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National Kidney and Transplant Institute
Bids and Awards Committee
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Section VII.

Technical Specifications/ Terms of Reference

NKTI Reference No. IB 21-003



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TERMS OF REFERENCE

NKTI HOSPITAL INFORMATION MANAGEMENT SYSTEMS PROJECT

MINIMUM PERFORMANCE STANDARDS AND SPECIFICATIONS

I. BACKGROUND

In 2002, the NKTi implemented a **hospital information system** which was supposed to provide a hospital-wide computerization of the entire premises of NKTi, from clinical to administrative to supply chain management. The implemented hospital information system was composed of the following Systems: admitting and discharge, out-patient department, emergency, billing, PhilHealth, treasury, ancillary services, clinical information system, medical records, accounting, human resource management, purchasing, and warehouse. The installed hospital information system ran for twelve (12) years before being recommended to have a supplier evaluation for an upgrade on the HIS. The final recommendation was that although the installed information system passed the users' evaluation, the direct upgrading with them was not recommended and instead shall pass through the usual bidding process.

In May 2012, an external audit of the NKTi's IT systems was performed and the recommendation was instead of an upgrade, a complete replacement and migration of data was needed due to the extent of changes not just in the Information Technology environment but also in the Institute itself with all of its upgraded and updated services and facilities. This information system would be developed with high emphasis on implementation and support, customer management, project management, and change management.

Recently, NKTi developed a Terms of Reference for the procurement of its **information and communication technology project**, of which, shall include private, internal campus cloud implementation of EMR (Electronic Medical Record), PHR (Patient or Personal Health Record), EHR (Electronic Health Record) and Doctor /Nurse EPM (Electronic Practice Management) systems. All major systems and system has to be 64-bit native application, with interoperability services and can be accessed in secure standard operating system client desktop and/or tablet for user productivity and mobility.



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II. DEFINITION OF TERMS

1. The Project refers to the supply, delivery, installation, implementation, commissioning and maintenance of NKTi end-to-end Hospital Information Management System (a 10-year contract).
2. NHIMS or NKTi Hospital Information Management System refers to a comprehensive and integrated information system that includes Clinical, Administrative, Financial Systems, and Data Analytics. This is synonymous to HIS.
3. Cloud is a general term for various hosted services delivered over the internet. It is the use of remote, rented servers to store and manage data, rather than the use of a local, privately maintained server.
4. Database – refers to all Medsys data including other existing NKTi database.
5. Go “Live” is defined where the entire NHIMS shall be online with at least five (5) years worth of cleaned, migrated, and validated data from current system.
6. Government Regulatory refers to national and local government agencies such as but not limited to: Office of the President, Department of Information and Communication Technology (DICT), National Privacy Commission (NPC), National Telecommunication Commission (NTC), Department of Health (DOH), Philippine Health Insurance Corp. (Philhealth), Commission on Audit (COA), Civil Service Commission (CSC), Department of Budget and Management (DBM), Government Service Insurance System (GSIS), Home Development Mutual Fund (HDMF/Pag-ibig), Bureau of Internal Revenue (BIR) and other Government Financial Institutions (GFIs).
7. HIS Provider refers to the software developer company.
8. IT Infrastructure Facility refers to an enterprise's entire collection of hardware, software, networks, data centers, facilities and related equipment used to develop, test, operate, monitor, manage and/or support information technology services.
9. Major Components of the HIS refers to the EMR, ERP and data analytics and reporting metrics.
10. Proponent refers to Bidders either a single company provider or under Joint Venture Agreement or Consortium. The JV or consortium has to be at least 60:40 ownership in favor of the Local Filipino Partner.



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11. Similar Contracts to Hospital Information Management System (HIMS) refers to contracts involving supply, delivery, development, installation of a complete, integrated Hospital Information System. The Hospital Information System has been installed and implemented in at least 350-beds hospital.

III. PROJECT SYSTEMS

The Project aims to computerize and digitize the entire operation of the National Kidney and Transplant Institute to adopt an almost paperless to completely paperless working environment. The Project likewise aims at providing an enterprise-level hospital information system with interoperable administrative, clinical, and research functionalities – geared towards a government standards-compliant and technology adapting ecosystem of health information exchange. The system shall likewise aid in acquiring information based from hospital data, hence aiding the institute in informed – and evidence – based clinical and administrative decision-making processes. The systems should be developed with an integrated single unified platform which integrates different applications and services to:

- Ensure that the users are using the same datasets and can share information. Data management with metadata information and versioning ensures the data is kept consistent.
- Integrate many kinds of applications (independent from platform, programming language or resource) which can be bound together in workflows and processes to work in conjunction. The different interfaces are hidden by the usage of a uniform interface in the integration platform (Process Integration).
- Interoperability between different operating systems and programming languages by the use of similar interfaces.
- Take security considerations into account so that, for example, data is shared only with the right resources.
- Visual guidance by interactive user interfaces and a common facade for all integrated applications.

All these are designed to improve over-all healthcare delivery services.

The Project consists of the following systems: 1) Application Systems Implementation, and Development; 2) Internet/Network Infrastructure Installation; 3) Hardware Requirements Delivery; 4) Software Procurement and Acquisition of Necessary Licenses; and 5) ICT and Text Messaging Services.

1. APPLICATION SYSTEMS DEVELOPMENT AND IMPLEMENTATION

The general design concept of each application/information system must be responsive to the information requirements, minimum design, performance



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standards and functionalities of the system to be provided and installed for the project. The solution should be a web-based which supports for all latest browsers like Firefox, chrome, safari, etc.

