process of calculating the final claim amount.

FR003	Plan Check	The system should check the plan of the enrolled customer.	The system shall check which plan the patient has taken. (Gold, Silver or Basic Plan) Each plan has different deductible limits.
FR004	Co-pay Check	The system should check the co-pay amount paid.	The system shall check if the co-pay amount has been paid by the patient to the doctor/hospital/clinic at the time of treatment.
FR005	Deductible Amount For User Plan Check	The system checks the deductible amount that a user has enrolled in.	The system shall check the deductible amount according to the plan that the patient has enrolled for. Example: If the patient has enrolled for the Gold Plan then the Gold Deductible Amount should be used by the system.
FR006	Patient deductible amount balance check	The system checks the deductible amount balance of the patient.	The system shall check the patient's deductible amount balance. If the patient is submitting his first claim system shall update patient deductible balance to the Plan Deductible Amount. E.g. PatientDedBal=Y
FR007	Updated Deductible Amount Calculation	The system calculates the deductible amount balance on the claim submitted.	The system shall check if the patient's deductible amount has been met for each claim by subtracting the amount that the incoming claim was submitted for (X) from the patient deductible amount balance(Y) E.g. DeductibleAmt: Z= Y-X
FR008	Negative deductible amount calculation	If the deductible amount calculated in previous step is negative, balance is set to Zero and claim adjusted amount is calculated	If the DeductibleAmt is negative, (Claim Amount > PatientDedBal) the system shall set the Patient Deductible Amount Balance to Zero and the Claim Adjusted Amount will be calculated. E.g. PatientDedBal=0
FR009	Claim Adjustment Amount Calculation	System calculates the claim adjustment amount.	The value of Claim Adjusted Amount is set equal to the deductible amount. E.g. ClaimAdjAmt=DeductibleAmt
FR010	Positive deductible amount calculation	The system updates the patient deductible amount and sets the claim adjusted amount to Zero in this case.	If the DeductibleAmt is positive, the system shall deduct the deductible amount (Z) from the patient deductible amount balance(Y) and update the patient deductible details. The patient will not have to pay any additional charge for this claim.

			E.g. Patient = Patient - Incoming DedBal DedBal ClaimAmt And, ClaimAdjAmt = 0
FR011	In Network Check	The system checks if the claim filed was an IIN type.	The system shall check if the claim was filed in the network of a pateint's health insurance plan.
FR012	Final Claim Amount Calculation for IIN	The system calculates the final claim amount using the 80% (insurance) + 20% (patient) rule.	If the claim was filed in network, then system shall calculate 80% of ClaimAdjAmt as the amount to be paid by insurance and 20% of ClaimAdjAmt as the amount to be paid by the patient.
FR013	Out network Check	The system checks if the claim filed was an OON type.	If the claim was filed out network, then system shall calculate 20% of ClaimAdjAmt as the amount to be paid by insurance and 80% of ClaimAdjAmt as the amount to be paid by the patient.
FR014	Final Claim Amount Calculation for OON	The system calculates the final claim amount using the 80% (patient) + 20% (insurance) rule.	The system shall update the final claim Adjusted amount notification to the patient and health industries.
FR015	Send to Finance team	The system sends status to the finance team.	The system shall send the final billing details to the finance team for the creation of cheques.
FR016	Notify bill amount to the users	The system updates the claim details.	The system shall notify all patients, employers on the claim bill payment details.

Use Case 4: Claim Settlement

Requirement Number	Name	Description	Details
FR001	Status Update	System shall update Claims status to "Finalizing"	Participating entities will be able to know the relevant claim is in the final stages of processing
FR002	Claims information review	Claims Admin shall have the option to review the Finalize claim	The claims admin will have the opportunity to review the final version of the claim before making the claim record available to be viewed by participating entities
FR003	Read-only claim	The claims admin shall not have the option to edit claim after re-pricing	The claims admin will not have the ability to edit re-pricing figures or information provided by healthcare providers

FR004	Claims auxiliary information text	The claims admin shall be able to append text notes to the claim	The claims admin will be able to add notes to the claim containing relevant information about the claims
FR005	Reject erroneous claims	The claims admin shall have the ability to reject the re-priced claim	Claims with errors or perceived flaws in re-pricing can be rejected and sent back to the relevant step in the process
FR006	Finalized status	The claims admin shall have the ability to determine a claim to be finalized	Finalizing a claim indicates that all claim information is accurate and re-pricing of the claim is acceptable
FR007	Claims backup and storage	The system shall save and store a copy of the finalized claim	The claims system will create an electronic copy of the final version of the claim stored into a records database
FR008	Claims data exportation	The system shall provide the ability to export claims to the finance department for billing	The finalized claims will be send to finance where invoices and records will be issued to patients, employers and health care providers

Use Case 5: ID Card Generation and Alerts

a. ID Card Generation

Requirement Number	Name	Description	Details
FR001	Login	The system should allow patients to login with their Healthcare details.	The patients use their name and default password given by healthcare providers to access the login page.
FR002	Accessibility	The system should be accessible to users after logging in with their healthcare details.	The login details of the patients should be validated so that patients can access their respective forms.
FR003	Forms	The system should provide patients with a form to fill/verify their healthcare details.	The new patients registered have to fill in their details in the new form whereas the patients already registered can update their information.

FR004	Validation by healthcare representatives	The system should allow healthcare provider's medical representative to validate patient details.	The healthcare representatives after receiving newly filled forms or updated filled forms have to ensure that the accuracy of the information is maintained.
FR005	Notification of change from patients	The system should allow authorized healthcare representatives to notify of any modified information after validation.	The healthcare representatives should be alerted if any information is modified on verification to incorporate changes.
FR006	ID Generation	The system should provide an option to generate ID Cards.	Once verification of patient information, the system should process ID Card generation.
FR007	Card Delivery	The system should provide patients with an option of delivering ID Card through courier.	Once the ID card generation process is initiated, the system should allow patients to verify their address.
FR008	Verification	The system should provide patients with an option to verify the information filled.	On finalizing the entire card generation process, the system should allow an alternative to verify their information.
FR009	Swap	The system should ensure the patient details are not swapped with patients having same name.	The patient details based on their common name, have the ability to get mixed up which should be prevented.
FR010	Updation	The system should ensure upgrades in patient plan.	The healthcare plan with any updates should be taken into account for processing healthcare cards.

b. Generating Alerts

Requirement Number	Name	Description	Details
FR001	Rejected Claims	The system should provide alerts when claims are rejected.	The contractual terms sometimes would restrict claims from being processed thereby causing claims to be rejected.
FR002	Denied Claims	The system should provide alerts when claims are denied.	The patient information provided would not be accurate enough leading to the claims being denied.
FR003	Claims Status	The system should notify patients about the status of claims.	The patients after submitting their information should be able to view their claim status if the claims are in process or not.
FR004	Check notification	The system should be able to notify when the checks are generated by Finance.	The claims department would receive notifications from Finance team once the check for the patient is generated.
FR005	View Claims	The system should notify patients, employers and healthcare providers when they can view their claims.	The system provides patients, employers and healthcare providers with an opportunity to view claims once they are finalized so that payment could be planned.
FR006	Out of Pocket Expense	The system should notify patients and employers in network if they exceed out of pocket expense.	The system keeps a track of patients out of pocket expense so that they can be aware if they are exceeding their annual out of pocket expense value.
FR007	Expense paid Confirmation	The system notifies patient when insurance expense is paid.	The patient, employer and healthcare provider receives alerts to confirm the payment of the bill generated.
FR008	Exchanged Claims	The system shall notify if the claims are exchanged between patients.	The system tracks if claims have been exchanged between patients and notify the patients when necessary.

Use case 6: Accumulator

Requirement Number	Name	Details
FR001	Database Maintenance	The system shall maintain a database which holds information of all the patients.
FR002	Batch Processing	The system shall get updates every morning whenever claims are processed, to perform the balance calculations.
FR003	Batch Processing	The system shall send updates to Alerts System every morning after calculating patient's balance.
FR004	Information Check	The system shall check every time if patient's deductible is met.
FR005	Calculation	The system shall calculate the balance of deductible, if it hasn't met yet.
FR006	Information Check	The system shall check if the patient is included in a family plan.
FR007	Information Check	If the patient is included in a family plan, the system shall check if deductible in family plan has met.
FR008	Information Check	The system shall check if the patient's out of pocket limit has reached.
FR009	Calculation	The system shall calculate the balance of patient's out of pocket limit, if out of pocket limit has not reached.
FR010	Information Check	If the patient is included in any family plan, the system shall check whether the family plan has reached it's out of pocket limit.
FR011	Information Check	The system shall check if the claim was filed in the network of patient's health insurance plan.
FR012	Batch Processing	The system shall be updated every morning for batch of new claims which are processed.

3.2 NON FUNCTIONAL REQUIREMENTS

Use case 1,2: Enrollment Check and Plan Eligibility and ICD Code Conversion

Requirement Number	Name	Details
NFR001	Performance	· The system must be online 24/7 without any unplanned outages.
		· The system must be able to process maximum of 1000 claims per hour.
		· The response time during the transition of pages can be a maximum of 0.8 seconds.
		· The system shall respond to the acceptance criteria of 0.2 - 0.8 seconds.
		· The system shall be able to handle a maximum of 400 users as a peak load.
NFR002	Accessibility	· The system shall provide access to claim admin, code converter , medical expert team only.
		· Access to update/modify databases shall be restricted.
		· The system shall be accessible only to admins to approve/reject claims.
		· The system shall be accessible only to code converters to create/update/delete ICD Code.
		· The system shall allow only admin to prioritize claims.
NFR003	Efficiency	· The system shall maintain centralized data to avoid redundancy.
		· Enrollment check and code conversion shall occur step by step to maintain performance.
		· Invalid records and ICD codes shall be automatically deleted to reduce latency.
NFR004	Reliability	· The system shall have automatic failover database cluster during breakdowns.
		· The system shall scrap out a claim from the system if it takes more than 120 seconds(timeout) to process. It will throw a timeout error.
		· The system shall identify the plans and apply claim calculations with accuracy. The ICD codes will be verified accurately before

Use case 3: Claim Amount Calculation and Billing

Requirement Number	Name	Description	Details
NFR001	Performance	The claim processing system should perform calculations at a very fast rate. This is because there could be thousands of incoming claims each day.	- The system must work 24 by 7. As claims can be submitted at any time. - The system must be able to process multiple claims (around 500 claims/hr) concurrently. - The system should perform calculations and update database with the calculated values. - The system shall have an acceptance criteria for response of 0.1-0.5 seconds.
NFR002	Accessibility	System should have varying accessibility to a variety of users.	- The system shall allow access only to IT admins. - The calculated amounts shall be updated and visible to employers, patients and hospital teams. - Access to update/modify shall be restricted.
NFR003	Efficiency	The system shall calculate the precise amount based on the submitted claims.	- The system shall process one claim at a time to calculate the billing amount accurately. - The system shall perform calculations up to 4 decimal places. - The system shall update the database periodically so that it contains the correct value.
NFR004	Reliability	The system shall be reliable for use.	- The system shall have automatic backups to prevent data loss during shutdowns. - The system shall verify and use only the updated amounts.
NFR005	Timeliness	The system shall update status periodically.	- The system shall update the claim status with the accurate billing amount accurately and regularly.

Use case 4: Claim Settlement

Requirement Number	Name	Details
NFR006	Performance	The system shall have the capacity to process up to 1000 claims per hour
		The response time during the transition of of pages can be a maximum of 0.8 seconds
		The system shall be able to handle a maximum of 400 users as a peak load
		The system shall be online 24/7 except for approved maintenance downtime
NFR007	Accessibility	Claims data shall be accessible to claims admin, re-pricing entities, health care providers and patients
		Access to update/modify databases shall be restricted to claims administrators
		Active directory groups will be created and maintained to grant access to information on a need to know basis
NFR008	Efficiency	The system shall maintain a centralized claim database to avoid redundancy
		Duplicate claims will be eliminated by comparing claims to existing information in central database
		The claims system will only allow for the work to be performed on the most current version of claims
NFR009	Reliability	The system shall have automatic backups to prevent data loss during shut downs
		The system shall verify and use only the updated claims

Use Case 5: ID Card Generation and Alerts

a. ID Card Generation

Requirement Number	Name	Details
NFR001	Performance	· The system should navigate from login to form filling page in 2 seconds.
		· The system must be able to validate information within 1 hour.
		· The response time during the transition of pages can be between 0.5-1 second.
		· The system shall respond after submission within 1 second.
NFR002	Accessibility	· The access to modify/update is available to patients and healthcare representatives based on the level of change.
		· The system shall have easy to use interface.
		· The system is accessible to authorized healthcare personnel.
		· The system should support atleast 10000000 users.

NFR003	Efficiency	· The system shall be able to handle information of maximum of 10000000 users.
		· The system shall process card generation based on employer priority, plans opted.
		· The system use only the final updated patient information.
NFR004	Reliability	· The system should back up all patient information.
		· The system should verify all patient details.
NFR005	Timeliness	· The system should keep updating patient information monthly to incorporate any changes.

b. <u>Generating alerts</u>

Requirement Number	Name	Details
NFR001	Performance	· The system should be able to update and navigate for notifying within 3 seconds.
		· The system must be able to validate information within 1 hour.
		· The response time during the transition of pages can be between 0.5-1 second.
		· The system shall respond after submission within 1 second.
NFR002	Accessibility	· The access to enable notifications is only restricted to authorized healthcare representatives.
		· The system shall have easy to use interface.
		· The system should support atleast 10000000 users.
NFR003	Efficiency	· The system shall be able to handle information of maximum of 10000000 users.
		· The system shall process alerts based on claims received within 24 hours or 48 hours
		· The system use only the final updated patient information.
		· The system should be able to process alerts when an error is encountered within seconds of processing information.
NFR004	Reliability	· The system should back up all patient information.
		· The system should verify all patient details.
		· The system should categorize alerts based on rejected claims, approved claims, denied claims etc.
NFR005	Timeliness	· The system should keep updating patient information monthly to incorporate any changes.