1.1 Application Systems Architecture

The Application System Architecture must meet the following specifications:

- a. Computerized transaction processing of NKTi operation. For this purpose, transaction processing refers to a method of organizing a data processing system in which transactions are processed to completion as they arise and incomplete transactions can be cancelled (rolled back) without harming the integrity of the database.
- b. Enterprise-grade Relational Database Management System (RDBMS), combined with schema-less database systems, to access and manipulate the databases for rapid generation of exception and on-demand reports, development of other query programs, and efficient handling of Big Data.
- c. Multi-tasking and multi-user operating system with a systems technology that is highly resistant to computer viruses, using open source licensing and enterprise grade.
- d. Up-to-date security features to ensure integrity and reliability of database, including:
 - i. Log-in Prompt – Users cannot run the system without going through the biometric-based authentication process.
 - ii. Modular Authorization/Single Access Rights – Access to specific Systems are limited to authorized/privileged users or role-based access.
 - iii. Multi-level Access Control Protection – Designated Authorized users will be issued identification cards with encrypted authorization codes, corresponding to their respective assigned tasks and responsibilities.
 - iv. Audit Trailing of Transactions – Any transactions made by a user can be trailed whenever required.
 - v. Tamper-proof procedures – Editing and revision of constant figures and sensitive data is limited to the systems administrator.
 - vi. Use of Barcode or RFID Technology



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- vii. Policies that support data integrity, validation, and verification
- viii. Policies that support disaster recovery and business continuity for a 24/7 IT system.
- ix. N-Tier SOA architecture and platform agnostic
- x. Should be a web-based solution which supports for all latest browsers like Firefox, chrome, safari, etc.
- xi. Inbuilt workflow engine for defining custom workflows for operation efficiency.
- xii. Inbuilt alert and rule engine
- xiii. SMS and e-mail gateway integration for any desired features and functionalities.
- xiv. REST API support for third party integration.
- xv. Strict adherence to the compliance with the following for standardized clinical communication protocols:
 - a. Clinical Development Architecture (CDA)
 - b. Continuity of Care Record (CCR)
 - c. Health Level 7 (HL7) with built-in integrator/connector
 - d. Digital Imaging and Communications in Medicine (DICOM)
 - e. International Classification of Diseases 11th Revision (ICD 11)
- e. Automatic Report Generation must be enabled.
- f. The systems must be capable of offline transaction and must be able to do automated data synchronization for offline transactions.
- g. Linkage to other government systems

1.2 Characteristics of the Systems

The Systems are characterized by the following principles that will ensure operational efficiency of NKTi's hospital functions, sustainability of technology adoption, and improved efficacy of patient care:

- a. **Comprehensive administrative information system**, compliant with standards set by the Philippine government on information exchange, effectively tailored to establish maximum operational productivity through a cost-effective information system.
- b. **Secure patient-centered health information system**, compliant with standards to be set-up by the Department of Health and the Philippine Health Insurance Corporation on health information.



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- c. **Workflow and process driven**, adaptable to established standards on hospital operations such as the ISO and JCI specifications. Because of the dynamic structure of NKTi departments and units, the SYSTEMS should be able to accommodate any changes in form collection or report generation, as necessary. Report generation should be in multiple formats that would fit the need of the end users of the system. The system should be adaptable to support improvement and optimization the business processes and workflow of the hospital, jointly assessed by the vendor, the end user, the IRM, and the Human Resources department.
- d. **Technology adaptable and scalable** – Optimum-level functioning with health information technologies existing and prospectively made available to NKTi, **including but not limited to** barcoding, wireless connectivity, NFC, telemedicine, clinical decision support systems (Up-to-Date) for evidence-based point-of-care medical resource and drug interactions, personal health records, among others. The New Hospital Information Management System should also be scalable and accessible to tablet and mobile device forms, either in Android or IOS platforms.
- e. **Integrated information system**, with full interoperability across all functional departments of the NKTi; interoperable with existing internal hospital ancillary information systems; as well as with external existing and future information architectures, including the DOH Enterprise Architecture and the PHIC Enterprise Architecture.
- f. **Sustainable project management, software implementation, change management and support** to ensure continuity and improvement of the Project for a minimum of 10 years.
- g. **Intelligent and responsive**. The system should be able to have inherent mechanisms for detecting close-matches for patient names and medical terminology. In such cases, the system should offer decision support methods to assist the users and hence decrease possibility of duplicate records.
- h. **Patient experience management** towards achieving optimum levels of patient care at NKTi, in coordination with PIO.
- i. **Analytics and Hospital Insights**
 - Availability of integrated or inbuilt BI with dashboards for providing real-time / near real-time data to CXO's.



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- Availability of dashboards showing the trends of doctors' performance
- Availability of dashboards showing the performance trends of individual departments
- Availability of dashboards showing the patient counts/revenue statistics to improve operational efficiency.
- Availability of dashboards highlighting the performance of services/professionals.
- Availability of Cost Margin Analysis Dashboard.
- Availability of Department wise consumption pattern for materials for better utilization of resources.
- Availability of dashboards / graphs showing occupancy census in the hospital
- Availability of dashboards showing revenue trends of different categories within the hospital
- Dashboards showing comparison between admitted and discharged cases.

1.3 Business Intelligence and Data Analytics

1.3.1 The system shall provide dashboards and reports that will generate insights on hospital operations and assess how to increase efficiency in operations. Data sources will be the hospital information system.

- Patient Profile – Provides information on patients including demographics, medical history, treatment and other related information. Analysis can be performed based on the following but not limited to:
 - No. of patients per week/month
 - No. of patients per department
 - No. of patients per physician
 - Patients classification according to region/area
 - Patients classification by age group/gender/demographics
 - Patients classification by case/sub-specialty or disease or sickness or operation
 - No. of admissions, readmissions, discharges, deaths, inter-agency referrals, and outcome of treatment
 - Generation of inventory of patient registry and indices by disease and operation



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- Financial Analysis – Provides an overview of the hospital's operations and its financial performance. Analysis can be done based on the following but not limited to:
 - Revenue trends for the last 5 years
 - Revenue and expense allocation across department/area
 - Analysis on receivables and collections
 - Ranking of top revenue contributions by department/physician/facility
 - Ranking of top expense contributions by department/physician/facility
- Inventory Analysis – Provides an overview on the hospital's supplies or inventory and its usage. This will analyze the inflow and outflow of supplies to ensure ample inventory exists to address patients needs and hospital demands. Analysis can include the following but not limited to:
 - Ranking and cost analysis of hospital supplies
 - Analysis of usage of supplies based on diagnosis, test, treatments
 - Comparison of usage vs baseline to determine overuse of supplies
 - Analysis of slow moving supplies or unused/obsolete supplies
- Admissions Analysis – Provides an overview on the patients admitted in the hospital including attending physician, diagnosis and test conducted and corresponding results. Analysis can include the following but not limited to:
 - No. of patients admitted over a period of time
 - Analysis of diagnosed sickness and the symptoms and the patients' geographic location
 - Analysis of the busiest departments and the most ordered test during admission
 - Analysis of the length of stay of a patient vs. Diagnosis vs. Baseline
 - Analysis of doctor and staff assigned to patients during admission

1.4 Functional Requirements of Core Systems

The system should comply with the following specifications, subject to the approval of the end users of the respective Systems and/or systems. The functional requirements should only serve as guide, and the Proponent should still perform basic data requirements analysis



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to validate and conform to all the needs and requirements of each functional department of the NKTi.

1.4.1 General Functional Requirements

- The system should be made available to accommodate all present and future forms which should be query able to provide actionable reports for clinical performance measurements, and produce all present and future reports needed by the functional departments of the National Kidney and Transplant Institute.
- The system should support basic end-user two-factor authentication, with access logs accessible through the administrative information System
- The system should support a medical terminology database which can support ontology features.
- The System must have a Module designer for clinical documentation, which allows administrators to configure new clinical pathways and protocols dynamically
- The System must have an Analytics for Population Health, Disease Management
- The System must have a Configurable Antibiotics usage policy & controlled workflow if necessary for Antibiotics usage.
- The System must have a Capability to order & administer fraction medicine
- The system should allow uploading of multiple documents, media, and ancillary attachments along with the particular System or system by which the attachment would complete the associated information in a single click.
- The system should have a method of prioritizing and reconciling simultaneous access to a particular entry
- The system should have an auto save feature that protects documents and the database integrity in instances of power interruption or similar events.
- The system should have a Report Generator to take data from the database and use it to produce a document in a format which satisfies a particular human readership.
- The major components offered by the HIS PROVIDER must be certified by the international standards ISO/IEC 27001:2013 and 9001:2015 or latest ISMS Certification or equivalent international standard
- The CLOUD to be utilized must be certified by the international standards 27017:2015 or latest ISO Certification or equivalent international standard



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- The System should be compliant with RA 10173, RA 10175, RA 8792, and the medical act of 1959.
- The System should be HL7 compliance certified of at least version 2.2 with built-in integrator/connector which require at the onset (Must Provide Certification). Middleware programs are not allowed.
- The System should be compliant with the Department of Health Administrative order 2013-0025, or the National Implementation of Health Data Standards for eHealth Standardization and Interoperability (eHSI Release one), or the most current version and / or update of the policy.
- The System should be compliant with the Department of Health draft administrative order for the implementation of the software certification in compliance to National Health Data Reporting, or the most current version and / or update of the policy.
- The System should be compliant with the most recent version of the Department of Health's policy on health information exchange and the Philippine e-Health Strategic Framework and Plan at the time of the implementation.
- The system shall comply with the Joint Administrative Order No. 2017-0001, entitled "Implementation of the National eHealth Electronic Health Record System Validation (NEHEHRSV)".
- The systems must confirm to international standards for high maturity levels and rated to CMMI-Level-5.
- The system should be utilizing health information exchange standards, **including but not limited to:**
 - Health Level 7 messaging standards for interoperability
 - International Classification of Diseases – 10th version, 5th edition 2016
 - Logical Observations Identifiers Names and Codes (LOINC) version 2.36
 - PhilHealth Identifiers for clients and providers
 - PhilHealth Revised Value Scale
 - Philippine National Drug Formulary
 - Philippine Food and Drugs Administration standards for drug codes, drug establishments, and machine identifiers.
 - Philippine Standard Geographic Code of 1996
 - Digital Imaging and Communications in Medicine (DICOM) 2011
 - Current Procedural Terminology, 2011 edition
 - Anatomic, Therapeutic and Chemical Classification system / Defined daily dose for drug classification and dosing.



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- Other health data standards that will be adopted by the Department of Health throughout the duration of the contract.
- Unified & Centralized Master Patient Index Health Management Information System, among others.
- Able to interface or meet system and hardware requirements of Laboratory, Radiology, Operating Room, HR, and other existing and future medical equipment. Cost of integration and data migration shall be borne by the Proponent. This would **be including but not limited to the following systems:**
 - Laboratory System
 - Radiology Information System
 - Picture Archiving Communication System
 - Hemodialysis software
 - Blood Bank Information System
 - Existing information system of the engineering department
 - Chart and medical record management system
 - Patient queuing system
 - Document Management System
- The system should be able to interoperate across all departments that are using the SYSTEMS, and provide the necessary health information exchange modalities for efficient operations.
- The system should be able to perform audit trails and transaction logs at each level of access
- The system should have a knowledge management system that will serve as repository of reports for each department
 - Executive office should have access to all these reports
 - Other departments should be able to obtain permission to access specific reports through a messaging system
- System should have interface to medical libraries to help clinicians educate patients and for bibliographic references.
- **Each major component of the HIMS should be accessed in one single dashboard.**

1.4.2 Conditions and Determinants Required

- The proposed solution must be process oriented under a single integrated platform (HIS-ERP - EMR - Data Analytics).
- It must function as an integrated system, where the patient is the center of the process, reflecting the clinical attention provided in



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the related administrative processes to register a cost per patient attended and its derivatives (costs for disease, demography, medical care, medications, health care services, specialties, etc.)

- The patient must be the center and driver of all the processes to be automated.
- The electronic medical record (EMR) must comply with international standards and be prepared to interoperate with the PhilHealth.
- The proposed solution must work with a unique single Electronic Medical Record (EMR) for each patient, allowing patient mobility and distance care for the clinical professional. The system must have at least one certification of the Electronic Medical Record at international level.
- The proposed solution must be operable from mobile tablets and smart phones.
- The system must be 100% web natively using a browser to operate, with no need to install any additional software on desktop and / or mobile workstations.
- The demographic and personal information of the patient must be encrypted to protect the information; the transmission of the data between the PC - workstation and the Database servers must be encrypted to prevent loss of information. All user passwords must be encrypted in the database.
- The system must interoperate with government applications when they are ready for it.
- The system must provide an analytical data / BI platform that can be easily managed to give a quick response to the end user in terms of creating new indicators to be established in the future, this application must be operated within the same system in its menu options and modules.
- The software must comply with international levels of information security (provide certifications).
- The software manufacturer must present an HL7 - Health Level Seven affiliation certificate that theirs HIS and EMR clinical software is in compliance with the international interoperability standards. The entire HIS and EMR software is focused on the continuous improvement of interoperability processes (must present the certification).
- The proposed software must allow the hospital to reach stage 6 or 7 of the HIMSS Analytics classifications where paper is no longer used to document and manage patient care.
- The proposed software must demonstrate that the generated clinical information can be shared in a structured manner according to the HL7 standards (comply with the CCD - Continuity of Care



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Document) through electronic transactions with other Health hospitals with which it inter-operates or has an exchange of patient health information.