Use case 6: Accumulator

Requirement Number	Name	Details
NFR001	INFORMATION	The system shall maintain an updated database of patient's information.
NFR002	SERVICE	The system shall track which patient is reaching an age of 65 and thus needs to be shifted in senior citizen plan.
NFR003	CONTROL (AND SECURITY)	The system shall track which patient is reaching an age of 65 and thus needs to be shifted in senior citizen plan.
NFR004	CONTROL (AND SECURITY)	The system shall have a time out period so that no user can remain log in for more than 20 minutes.
NFR005	PERFORMANCE	The system shall verify the calculations on a daily basis.
NFR006	INFORMATION	The system shall maintain profile of every patient with the following attributes: PatientID, Claim_Cost, Deductible_Balance, Out_of_pocket_Balance
NFR007	ECONOMY	The automated process's cost calculation shall be lesser than the original value.
NFR008	EFFICIENCY	The system shall make errors in calculating deductibles and OOP up to a defined limit.
NFR009	EFFICIENCY	The system shall be termed in dangerous state if the limit of making errors has been crossed.
NFR010	SERVICE	The employees who manually rectify the errors in calculations shall be trained in tools like MS Excel.

3.3 BEHAVIORAL MODELLING REQUIREMENTS

Use case 1: Enrollment and plan check

Enrollment Check	**Rule 1**	**Rule 2**	**Rule 3**
Condition 1	Patient/Customer enrollment verified successfully in the database.	Patient/Customer found successfully in the database.	Patient/Customer not found in the database
Condition 2	Patient is associated with the insurance company.	Patient is not directly associated with the insurance company.	Patient/Customer not found in the database
System Response	The system would display a message on UI saying 'Provider Network Name Verified: In Network'. The claim should be forwarded to the next phase.	The system would display a message on UI saying 'Provider Network Name Verified: Out Network'. The claim should be forwarded to the next phase.	The system would display 'Customer Invalid' error message on the UI. The claim should be sent back to the Claims Processing Team.

Condition	**Rule 1**	**Rule 2**	**Rule 3**
Patient/Customer enrollment verified successfully in the database.	Yes	No	No
Patient/Customer found successfully in the university database.	No	Yes	No
Patient/Customer not found in the database	No	No	Yes
System Response	The system would display a message on UI saying 'Provider Network Name Verified: In Network'. The claim should be forwarded to the next phase.	The system would display a message on UI saying 'Provider Network Name Verified: Out Network'. The claim should be forwarded to the next phase.	The system would display 'Customer Invalid' error message on the UI. The claim should be sent back to the Claims Processing Team.

Condition	**Rule 1**	**Rule 2**	**Rule 3**
Plan Name found in the database.	Yes	No	No
Plan Name not found in the database.	No	Yes	No
Plan expired.	No	No	Yes
System Response	The system would show a message: 'Plan Details Verified'. The claim should be forwarded to the next phase.	The system would show a message: 'Plan details not found'. .	The system would show a message: 'Plan Expired'.

Use case 2: Code conversion and mapping

Condition	**Rule 1**	**Rule 2**	**Rule 3**	**Rule 4**
ICD Code found in the pattient records	Yes	No	No	No
ICD Code not found in patient records	No	Yes	No	No
ICD code standard is 9	No	No	Yes	No
ICD code standard is 10	No	No	No	Yes
System Response	The system would show a message: 'ICD Code Verified'. The claim should be forwarded to the code standard check.	The system would show a message: 'ICD Code not Found' .The claim should be sent back to the healthcare provider.	The system would show a message: 'ICD Code Standard: 9 - Needs to be converted to be ICD 10 compliant".The claim will be forwarded to the code conversion step.	The system would show a message: 'ICD Code Standard: 10 ".The claim will be forwarded to the claim calculations step.

Condition	**Rule 1**	**Rule 2**	**Rule 3**	**Rule 4**
Data Extract from ICD 9 is mapped to ICD 10 fields	Yes	No	No	No
Data Extract from ICD 9 is not mapped to ICD 10 fields	No	Yes	No	No
ICD 9 is converted to ICD 10 successfully.	No	No	Yes	No
ICD 9 is not converted to ICD 10 successfully.	No	No	No	Yes
System Response	System will display a message that "ICD mapping is successful" and will be forwarded to the code conversion.	System will display a message that "ICD mapping unsuccessful" and will be sent back to the claim admin for getting the required data extract.	The system should show a message: 'ICD Code Conversion: Successful" and claim will be forwarded to calculations.	The system should show a message: 'ICD Code Conversion: Failure" and claim will be forwarded to medical expert team for review and updation.

Use case 3: Claim Amount Calculation and Billing

a) Patient visits In Network Health Provider

Plan Type	**Rule 1**	**Rule 2**	**Rule 3**	**Rule 4**	**Rule 5**
Member In Plan?	Yes	Yes	No	Yes	Yes
Co-pay Amount	Yes	Yes	Yes	No	No
Claim Amount	Claim Amount < Deductible Amount	Claim Amount > Deductible Amount	Claim Amount < or > Deductible Amount	Claim Amount < Deductible Amount	Claim Amount > Deductible Amount
Deductible Amount Balance Present	Yes/No	Yes/No	Yes	Yes	Yes
System Response	The system shall deduct the claimed amount from the deductible and the deductible balance would be reduced Deductible Amount to be paid = 0 No Insurance fee No member fee Member has to pay only co-pay fee	The system shall reduce the deductible balance to Zero Deductible=0 Amount to be Paid = Claimed Amt - Deductible Amt Insurance:80% Member: 20% Member has to pay 20 % and has already paid co-pay	System displays a message 'Member is not registered in any plan' User has to register for New Plan	The system shall deduct the claimed amount from the deductible and the deductible balance would be reduced Deductible Amount to be paid = 0 No Insurance fee No member fee Co-pay amount is deducted from deductible amount	The system shall reduce the deductible balance to Zero Deductible=0 Amount to be Paid = Claimed Amt - Deductible Amt Insurance:80% Member: 20% Member has to pay 20% and co-pay fee

b) Patient visits Out of Network Health Provider

Plan Type	**Rule 1**	**Rule 2**	**Rule 3**	**Rule 4**	**Rule 5**
Member In Plan?	Yes	Yes	No	Yes	Yes
Co-pay Amount	Yes	Yes	Yes	No	No
Claim Amount	Claim Amount < Deductible Amount	Claim Amount > Deductible Amount	Claim Amount < or > Deductible Amount	Claim Amount < Deductible Amount	Claim Amount > Deductible Amount
Deductible Amount Balance Present	Yes/No	Yes/No	Yes	Yes	Yes
System Response	The system shall deduct the claimed amount from the deductible and the deductible balance would be reduced Deductible Amount to be paid = 0 No Insurance fee No member fee Member has to pay only co-pay fee	The system shall reduce the deductible balance to Zero Deductible=0 Amount to be Paid = Claimed Amt - Deductible Amt Insurance:20% Member:80% Member has to pay 80 % and has already paid co-pay	System displays a message 'Member is not registered in any plan' User has to register for New Plan	The system shall deduct the claimed amount from the deductible and the deductible balance would be reduced Deductible Amount to be paid = 0 No Insurance fee No member fee Co-pay amount is deducted from deductible amount	The system shall reduce the deductible balance to Zero Deductible=0 Amount to be Paid = Claimed Amt - Deductible Amt Insurance:20% Member: 80% Member has to pay 80% and co-pay fee