- The quotation must include unlimited user licenses for users

1.5 Application Systems: Enterprise Resource Planning (ERP)

1.5.1 Financial Management Information System

The Financial Management Information System (FMIS) shall facilitate financial transactions and reporting and monitoring of financial transactions. The FMIS has the following Systems:

1.5.1.1 Accounting information management system

The accounting information management system shall serve to accommodate all functional requirements and linkages of the accounting division of NKTi. This would include form entries and report generation of chart of accounts, journals, ledgers, among others. The accounting System should be able to improve and enhance operational efficiency of all its activities and provide NKTi with optimal performance in their accounting division. The accounting System should be able to generate accurate trial balance, financial position and performance reports, schedules, and other reports by which the accounting division will require. The accounting information management system should also be compliant with the government requirements among which is the adoption of Philippine Public Sector Accounting Standards (PPSAS) and any future accounting regulatory compliance requirements including International Public Sector Accounting Standards (IPSAS). The accounting information management system should be able to integrate functions with the Procurement, Supply Management, Billing and Claims, Treasury, Budget Divisions, and all Revenue Centers:

- a. Generate receipts and issues reports and all transactions from the central warehouse;
- b. Determination of complete data necessary in the costing and re-costing of hospital procedures and supplies;
- c. Can perform validation process and reconciliation regarding the accuracy of receipts, issuances and supplies ending balance reports from all income generating centers versus the records of warehouse and inventory section.
- d. Generation of Lapsing Schedule
- e. Supply Management – report of supplies and materials issued.



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The Accounting System should have the following functionalities as required:

- User friendly and intuitive.
- Able to perform validation of data
- This system should be capable to establish external linkages via secure Web Services/Internet but not limited to the following:
 - Bank reconciliation and online transactions
 - Department of Budget and Management for reports submission
 - Department of Health for reports submission
 - Bureau of Internal Revenue for Remittances submission
 - Commission on Audit for Reports submission
 - Department of Finance for report submission
- The accounting system shall include but not be limited to the following features:
 - Cash Receipt Journal (CRJ) Voucher
 - Check Voucher
 - General Journal Voucher
 - Petty Cash Voucher
 - Purchase Journal Voucher
 - Pending Accounts
 - Bank Reconciliation
 - General Ledger
 - Trial Balance
 - Check Printing
 - Annual Budget Entry
 - Close Income & Expenses
 - Accounts Receivable Posting
 - Multiple CRJ Accounts Edit
 - Multiple OR Accounts Edit
 - OR with no entry
 - Cash Receipt Journal Processing
 - Disbursement Journal Processing
 - Sales Journal Processing
 - Adjustment Entries
 - Subsidiary Ledger for all Financial Position Accounts
 - Accounts Receivable
 - Accounts Payable
 - Property, Plant and Equipment Ledger Card
 - Other Payables
 - Trust Liabilities
 - Cash Disbursement of Offices



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- Contracts and Contractual Services
- Supplies
- The accounting system should be able to produce the following reports:
 - Chart of Accounts
 - Transaction Summary
 - General & Administrative Expenses
 - General & Administrative Expenses (Detailed)
 - Operating Expenses
 - Operating Expenses (Detailed)
 - Report of Supplies and Materials Issued (RMSI)
 - Schedules (all balance sheet accounts)
- The accounting system should be able to perform functions for the following journals:
 - General Journal
 - Cash Receipt and Deposit Journal
 - Cash Receipt Journal Summary
 - Disbursement Journal (Cash/Check)
 - Disbursement Journal Summary
 - Sales Journal
 - Sales Journal Summary
 - Sales Journal (Discounts)
 - Purchase Journal
 - Inpatient Cash Receipt Journal (Detailed/Summary)
 - Sales Journal With No CRJ Entry
 - Journal of Bills Rendered
 - Other Payables
 - Journal Entry Voucher
- The accounting system should be able to account for the following purchases information:
 - Unpaid Invoices
 - Unpaid Invoices (per vendor)
 - Stocks Receiving (per vendor)
- The accounting system should be able to produce the following financial sheets
 - Trial Balance
 - Trial Balance (Quarterly and Monthly)
 - Trial Balance (Formatted)
 - Income Statement / Statement of Financial Performance
 - Income Statement With Budget



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- Income Statement (Quarterly and Monthly)
 - Balance Sheet
 - Balance Sheet (Formatted)
 - Comparative Balance Sheet (by month)
 - Comparative Balance Sheet (by year)
 - Comparative Balance Sheet (Formatted) (by month)
 - Comparative Balance Sheet (Formatted) (by year)
 - Comparative Income Statement (by month)
 - Comparative Income Statement (by year)
 - Comparative Income Statement (Formatted) (by month)
 - Comparative Income Statement (Formatted) (by year)
 - Cash Flow Statement
 - Statement of Changes in Net Assets/ Equity
 - Statement of Comparison of Budget and Actual Amounts
- The accounting system should be able to function on the requirements of accounts payable
 - Aged Accounts Payable (Vendors)
 - Petty Cash Transaction
 - Other Payables
 - Paid A/P as per MOE, PS, and CO
 - Paid A/P as to Current and Prior
 - The accounting system should be able to function on the requirements of accounts receivable
 - Aged Receivables (Pay/ Service/ Hemo/Employees)
 - Aged Receivables (HMO / Co. Sponsored)
 - Aged Receivables (PHIC Patients/ Lab to Lab/ Research)
 - Summarized Transaction Report
 - Detailed Transaction Report

The Accounting System should be able to capture the following reports as per the attached requirements (Annex 1).

1.5.1.2 Credit and collection information management system (Billing and Claims)

The credit and collection system should be able to perform automated processing of billing statements for various company sponsored patients both government and private agencies, promissory notes, medical assistance fund utilization, deposit monitoring, in-patient outstanding account, and employees salary deduction. It should be linked to all profit centers of the hospital and be able to create, view,



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and update the necessary information related to billing of services rendered by the hospital.

It should be able to generate reports which are needed by the other government agencies (e.g. DOH, COA). In order to be up-to-date with the latest methods of financial transactions, the credit and collection system should also be able to process payment methods aside from cash and checks, **including but not limited to:** credit cards, PayPal, other online methods of payment, and other forms of payment which may be made available during implementation.

- The system should be able to perform the following functions
 - Patient's for Promissory
 - Promissory Notes
 - Billing Query
 - Search Payments
 - Patient's with Promissory Note Report
 - Patient's with Promissory Note Report (PAID)
 - Patient's with Promissory Note Report (HOSPITAL)
 - Patient's with Promissory Note Report (DOCTORS)
 - Unsettled HMO Accounts (PER HMO)
 - Unsettled Company Accounts (PER COMPANY)
 - Settled HMO Accounts (PER HMO)
 - Settled Company Accounts (PER COMPANY)
 - Unsettled HMO Accounts (ALL)
 - Unsettled Company Accounts (ALL)
 - Settled HMO Accounts (ALL)
 - Settled Company Accounts (ALL)
 - Demand Letter Report
 - Auto-block of Patients (PN's, Pending Accounts, Absconded)
 - Alert for Incoming PN Deadline

The Credit and collection system should likewise be able to perform the following functions:

- Updating of In-Patients Account
 - Request for Deposit – automatic generation from the system indicating deduction i.e., PWD, Senior Citizen, PHIC (estimated amounts), government employee, and government dependent
 - Notice of Suspension
 - Letter to Attending Physician (informing the current status of account)



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- Indicate the type of Assistance on Patients Account
- * (patients with multiple sponsors- DOH MAP, PCSO, HMO, Insurance)
- Generation of Promissory Note
 - Prompt/ dialog box for patients with overdue PN/ accounts
 - Promissory Note Reports
- List of Issuance (Daily, Monthly, Annual)
 1. Indicate the number of patients
 2. Report should be per category
 - In-patient
 - Out patient
 - service patient
 - Pay patient
 - Pay to Service Patient
 3. Subsidiary Ledger for PN (with updated balance)
- Report of Due PN
 - Printing of Tracers (1st, 2nd, 3rd) * Triggered by due PN's
 1. First Tracer – Triggered by due date of PN
 2. Second Tracer – 15 days after sending first tracer
 3. Third Tracer – 10 days after sending second tracer
- Report of Paid PN (Monthly / Annually)
- Payment Monitoring (determine duration/period PN was settled)
- Percent of settled PN for the year
- Individual summary of PN (for patients with numerous/various PN transactions)
- HMO/Company
 - Preparation of Billing Statement (HMO, Company)
- Report of Paid HMO/Company Account (with invoice #/ OPD, IP, Hemo)
- Report of Unpaid HMO/Company Account (Individual, All)
 - * Prompt/ reminder to send collection/demand letter- (FORMATTED with attached SOA)
- Report of Doctors Rental Fee (Paid and Unpaid)
- Aging of Accounts Receivable
- Comparative Report (percentage of paid accounts receivable)
 - yearly / monthly comparative report including graphical report
- Report on Balance of Receivables
- Notice of Contract Expiration



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- Communication and Notices For HMO/Company Contract Expiration
- * (6mos prior expiration, 3mos. and a month before expiry)
- Research Account
- Summary of Charges with Invoice per month (OPD and In-Patient) – should reflect funds and payments (OR Number, dated and amount
- Number of patients per research account
- Subsidiary ledger module of the following, (both in-patients and out-patients)
 1. HMO
 2. Government Agencies
 3. Private companies
 4. Lab to Lab transactions
 5. Salary Deduction for employees

Subsidiary ledger for contracts for space rental. The ledger should be linked to business records management, accounting, treasury, credit and collection, building administration, and executive information systems.

- Medical Assistance Fund Report – the system should be capable to establish external linkage via secure web services/internet to all agencies or office with existing funds at NKTi.
 - -Fund Utilization Report
 - Daily Fund Monitoring Report (per Guarantee Letter Code), please see attached manual report (**refer to Attachment 1**)
 - Medical Assistance for Indigent Patients (MAIP) Report generated automatically from the module (manual entry of account details before we can generate the report) (refer to **Attachment 2**)
 - Report of Daily Processed GL per code (with number of patients per code)
 - GL code visible to all cost centers for accurate charging / utilization (with GL#)
 - For PF paid thru GL
- * report should indicate all patients name with GL code (per doctor)
For Credit and Collection record purposes, to include the name of person who processed the GL (in case where the submitted GL was already used/processed) (**attachment 3**)

Posting of payments (DOH GL intended for Hospital Bill of patients confined for long period of time) should be reflected on



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the report of the same month, posted/deducted on patient's bill.

***** recommendation:**

1. 1 GL – 1 type of assistance reflected – for specific/accurate Utilization
2. Prompting dialog or endorsement box indicating patient's transaction history, previous endorsements on GL transactions & admissions, account status and others.
3. Individual summary of processed GL's
Should reflect name of patient, GL No. and code, amount and status of fund (consumed or with remaining balance)
4. Separate credit module program for DOH required monthly reports (please see attached format)

Suggested format

- a. 1st column - Number (to determine the number of patient served)
- b. 2nd column - Name of patient
- c. 3rd column - Age
- d. 4th column - Address (just the summary – e.g. Antipolo, Rizal; Kawit , Cavite; etc.)
- e. 5th column - MAIP Guarantee Letter (GL) Date
- f. 6th column - MAIP Guarantee Letter (GL) Number
- g. 7th column - Amount of MAIP GL (Allocation)
- h. 8th column - Type of assistance (e.g. Medicine, Laboratory, Hospital Bill, etc.)
- i. 9th column - Amount of MAIP utilization (Net amount per type of assistance with discount deduction/s)
- j. 10th column - Total utilization amount per GL
- k. A total per column and a Grand Total at the lower extreme right bottom are reflected.
 - Above details are for Pay and Service patients and could be separated or combined;
 - Above details should be searched per code and per date/coverage;
 - Above details should be applicable for other GL's like "PDAF, Suntay, DOH-NCRO, etc.
5. A separate/new module for monthly PREXY Report (Reports on patients that were admitted and discharge at Nkti with MAIP GL.