Use case 4: Claim Settlement

Claims Finalizing	Rule 1	Rule 2	Rule 3
Condition 1	Information on claim is accurate with the treatment the patient received	Information on claim is not accurate with the treatment the patient received	Duplicate Claims are discovered
Condition 2	Agreement has been reached for final price of claim	Agreement has not been reached for final pricing	Claims information is accurate and re-pricing has occurred
System response	Claim will be finalized and sent to re-pricing	Claim will not be finalized	Finalize the first claim to be processed and reject subsequent claims

Use Case 5: ID Card Generation and Alerts

a) Validating Information:

Inputs	Healthcare Providers	
	Valid	Invalid
Patient Name	Yes	N/A
ID Number	Yes	No
Employer Name	Yes	No
Type of Plan	Yes	No
Treatments covered	Yes	N/A
Type of Network	Yes	No
System Response	User authenticated and card generation process within 24 hours for in network patients and within 48 hours for out of network patients	Invalid ID Number: Invalid entry. Please use the ID assigned with your name
		Invalid Employer/Group Number: Invalid prompt
		Invalid Plan: Invalid prompt
		Type of Network: Invalid prompt

Requirements:

1. The patient should provide valid details of their information like ID Number and Name.
2. The patient should ensure that he is aware of his employer name if he is changing jobs before processing his information.
3. The patient should be aware of the plan adopted by his employer.
4. If the patient is not sponsored by his employer, he should be aware of his out of network plan and the treatments involved.

b) ID Card Generation

Inputs	Customers	
	<1 day for verification	>1 day for verification
Patient Name	Yes	Not Verified
ID Number	Yes	Not Verified
Employer Name	Yes	Not Verified
Type of Plan	Yes	Not Verified
Treatments covered	Yes	N/A
Type of Network	Yes	Not Verified
System Response	Your Healthcare ID card generation is in process and you will receive it within 3 business days for in network patients and within 7 days for out of network patients	Invalid Name: The Name should match with your employer records prompt. Card Generation delay
		Invalid ID Number: Please verify your ID with your healthcare provider prompt
		Invalid Employer Name: Invalid Prompt. In case of changed employer please update your information prompt. Card Generation delay
		Invalid Type of Plan: Please confirm with employer about your plan type prompt. Card Generation delay
		Invalid Type of Network: Please verify if employer exists prompt. Card Generation delay

Requirements:

1. The patient should be aware if his card processing details are not verified within 1 day then he has to rectify his information provided
2. The patient should provide appropriate data for verification of his personal information like his name, id number, employer name, type of plan, treatments covered and type of network.

c) Generating Alerts

Inputs	Customers		
	Approved	Rejected	Denied
Patient Name	Yes	Not Verified	Not Verified
ID Number	Yes	Not Verified	N/A
Employer Name	Yes	Not Verified	Not Verified
Type of Plan	Yes	Not Verified	Not Verified
Treatments covered	Yes	N/A	N/A
Type of Network	Yes	Not Verified	N/A
Validity of Plan	Yes	Not Verified	Not Verified
Amount	Yes	Not Verified	N/A

System Response	Claim is under process and will receive updated bill in 24 hours for in network and 48 hours for out of network.	Invalid Name: The Name should match with your employer records. Prompt Please confirm your full name as per your identity.	Invalid Name: The Name should match with your employer records. Prompt Please confirm your full name as per your identity.
		Invalid ID Number: Please verify your ID with your healthcare provider prompt.	Invalid Employer Name: Invalid Prompt. In case of changed employer please update your information prompt. Claims denied prompt
		Invalid Employer Name: Invalid Prompt. In case of changed employer please update your information prompt. Claims denied prompt	Invalid Type of Plan: Please confirm with employer about your plan type prompt. Claims rejected prompt. Please verify with your employer about your plan details if in network/ verify payment details prompt for out of network patients. Claims processing rejected alert.
		Invalid Type of Plan: Please confirm with employer about your plan type prompt. Claims denied prompt.	Invalid Validity of Plan: Please verify your plan validity. Claim rejected prompt. Please verify with your employer about your plan details if in network/ verify payment details prompt for out of network patients. Claims processing rejected alert.
		Invalid Type of Network: Please verify if employer exists prompt. Claim denied prompt	
		Invalid Validity of Plan: Please verify your plan validity. Claim denied prompt.	
		Invalid Amount: Please pay the correct amount. Claim denied.	

Requirements:

1. The patient should provide details like Patient Name, ID Number, Employer Number, Type of Plan, Treatments covered, type of network, validity of plan and amount.
2. The contractual conditions should be validated so that claims are not denied.
   The patient should

Use Case 6: Accumulators

	REQUIREMENT NUMBER →					
CONDITION ↓	**1**	**2**	**3**	**4**	**5**	**6**
Individual Deductible Met?	T	F	F	F	F	F
Individual Out Of Pocket Reached?		T	F	F	F	F
Family Deductible Met?			T	F	F	F
Family Out Of Pocket Met?				T	F	F
In Network Service?	T/F		T/F		T/F	T/F
Co-Pay was paid						T
ACTION						
UPDATE PATIENT'S BALANCE	✓	**N/A**	✓	**N/A**	✓	✓
UPDATE CLAIM'S STATUS	✓	**N/A**	✓	**N/A**	✓	✓

Requirements:

- The system shall maintain hold of writing permission in the database.
- The system shall be designed in a way through which it automatically calculates respective columns of balance deductible, balance out of pocket limit.
- Any erroneous calculation shall be handled manually.
- The system shall maintain a status which signifies the balance was calculated and updated for future reference.
- The system shall also keep a track of all the physicians and hospitals with their respective area code. This is done to map where the patient consulted the doctor and whether that area was in network of his insurance plan?
- The system shall let employee log in with correct ID and password.
- The system shall be maintained as private and confidential since Accumulator holds honest records of patient's account.

3.4 MAINTENANCE REQUIREMENTS

Use case 1: Enrollment Check and Plan Eligibility
Use case 2: ICD Code Conversion

Requirement Number	Name	Description
MR001	Data Extract / Code backup	The code converter will be allowed to save the ICD codes and the corresponding data extract and maps so that it can be used for future claim processing.
MR002	Calculation Backup	The data used for calculation will be saved and the multiple data sources will be documented and clearly explained in a report.
MR003	Internal Audit	The challenges faced in the code conversion and claim calculation will be documented and saved in the database for future references. The challenges will be discussed with the entire team so that they can use the information in future claim processing.
MR004	Database Updating	The system shall allow admin to add new comments to the claim which will be useful for claim calculation and ICD conversion.
MR005	Prioritize Claim processing	The system shall allow claim admin to prioritize claims depending on the request from healthcare provider or employer.
MR006	Database backup	The system shall allow the admin to take full backup of the database incase the data is lost due to technical difficulties.
MR007	System Restart	The system shall allow the admin to restart the system in case of any slowness or breakdown.

Use case 3: Claim Amount Calculation and Billing

Requirement Number	Name	Details
MR001	Calculation Backup	- The data used for calculation shall be saved in multiple data sources. The data backup will be taken periodically using automated backup systems to avoid any loss of data.

MR002	Code Backup	- The code used for calculations shall be saved in multiple data sources. It can be used for future claim processing.
MR003	Database Updating	- The system shall update the database periodically storing updated values at various steps of calculations.
MR004	Internal Audit	- The system shall save the calculation formula and shall document all the claim billing amount calculation for future reference. This can be accessed by auditors and the team in future to refer to the history of the processed claims.
MR005	Database Backup	- The system shall backup the updated content using automated backup mechanism.
MR006	System Restart	- The system shall autorestart incase of slowness or breakdown. Admin shall also have the rights to restart the system.

Use case 4: Claim Settlement

Requirement Number	Name	Description
MR001	Claim Code backup	Claims needs to be backed up after each edit
MR002	Communication Channel	Communication channels between re-pricing and the provider must be intact
MR003	Data formatting	Data formatting must be consistent among participating entities
MR004	Accessibility	Claims, patient, employer, provider information need to be accessible
MR005	User Access	Access control shall be established for access to patient health information
MR006	User login credentials	User name and Password is required to access any HCG system

MR007	Information Access	Access to information shall be granted on an as needed bases
MR008	Maintaining Error logs	Errors in the claim processing system shall be logged to an error log file
MR009	Error alerting maintenance	Errors shall be alerted to HCG Administrators to manually investigate

Use Case 5: ID Card Generation and Alerts

a) ID Card Generation

Requirement Number	Name	Description
MR001	Patient Information Backup	Patient information required from the patient will be stored in the database to maintain its history and use for further validation.
MR002	Update	The system shall automatically update the patients information periodically in case of changes and store it in the database.
MR003	Card Generation	The system would process the card generation for patients whose information is confirmed before 05:00pm on business days and 01:00 pm on Fridays.
MR004	Verification on Card Delivery	The system will verify if each patient has received card within 3 business days for in network patients and within 7 business days for out of network patients.

b) Generating Alerts

Requirement Number	Name	Description
MR001	Patient Information Backup	Patient information required from the patient will be stored in the database to maintain its history and use for further validation.
MR002	Patient information Update	The system shall automatically update the patient information periodically in case of changes and store it in the database.
MR003	Claims Generated	The system would process claims within 24 hours for in network patients and 48 hours for out of network patients provided information provided is accurate and requires no validation.

MR004	Claims Status	The system will store information regarding all the claims cleared/pending by the patients after the bill is generated.

Use case 6: Accumulator

Accumulator needs to be maintained for following reasons:

- The database of patient's records in terms of balance in their respective plan is important. Losing this valuable data can lead to unsubstantial calculation of their claims.
- This information in accumulator is private and hence its security needs to be maintained.

Requirement Number	Name	Description
MR001	Data Extract / Code backup	The system requires a set of unique log in ID and password for every employee who can log into Accumulator.
MR002	Read Only Access Right	The system is required to let Employees from other departments have accessibility right for fetching desired information.
MR003	Write Only Access Right	The system is required to let patients possess accessibility right in order to update their information.
MR004	Read & Write Only Access Right (UPDATE/MODIFY/DELETE)	The system is required to let employees who maintain the accumulator have accessibility right for updating the database.
MR005	Data Archiving Policy:	The system is required to make alias and archives of patient's records.

3.5 DATA REQUIREMENTS

Use case 1: Enrollment and plan check

Requirement Number	Name	Description
DR001	Customer Name	The Customer name is required for the system to verify it with its own database to check for enrollment.
DR 002	Healthcare provider Name	Nme of hospital, lab or pharmacy from where the claim request is coming.
DR 003	Customer ID	The Contract Number is used to verify the existence of the customer in system's database. It is also required to verify the customers validity and check the expiry date of the plan.It is used to know about the plan of customer which is required for claim calculation.
DR 004	Bill Details	The healthcare provider should forward the bill amount while submitting the claim.
DR005	Treatment Details	The healthcare provider should forward the treatment details while submitting the claim.

Use case 2: Code conversion and mapping

Requirement Number	Name	Description
DR 001	ICD Code	The healthcare provider should forward the ICD code of the claim while submitting the claim.
DR 002	Treatment Details	The healthcare provider should forward the treatment details while submitting the claim since it contains the details of the patient which will be used in ICD code conversion
DR 003	Data Extracts	The data extracts must be submitted by the healthcare provider so that it will be used for mapping the current ICD 9 code in the ICD 10 fields.

Use case 3: Claim Amount Calculation and Billing

Requirement Number	Name	Details
DR001	Customer Details	- The system shall require the customer personal details and the health details.
DR002	Co-Pay Amount	- The system shall require the co-pay amount paid by the patient at the time of treatment.
DR003	Deductible Amount	- The system shall require the plan details that the patient is enrolled in. This will help him calculate the deductible amount.

DR004	Customer Id	- The system shall require the customer number to verify the plan and check the deductible amount balance available to the user.
DR005	Type of Network	- The system shall require the type of network that the patient was treated in (i.e. IIN or OON) The system needs this data to calculate the percentage that will be paid by the member and the percentage that will be paid by the insurance company while creating the bill.
DR006	Bill Details	- The system requires the bill details to verify the type and amount of treatment given to the member.

Use case 4: Claim Settlement

Requirement Number	Name	Description
csDR001	Re-price check	The re-pricing information is required to finalize claim
csDR002	Format check	Claims formatting must be consistent among participating entities
csDR003	Validate fields	The system shall be able to ensure all fields are completed
csDR004	Security check	Fields shall be updateable only through an issue escalation process
csDR005	Financial detail Accessibility	All information needed by the finance department shall be accessible via centralized database

Use Case 5: ID Card Generation and Alerts

a) ID Card Generation

Requirement Number	Name	Description
DR001	Patient Name	The patient name is required for the system to verify existing record in database.
DR002	Patient ID	The patient ID is required to verify if they have e-card or physical card.
DR003	Employer Name	Employer Name is required to denote the network type.
DR004	Type of Plan	The type of plan is required to identify the card color and design.
DR005	Treatments covered	The treatments covered are essential so that they are printed on the card.

DR006	Type of Network	The type of network is required to process the card generation process in the selected time duration.

b) Generating Alerts

Requirement Number	Name	Description
DR001	Patient Information	The system should collect patient information such as name, id, employer details, type of network and treatment type.
DR002	Calculations	The system should receive updated information after calculating copay, deductibles, coinsurance etc. to finalize information for generating the bill.
DR003	Sources	The system should receive the repriced claim value and final bill by the finance department to alert the parties for payment.

Use Case 6: Accumulators

Requirement Number	Name	Description
DR001	Claims Accumulation	The system shall fetch claims data every morning from claim processing system.
DR002	Passing On Accumulator Values	The system shall send updated data in the accumulator to the alert system every morning.
DR003	Automated Calculation	The system shall execute data calculations automatically.
DR004	Database Maintenance	The system shall maintain data of every patient all the time.
DR005	Database Security	The system shall also recover data at time of data loss under special supervision.
DR006	Manual Verification	The employees shall re-evaluate data manually which is produced by automated erroneous calculations of the system.