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A. FOR PAY PATIENT'S

- 1st column - Number (to determine the number of patient served)
- 2nd column - Name of patient
- 3rd column - Date of Discharge
- 4th column - Admission number
- 5th column - Age
- 6th column - Address (Just the summary – e.g. Antipolo, Rizal; Kawit, Cavite; etc.)
- 7th column - Total amount of Patient's Bill on Professional Fee (PF)
- 8th column - Total amount of Philhealth (PHIC) deduction On PF Bill (PF Bill in column 7)
- 9th column - Total amount of PF bill less PHIC deduction (column 7 less column 8)
- 10th column - Total amount of Patient's Hospital Bill
- 11th column - Total amount of PHIC deduction on HB (HB in column 10)
- 12th column - Total amount of discount/s (e.g. senior citizen; PWD; government employee, etc.) on HB (HB in column 10)
- 13th column - Total amount of QFS in HB (HB in column 10)
- 14th column - Total amount of patient's cash payment on HB (HB in column 10)
- 15th column - Total amount of patient's cash deposit on HB (HB in column 10)
- 16th column - Total amount of HB less PHIC, discount/s, QFS, cash payment and cash deposit (column 10 less 11 to 15)
- 17th column - Total amount of patient's payment using MAIP GL on PF (PF in column 7) of PF Bill
- 18th column - Total amount of patient's payment using MAIP GL on HB (HB in column 10) These payments are either for deposit or HB
- 19th column - Total amount of patient's payments using MAIP GL on PF and HB (17th column plus 18th column)

B. FOR SERVICE PATIENTS

- 1st column - Number (to determine the number of patient served)
- 2nd column - Name of patient
- 3rd column - Date of discharge



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- 4th column - Admission number
- 5th column - Age
- 6th column - Address (just the summary – e.g. Antipolo, Rizal; Kawit, Cavite, etc.)
- 7-10th column - Total amount of patient's Hospital Bill (HB)
- 8th column - Total amount of PHIC deduction on the HB (HB column 7)
- 9th column - Total amount of discount/s (e.g. senior citizen, PWD, government employee, other discount)
- 10th column - Total amount of QFS in HB (HB in column 7)

- 11th column - Total amount of patients cash payment on HB (HB column 7)
- 12th column - Total amount of patients cash deposit on HB (HB column 7)
- 13th column - Total amount of HB less PHIC, discounts, QFS, cash payment and cash deposit. (column 7 less columns 8 to 14)
- 14th column - Total amount of patients payment using MAIP GL on HB (HB in column 7). These payments are either for deposit or HB

- Processing of Refund (Formatted/ Auto Fill)
 - Prompt message when search indicators like Official #, Admission # and Bill Number will be encoded to detect if the said refund (Petty cash voucher or Disbursement Voucher) was already processed.
 - Processed refund will automatically be posted on patients account
 - Report of Monthly Processed Refund (status: claimed/ on file)

- Fund Utilization Reports
 - Monthly Report Patient's with GL (Per Name of Sponsor, Name of Patient/Bill # and Admission #, and Amount)
 - Report of Paid Receivables (Name of patients, Bill No., Amount)
 - Report of Unpaid Receivables (Name of patients, Bill No., Amount)
 - Comparative Report of Receivables (monthly, annually)



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*** Prompt message /reminder connected to all cost centers regarding the account status (unsettled accounts) of patient and immediately coordinate with Credit and Collection.

1.5.1.3 Budget System

The service should be able to provide cumulative budget utilization report for personal services accounts, maintenance and other expenses accounts, equipment accounts, infrastructure accounts. The System should be able to get the steps in the preparation of Budget Utilization Slip, and document the daily preparation of BUS and the simultaneous/automatic deduction of the BUS accounts from the programmed allot for Personal Services, Maintenance, and other Expenses.

The Budget System must have the following functions but not limited to:

- The Budget Utilization Request and Status (BURS) shall be linked to Accounting System. A running balance should be reflected and can be monitored everytime a BURS is used in payment of various obligations of the institute
- The system should also be connected to the Treasury system for monitoring of transactions
- Generate schedule of BURS with balances for the year according to the requirements of COA under PPSAS
- Adjustments on BURS should be reflected thru Notice of Budget Utilization Request and Status Adjustments for accurate utilization report
- Generation of reports
 - Monthly Summary of BURS
 - BURS running balance
 - Summary per obligation
 - Summary per category of purchase
 - Monitoring of budget utilization per Office/Department, etc

1.5.1.4 Billing information management system

The billing information management system should be able to perform immediate finalization of bills of patients for discharge with all the necessary deductions of Philhealth benefit and discount along with the detailed breakdown of professional / reader's fees within 20



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minutes upon clearance from the different cost centers. This performance requirement is upon clearance.

The system should be capable to monitor all PhilHealth claims by income centers from deductions, filing, and up to payments. The billing system should be well-integrated with the PhilHealth system. It should have linkages with all the profit centers of the hospital, as well as administrative centers for automated business processing of all billable services of the hospital. It should have the capability of interacting with the PhilHealth system, able to exchange all information which may be relevant to claims processing using the eClaims system, or other systems of PhilHealth that will be made available during implementation. Besides being able to process PhilHealth claims, the billing system should also be able to process claims from other insurance agencies that are accepted by the NKTi during implementation, as well as those insurance agencies that will be made available for use by NKTi during implementation. The system should be able to facilitate patient discharge clearance for all billable services rendered by the hospital to the patient. All reports needed by the Billing and PhilHealth Section should be automatically generated by the SYSTEM.

- The system should be able to accommodate linkages from the Admitting System to perform the following functionalities:
 - View and print admission drafts.
 - Print daily discharges.
 - Tag PhilHealth patients particularly NBB.
 - Sponsored patients, government employees and dependents, senior citizens and PWD patients.
 - Tag type Z patients with the category.
 - Tag NKTi employees and dependents
 - Tag patients with waiver on room accommodation
 - Tag time patients expired.
 - Room rate with room sharing.
 - Type of executive check-up to be printed in the statement of account (SOA) with the corresponding amount of package.
 - Room transfer of patient.
 - ICU patient maintaining room.
- The system should be able to accommodate linkages from the Treasury System to perform the following functionalities:
 - Print official receipt number of deposits and payments and indicate status of receivables per patient upon generation



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of report of bills rendered (RBR). Access on the clearance slip issued to patients and status of payment upon discharge

- This system should get electronic charges of services and supplies provided to the patient:
 - Real time charging of all cost centers
 - All charges inclusive of credit/debit memos to be printed in the detailed breakdown of patients charges including readers fees, if applicable
 - Compute discount on selected procedures for service patients
 - Clearance of patients when tagged for discharge
 - Generate result of PhilHealth patient availed of case rate benefit
 - Diagnostic results relevant to treatment
 - Operative and Anesthesia Record
 - Biopsy report, Endoscopy Report, Thoracentesis Report and any other operative report.
 - Bedside procedure (EG. IJ Insertion, AVF Creation and the like)
- This system should have the capability to bill a patient and deduct Philhealth and discount upon discharge.
 - The system should have the option to set the type of patient membership, whether on PhilHealth or on other insurance systems.
 - The system should be able to separate charges from pay to service and to compute discount for pay bills (if applicable) and Quantified Free Service (QFS) for service bills.
 - The system should be able to compute 7 days free confinement for NKTi employees and discount if with operation and monitor the allowable 45 days benefit.
 - The system should be able to compute discount and quantified free service (QFS) of the following:
 - A. PAY
 - 1. Senior Citizen
 - 2. Person with Disability (PWD)
 - 3. Government Employees/Dependents
 - 4. NKTi Employees/Dependents
 - 5. Special Discounts
 - B. SERVICE (Per Classification)



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1. Service (A-indigent)
2. Service (B-indigent)
3. Service (C-indigent)
4. Service (D-indigent)
5. No Balance Billing (NBB)

C. PAY to SERVICE

- The system should be able to identify gap of 90 days (single period of confinement) for same diagnosis for Philhealth benefit, identify exclusions
- The system should be able to monitor Philhealth availment and 45 days Philhealth benefit and lock for exhausted benefit.
- This system should be capable of handling discounts and other adjustments depending on the type of patient handled.
 - This system should be able to set one or more deduction types (HMO#2 / Company#2)
 - This system should support addition of Promissory Note Entry
 - This system should support inclusion of PCSO Deductions
 - This system should support PHIC deductions (i.e., PHIC Deductible medicines)
 - This system should have a List of NKTi employees and dependents, in-house and contracted employees, etc. with the corresponding percentage of discount.
 - The system should be able to deduct discount based on the following.
 - a. Discount of HMO patients based on Credit & Collection Section's assessment.
 - b. Discount based on the category tagged by the Admitting & Discharge Section (eg. Senior Citizen, PWD, etc.)
 - c. Discount deducted net of Philhealth and dietary charges.
 - d. Discount of Executive Check-up patients
 - e. Discount on patient's room sharing
 - f. Credit Memo Philhealth deduction for patients with promissory note and late submission of Philhealth documents.
- The system must be capable of having the patient's bill be trackable using the Patients Bill Finder



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- The system must be capable of having the patient be tagged with the May-Go-Home Tagging
- The system should have a Discharge Patients Viewer
- The system should be able to Cancel Transaction as necessary
- The system should be able to Add Other discount to the patient's current bill as necessary
- The system should be able to handle Professional Fee
- The system should be able to handle Deductions (Company, Philhealth, HMO)
- The system should be able to produce a Billing History, patient's balance and patient's Statement of Account that can be retrieved immediately upon request from a patient or physician.
 - SOA for Professional Fee only
 - SOA per department only
 - Detailed SOA Checklist
- The system should also be capable of having the patients check their bills through an Online Billing Inquiry Option
- The system should be able to individually view a patient's billing transaction
- The system should have provisions for a patient information portal accessible through the patient's room via a cable tv system inside the hospital.
- The system should be able to search the billing history that may be of interest to the end-user.
- The system should be able to track Transfer of Room and consequently adjust billing charges afterwards.
- The system should be able to reflect Payments made by Patient
- The system should be able to request for clearance from other linked departments.
 - Clearance is manifested in other departments through a notification/warning.
 - There should be an option for Clearance Approval Printing
- The system should be able to discharge a patient, as well as unset the patient's discharge status
 - The System should be able to Set the patient's Date of Discharge
- The system should be able to have the user view the patient's Room Charge
- The system should be able to handle Incremental Cost
- The system should be able to view Hospital Excess and relate it to PhilHealth costs



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- The system should be able to accommodate remarks being added to the transactions in the Billing System. This would serve as comments for any transaction that would need clarification
- This system should be able to Update Account Codes
- The system should be able to provide the following terminology libraries
 - RVU/RVS
 - ICD 10
- The system should be able to follow health terminology standards
 - ICD 10 for benefit caps set-up
 - RVU/RVS Form for viewing previous admission (usage of Philhealth benefits)
- The system should be able to provide Setting of Packages
- This system should have an administrative function that will allow administrators of the application to use Revised format of deduction
- This system should be able to accommodate validation mechanisms, and provide entries for Prepared by / Checked by/ Noted by
- The system should be able to support messaging across the different departments
- This system should be able to support Auto posting to GL
- This system should be able to receive Advisory Alerts
- This system should be able to facilitate Room & Board Setting
- The system should be able to produce the following reports:
 - Payment History Report
 - Statement of Account (SOA) Report
 - Statement of Account (Itemized, Summarized, PF only)
 - Patient Account Suspension (on-hold)
 - Checklist of Charges Report
 - Inpatient Summary Report
 - Summary of Discharges
 - Daily Income Report
 - HMO Daily Report of Bills
 - PhilHealth Patients Listing for Deductions (Winning Bidder Must Provide this prior to Final Acceptance)
 - Mandatory Report
 - List of Patient's for Deduction (coming from the Billing Department)
 - Patients with No Transmittal Report
 - Unpaid Claims
 - Refund of Philhealth Professional Fees (PF)