3.6 BUSINESS INTELLIGENCE REQUIREMENTS

Use case 1: Enrollment and plan check

Requirement Number	Name	Description
BI001	Incoming Claims	The system shall count the number of incoming claims in a day.
BI002	Customer mapping	The system shall be able to count and categorize the incoming claim and map it to the particular member who is enrolled.
BI003	Verification Completeness	The system shall ensure that there are no pending claims in the queue and that all claims passes through the plan and enrollment verification phase.
BI004	Delete expired members	While doing enrollment verification, the system will delete a contract from database if the membership already expired.
BI005	Claim reject	The system shall redirect claims back to the healthcare provider if at any point, if the verification process fails at some step.

Use case 2: Code conversion and mapping

Requirement Number	Name	Description
BI001	Incoming Code conversions	The system shall count the number of incoming ICD codes to be converted in a day.
BI002	Possible conversions	The system must be able to check 50 ICD codes if they are ICD 9 or 10 complaint per minute.
BI003	Conversion Completeness	The system shall ensure that there are claims are converted completely and the ICD 9 codes are completely mapped to ICD 10 fields.
BI004	Send for review and update	At any point during or after the conversion process the data (alerts)can be sent for review to the medical expert team for their views and updating the codes.
BI005	Redirecting claims	The system shall redirect claims back to the healthcare provider, if at any point, the conversion process fails at some step.

Use case 3: Claim Amount Calculation and Billing

Requirement Number	Name	Details
BI001	Incoming Claim	- The system shall count the number of incoming claims submitted by the patient.
BI002	Copay Amount	- The system shall check the amount that customer paid during the treatment as co-pay fee.
BI003	Calculation Intelligence	- The system shall perform calculations according to the plan that the patient had selected and the corresponding deductibles.
BI004	Verification of completeness	- The system shall ensure that there are no pending claims, for which calculating the billing amount is pending.
BI005	Submitted claim amount verification	- The system shall verify the amount that the claim was submitted for.
BI006	Claim Reject Handling	- The system shall reject the claim if there is a failure in the verification process.
BI007	Claim Adjustment Calculation	- The system shall be able to determine the 80%+20% ratio depending on the type of claim submitted. - E.g. IIN or OON
BI008	Send for Financing	- The system shall send the final calculated billing amount to the financing team and update the patients with the bill details.

Use case 4: Claim Settlement

Requirement Number	Name	Details
BI001	Employer Information Access	System shall have access to employer information including industry, health plans offered, number of employees, list of employees ages and associated gender
BI002	Enrollment Data Access	System shall have access enrollee data including age, gender, health history, family health history if provided, employment status, employer, job function, coverage plan
BI003	No Access	System shall not have access to social security numbers, names, or contact of enrollees
BI004	Claim Access	The system shall have access to all claims
BI005	Identify Settled Claim	The system shall be able to identify settled claims
BI006	Identify Open Claim	The system shall be able to identify open claims
BI007	Identifying Rejected claims	The system shall be able to identify rejected claims

BI008	Claim Error identification	The system shall have access to erroneous claims data
BI009	Claim Information Access	System shall have access to provider information extracted from claims
BI010		System shall have access to a claims filing date
BI011		System shall have access to a claims settlement date
BI012		System shall have access to initial claims pricing
BI013		System shall have access to final claims pricing
BI014	Financial Information Access	System shall have access to outstanding balances from the financial department
BI015		Systems shall have access to positive balances from the financial dept.
BI016	Employer details access	Systems shall have access to employer payment history
BI017	Health Plan Access	System shall have access to enrollee health plans
BI018	Report Generation	System shall have ability to run to export data to tableau
BI019		System shall have ability to export data to R studio
BI020		System shall have the ability to publish reports to requesting parties

Use Case 5: ID Card Generation and Alerts

a) ID Card Generation

Requirement Number	Name	Description
BI001	Address Change	The system shall count the times patient selects no for any updates in their delivery address.

BI002	Medical Plan Track	The system should track the users having same medical plan.
BI003	ID notification	The system should provide the list of patients who have received/ not received ID cards upon delivery.
BI004	In-Network/Out-of-network	The system should be able to identify in network and out of network patients for ID card generation.
BI005	Update Incorrect Information	The system should be able to update incorrect patient information when selecting an update option.
BI006	Unfilled Entries	The system should detect unfilled entries and prompt the patient to fill them.
BI007	Physical ID Check	The system should count the times the patients selects no for physical ID card.
BI008	Change in Plan	The system shall count the times the patients selects no for upgrades in their plans.
BI009	Change in Employer	The system shall count the times the patients selects no for change in employer.
BI010	Incorrect Information Validation	The system should track how many times the patients provides incorrect information for validation.

b) Generating Alerts

Requirement Number	Name	Description
BI001	Plan	The system should segregate data according to the type of plan.
BI002	Network	The system should segregate data according to the network.
BI003	Claim Category	The system should keep a log of claims approved, rejected and denied.
BI004	Incorrect Information	The system should allow modifications for changing incorrect information.
BI005	Status of Claims	The system should update status of claims.
BI006	Unknown Activity Alert	The system should generate alert for each unknown activity encountered.

BI007	Employer Claim	The system should segregate data according to their employers.
BI008	Expense Tracking	The system should be able to track the time period in which the patient has cleared his bill.

Use Case 6: Accumulators

Requirement Number	Name	Description
BI001	Analytical Requirement	The system shall check how often calculation errors are made by the system?
BI002	Analytical Requirement	The system shall check are calculation errors handled properly by the employees?
BI003	Analytical Requirement	The system shall check how many patient's deductibles are met?
BI004	Analytical Requirement	The system shall check how many patients out of pocket limit has reached?
BI005	Tools Requirement	The system requires BI tools like spreadsheets, data mining, data warehousing, and local information systems.

4.0 Risk and Mitigation

a) RISK REGISTER:

Risk ID	Risk	Mitigation
1	System is not able to access the databases to verify enrollment.	The Database Administrator must be alerted to give appropriate permissions
2	System fails while verifying a plan eligibility	The system should automatically save the claim in process and resume verification once back in process.
3	System is not able to access the databases.	The Database Administrator must be alerted to give appropriate permissions
4	System fails while processing a claim.	The system should automatically save the claim in process and resume verification once back in process.
5	System not responsive	The claim admin should raise a request with the server team to restart the server.
6	System fails while processing a claim or taking too much time to process.	The claim admin should raise a request to restart the DB to clear the deadlock
7	System taking too much time to check ICD code	The system should automatically save the claim in process and resume checking once back in process.
8	System taking too much time to convert the code	The code converter should be alerted to look into the issue and the DB , App and Web server logs need to be checked for hung threads, deadlocks or dump issues,
9	System fails to verify the co-payment details	The system shall alert the member to submit proof of the cop-pay amount.
10	System is not able to access the updated member deductible value.	The admin must be alerted to check if there was an error in the system while calculating and saving previous claims
11	System is not able to verify if the user network was IIN or OON.	The system shall alert the member to attach proof of the type of network of the treatment.
12	System fails while calculating and processing the claim.	The claim admin should raise a request to restart the database to clear deadlock.
13	System is not responsive	The claim admin should raise a request to restart the server.
14	System may perform a wrong calculation if the claim id submitted is incorrect and associated to a different patient amount	The system should have a verification screen to verify the details entered.
15	System user fails to check if the out of pocket payment limit of the member is crossed.	The system should notify the admin when the out of pocket payment amount has been reached for the year
16	System may not have updated the health insurance plan if it was renewed recently	The claim admin should make sure that the health insurance plan is updated correctly
17	System could skip a batch calculation due to incorrect or error in one of its claims	The system should re run the entire batch, after the claim admin identifies the claim that had the issue
18	A patience claim may contain errors in each category.	Manual check
19	An error present in a claim will delay the final re-pricing until corrected	Validate claim information before re-pricing

20	Multiple versions of the same claim may be in circulation. Duplicated claims may be a product of fraud.	Search claims database for similar matches
21	Fraudulent claims will incur unwarranted costs for all claims entities	Investigate duplicate claims and claims with anomalies
22	e-claim files can become unusable due to integrity issues	Access previous archived claim versions
23	Interoperability between Claims entities is faulty	Utilize alternative method of dispersal
24	Interoperability between claims entities is faulty	Utilize alternative method
25	During claims processing the patient transition to a different healthcare plan	Use most recent health plan criteria
26	During claims processing the patient becomes deceased	Create agreement with employers on process
27	During claims processing the patient receives financial protection under the law	Patient Employer is liable
28	During claims processing the employer receives financial protection under the law	HCG shall raise issue with legal department
29	During claims processing the health care provider receives financial protection under the law	HCG shall raise issue with legal department
30	The financial and logistical procedures of a health care provider are changed	HCG shall keep up to date records on health care providers
31	The HCG application becomes inaccessible	Offsite data backups will retain information
32	The electronic record system becomes inaccessible	A secondary backup shall be in place
33	Tech infrastructure becomes damaged beyond repair	Backups shall be distributed over large geographic regions
34	The healthcare providers can login on behalf of patients and misuse their personal information for personal benefits by modifying information and insurance details.	Ensuring only authorized hospital representatives are given access to see patients personal information
35	The user enters his healthcare ID incorrectly	Provide a snapshot of the ID number where the data should be entered from on the login screen
36	The system fails to response if all the fields are not filled	The system should provide prompts for fields not filled
37	The system access is provided to unauthorized healthcare representatives which could lead to incorrect validation	Giving authority to representatives who can only validate/modify incorrect information
38	The authorized healthcare representative is unavailable or has resigned. This activity is highly dependent on the healthcare individual authorized	Training representatives on the bench for unforeseen events occurs to ensure patient validation is not delayed
39	The server connecting ID card generation is experiencing downtime or failure in connectivity due to the large database	Ensure a fall back server is in place to continue ID card generation process in case of downtime
40	The system does not confirm the address of delivering the card. This could lead to delivery at an address which the user might likely to change	The system should provide a confirmation screen for verifying address of delivery

41	The patient of different age groups might not be able to fill in the details accurately	Provide a tutorial before form filling with examples
42	Delay in the verification of patient information	Increasing the performance of the system and assigning more representatives to validate multiple patient details
43	Restriction in the addition of number of users joining the Insurance	Storing information in a large database to accumulate at least 10000000 users in the system
44	Unable to verify patient information required for updating and modifying	Automated tools in place for verifying with documents and online forms filled
45	Depending on the accuracy and availability of appropriate documents, the process could take 1-2 days	Immediate prompts to verify any information unable to ensure fast processing of patient details
46	Accumulator is an automated database management system which gets updated with patient's balance and benefits after claim processing. It's risky if this automated process doesn't function some time, resulting in un-updated accumulator, which can give extra benefits to patient.	System shall provide a screen for the admin to verify claim balance
47	There is a risk that the calculation might go wrong. Information of two patient's might mix up resulting in wrong balance.	System shall have a confirmation box for admin to verify the patient whose claims balance is being calculated
48	There are chances that a deductible value was met in last claim but the system didn't update it.	System shall display the time and data details for admin to verify the data that is updated.
49	The family plan which the person was associated with could have changed and is not updated in our accumulator.	The system shall send a notification to the user to confirm the family plan. The plan once confirmed by the user would be used by accumulator
50	Some other person from the family plan got his claim processed which never got reported. Calculation of second person's deductible as a family plan will result in incorrect balance.	The user must be verified by the system
51	Out Of Pocket Limit is reached and not reported appropriately.	System admin shall notify the users when the out of pocket limit is reached
52	There can be a case where the patient's records didn't fetch any family plan information.	System shall display error message when no user details are found
53	Health insurance plans benefits are renewed every year. There is a high probability risk that this plan was renewed but not updated. This can result in older out of limit pocket value as of now.	Claims admin should verify the health insurance and the team should keep a check on the health insurance policy
54	There is a risk that a particular area in the outskirts of network was treated in the network. In this way the value updated can be "in the network" costing in lesser value.	The system shall provide a interface for the user to confirm the network of the health provider
55	There are high chances that a claim can be skipped between two batches by the system.	The system support team shall have a interface that keeps a check on the batch processing details
56	There can be a risk where the profile of a patient gets deleted or an attribute in that profile gets deleted	The system shall have an option to rollback to previous state

b) RISK ASSESSMENT:

Risk ID	Risks	Probability of Occurrence	Impact On Occurrence	Likelihood of Advanced Discovery	Likelihood of Prevention	Risk Priority Number
1	The healthcare providers can login on behalf of patients and misuse their personal information for personal benefits by modifying information and insurance details.	2	4	3	3	8
2	The user enters his healthcare ID incorrectly	5	4	1	1	20
3	The system fails to response if all the fields are not filled	1	2	2	1	4
4	The system access is provided to unauthorized healthcare representatives which could lead to incorrect validation	3	5	2	1	30
5	The authorized healthcare representative is unable or has resigned. This activity is highly dependent on the healthcare individual authorized	5	4	3	4	15
6	The server connecting ID card generation is experiencing downtime or failure in connectivity due to the large database	3	4	4	3	16
7	The system does not confirm the address of delivering the card. This could lead to delivery at an address which the user might likely to change	3	3	3	1	27
8	The patient of different age groups might not be able to fill in the details accurately	5	3	3	3	15
9	Delay in the verification of patient information	2	4	1	1	8
10	Restriction in the addition of number of users joining the Insurance	1	5	2	1	10
11	Unable to verify patient information required for updating and modifying	4	4	2	1	32
12	Depending on the accuracy and availability of appropriate documents, the process could take 1-2 days	2	3	2	1	12
13	There is a high chance that this database is not backed up daily. This can result in loss of valuable information.	4	4	2	4	8
14	Health First Ltd.’s accumulator is an automated database management system which gets updated with patient's balance and benefits after claim processing. It's risky if this automated process doesn't function some time, resulting in un-updated accumulator, which can give extra benefits to patient.	2	4	5	2	20

15	There is a risk that the calculation might go wrong. Information of two patient's might mix up resulting in wrong balance.	3	4	5	1	60
16	There are chances that a deductible value was met in last claim but the system didn't update it.	4	3	3	2	18
17	The calculation process is automated and possibly the system can enter incorrect value.	4	4	3	2	24
18	The family plan which the person was associated with could have changed and is not updated in our accumulator.	5	3	4	2	30
19	Some other person from the family plan got his claim processed which never got reported. Calculation of second person's deductible as a family plan will result in incorrect balance.	2	4	3	3	8
20	Out Of Pocket Limit is reached and not reported appropriately.	2	3	2	2	6
21	There might be a risk where co-insurance value is not included.	2	3	4	2	12
22	There can be a case where the patient's records didn't fetch any family plan information.	4	3	4	3	16
23	Health insurance plans benefits are renewed every year. There is a high probability risk that this plan was renewed but not updated. This can result in older out of limit pocket value as of now. The patient can leverage not deserving benefits in this case.	4	3	3	3	12
24	There is a risk that a particular area in the outskirts of network was treated in the network. In this way the value updated can be "in the network" costing in lesser value.	2	2	5	1	20
25	There are high chances that a claim can be skipped between two batches by the system.	4	3	5	3	20
26	The Alert System maintain accumulator's boards for every batch of updates. There are high chances that this record can get corrupt resulting in loss of valuable data.	4	4	2	4	8
27	Risk where a family changes a plan or shifts to a new house and doesn't report to Health First.	5	2	4	1	40
28	There is a possibility where a person's birthday has gone but his age is not updated.	3	2	4	1	24
29	There is a very high risk if log in ID and password of a particular employee is leaked or hacked.	2	5	1	5	2

30	A high risk can occur for this requirement if the hacker takes valuable information within this time frame.	2	5	1	5	2
31	There is a possibility that a day is skipped when the verification was not done.	5	2	2	1	20
32	There can be a risk where the profile of a patient gets deleted or an attribute in that profile gets deleted.	4	2	1	1	1
33	The automated process results in so many errors that the cost in improving becomes much high.	4	4	1	2	8
34	There is a risk if the system crosses its dangerous state and make more than acceptable errors.	4	5	2	3	13
35	There can be chances where an employee is not trained up to mark.	5	2	2	2	10

c) KEY RISK INDICATORS:

1. An alert message for an unauthenticated log in trial.
2. No record of contact with clients enrolled in family plan. This is a key indicator which signifies company is not in touch with clients and hence not updated with any changes they have made.
3. A claim is processed for a patient. Desired calculations for the deductible balance and out of pocket limit balance are to be made in Accumulator.
4. Processed claims left in unit which are waiting to get in batch.
5. Deductible of a patient is met. Hence, it needs to get updated.
6. Out of Pocket limit of a patient has reached. Hence, it needs to get updated.
7. Deductible of a family plan is met. Hence, it needs to get updated.
8. Out of Pocket limit of a family plan has reached. Hence, it needs to get updated.

5.0 Transitional Requirements

Requirement Number	Description
TR001	- The admin shall make sure that the environment has been setup for movement of code to production environment. They should have access to required URLs, passwords, databases, interfaces etc.
TR002	- The admin team shall make sure that the database passwords have been updated and backend code is successfully moved to production. They should verify that all data and packages are moved successfully and that there are no data source objects that are missed during deployment.
TR003	- The admin team shall make sure that the front end code is ready for deployment to production with required approver access
TR004	- The admin team shall make sure that they move the ICD 9 to ICD 10 mapping file to the production environment
TR005	- The admin team shall setup test users to test the application on production environment before giving the signoff to the testing team
TR006	- The admin team must provide signoff and complete smoke testing before signing off the deployment on production environment
TR007	- The claims admin team should be trained on how to deal with troubleshooting
TR008	- The claim admin team should be aware of the security constraints that are involved with the system
TR009	- The claim admin team must be able to handle situations where processing fails or timeout occurs
TR010	- The claim admin team must be able to handle situations of rollback

6.0 Business Process Requirements

Requirement Number	Description
BPR001	- The system shall generate reports based on the patient age with age groups from 20-30, 30-40, 40-50, 50-60, 60-70, 70-80, above 80. This report would be useful to the value based system to provide care to the customers
BPR002	- The system shall generate weekly reports based on the claims submitted by the customers. This report would be useful to the value based system to perform a trend analysis and provide value based care to the customers
BPR003	- The system shall generate reports based on the patient age with age groups from 20-30, 30-40, 40-50, 50-60, 60-70, 70-80, above 80. This report would be useful to the employers to help them understand their employees health
BPR004	- The system shall generate weekly reports based on the claims submitted by the customers. This report would be useful to the employers to analyze the average claims submitted by their employees and would affect their decision making
BPR005	- The system shall generate reports based on the claims that are approved and that are rejected. This would help the audit and compliance team during the review of the processed claims
BPR006	The system shall generate graphs and analyze the pattern of the claims that are submitted. This would help the organization come up with methods to prevent certain diseases or problems well in advance and help them prepare well to fight against them
BPR007	- The system shall forward the claims to the re-pricing team to apply discounts based on the employee plan details
BPR008	- The system shall maintain logs of the approved claims and rejected claims to help analyze the performance of the system and analyze ways on improving the claim processing system and its convenience to the users
BPR009	- The system shall process claims efficiently and quickly thereby improving the claim alerting system to provide real time and low time delay in sending notifications to the user
BPR010	- The system shall update its user interface periodically based on the feedback of the system users to improve the claim processing process
BPR011	- The system shall update the claim mapping table periodically to make sure that the claim conversion process is up to date.
BPR012	- The system shall perform calculations of bill to be paid, out of pocket expense, deductibles and family health plan amounts efficiently and quickly without delay to improve the process of the finance team in the creation of cheque and complete the transaction process of the claim

7.0 Open Issues

Requirement Number	Description
TR001	- The System shall require training for the claims admin to verify claim co-pay, hospital bill and deductible verification.
TR002	- The system shall be provided with a user manual with description to check the claim co-pay amount
TR003	- There system shall come with a user manual with description to verify the hospital bill amount
TR004	- The system should come with a user manual with description to check the deductible associated with each member
TR005	- The claims admin team should be trained on how to deal with troubleshooting
TR006	- The claim admin team should be provided with training on the security constraints that are involved with the system so that he can access and fix any future defect
TR007	- The claim admin team must be trained on how to update the mapping file so that the conversion done is with respect to the latest ICD codes
TR008	- The system shall not create or perform the transaction of the amount of the approved claim. This would be done only by the finance team
TR009	- The system shall have super users that would be trained to provide solutions to business specific customer questions
TR010	- The system customer support team shall be trained on the latest system updates to handle customer queries and to help them provide 24 hour customer support

8.0 Conclusion

Thus, the system deals with more precise codes providing potential benefits like fewer rejected claims, improved benchmarking data, improved quality and care management, and improved public health reporting. ICD-10 will advance healthcare in many ways, with benefits accruing across five major categories.

- Quality Measurement
- Public Health
- Research
- Monitoring and Performance
- Reimbursement

Thus, the ICD-10 compliant Claim Processing System – Requirement Phase Analysis, Behavioral Modelling and the Risk and Mitigations designed are highly beneficial as it helps in the understanding of behavior amongst various parts of the system and helps in the designing of the system. It helps to make sure that the system designed is of high quality, efficient, has good performance and helps in making sure that all scenarios are covered.