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- Philhealth Type Z Cases Refund
 - 1. ER Admission – Date of admission should be based on the first date the patient is seen at ER.
 - 2. Generate preliminary separate SOA for pay and service (if patient's classification is transferred from Pay to Service).
 - 3. Report of paid, returned to hospital (RTH) and denied claims.
 - 4. Monitor Philhealth accreditation of doctors. (expired, nearing expiry)
 - 5. Send SMS to doctors for notification.
 - 6. Track single period of confinement (90 days gap) for the same diagnosis/ICD10 or RVU/RVS codes.
 - 7. Breakdown of detailed professional and readers fees with the applicable Philhealth benefit and discount, if any.
 - 8. Print daily transmittal of claims by cost centers with Philhealth.
 - 9. For executive check-up patients – accurate number of days and charges outside the package to be included in the patient's bill.
 - 10. Philhealth availment Report base on membership category and profit center.
 - 11. List of Patient for Z-Packages.
 - 12. Philhealth Payment Report.
 - 13. Daily outstanding balances of all admitted patients

The system must be able to generate daily report of bills rendered (RBR) with the following requirements:

- 1. OR # for deposits and payments
- 2. Promissory Note #
- 3. Name of HMO's and other companies
- 4. Cancelled Bill
- 5. Show breakdown of adjustment if with discrepancies in the total hospital charges.
- 6. Total # of the following should be tally with the total discharges:
 - a. Cancelled Bills
 - b. Total number of pay patients
 - c. Total number of service patients
- 7. Recapitulation according to accounting codes



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8. Summary and Receivables, Philhealth, Total PF and C/o NKTi Employee
9. Breakdown of Total Hospital Charges, Deposit, Payments, Special Project and Philhealth for Pay and Service
10. Breakdown of NKTi Employees and Dependents
11. Narrative and Comparative Report
12. Philhealth Report of Receivables and Payments per Income Center

1.5.1.4.1 PhilHealth Systems

The PhilHealth system should be able to support all manual and electronic systems of PhilHealth being rolled out to government hospitals. This would include, but not be limited to, PhilHealth claims processing system (of which including the most recent version of the case rates table), eClaims system, z-benefits information system (Z-BITS), Point-of-Care (Onsite Rapid Enrollment), Institutional Health Care Provider Portal, Patient's Basic Eligibility Verification (PBEV), among others. It should be able to perform online verification, claims submission, and claims follow-up. In such an event that the NKTi would already have an eClaims software developed, systems should be able to use the said software with support from the winning entity. In case that NKTi would not have existing eClaims software, systems should be able to **Mandatory provide an eClaims system**, using the security credentials that NKTi has acquired from PhilHealth. In such an event that PhilHealth is not ready with eClaims during the implementation phase, systems should be able to automatically process claim forms 1-3 and CF4, with complete functionality in terms of entering ICD-10 code (both international and Philippine modifications), RVU/RVS, Type Z cases, case rates, and report generation.

The winning bidder shall integrate Philhealth ePortal using existing NKTi Philhealth provided credentials.

- This system which should be embedded in the HIS/FMIS to avoid double encoding shall have the following features: (Winning Bidder Must Provide this prior to Final Acceptance)
 - This system should be able to setup patient information for Philhealth processing
 - This system should be able to extract information from the other Systems of the systems to populate data for the PhilHealth claim forms



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- The system should be able to have a viewing option for Paid and Unpaid Claims
- The system should be able to produce Philhealth Logbooks with Audit Trail Report
- The system should have the capability for Enhanced PhilHealth Claims 1, 2,3 & 4
- The system should have the capability of checking Philhealth requirements completion
- The system should be able to allow the end users to scan Philhealth requirements through an external scanner and append the attached documents to the PhilHealth information of the patient.
- The system should be able to accommodate transmittal of Philhealth claim information
- The system should be able to display transmittal status of Philhealth claim information
- The system should acknowledge all transmitted claims
- This system should be able to utilize the Philhealth eClaims system, including eClaims eligibility screening, forms processing, and form validation/verification, scanning and uploading as well as future processes that may be required in the eClaims system.
- The system should be able to conform to the ICD 10 coding system currently utilized by the National Health Insurance.
- The system should be able to generate Philhealth payment report
- Philhealth Summary Reports
 - Monthly Mandatory Hospital Updated Report
 - Ageing Report
 - Membership Category Reports
 - Per Profit Center Reports such as e.g. (In-Patient, Emergency Room, Hemodialysis, Operating Room, Radiotherapy, Chemotherapy and Endoscopy).
 - Type Z-cases Reports (Kidney Transplant, Breast Cancer, Continuous Ambulatory Peritoneal Dialysis (CAPD) and Prostate Cancer).

1.5.1.5 Treasury information management system

The treasury system should be able to perform automated processing of cash, credit card, and other modes of payment for hospital services and other miscellaneous charges upon encoding the charge slip number issued by the different cost centers, as well as being able to



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produce the reports defined by the department. The treasury system should be linked with all cost centers of the hospital, as well as with the business record section and administrative offices that are responsible for financial processes in NKTi. The treasury section should be able to communicate with external systems by sending reports to the bank, Commission on Audit, Bureau of Internal Revenue, Bureau of Treasury, and other agencies that may require reports during the time of implementation. There should be an audit and transaction trail that may be analyzed by the internal audit office or management staff as necessary. The treasury system should also be able to provide a point-of-sale system that would allow to receive cash, checks, credit card payments, PayPal payments, other online methods of payments, and other payments that will be made available during implementation. The treasury system should also be able to provide functions for disbursements through an automated daily processing of Checks and Disbursement Vouchers, with automatic calculation of processed and issued checks, as well as disbursement of staled and cancelled checks. The treasury system should also be able to communicate with equipment that will facilitate check writing. The treasury system should adhere well with the NGAS requirements, and should be up-to-date with any changes that NGAS would incur during the time of implementation.

The Treasury Section accommodates patient /relatives on payment transactions. After payment, Treasury Section will issue clearance slip to signify that you are cleared from any accountability from the Institute. The Treasury system shall **include but not limited to the following:**

- The system should be able to accept all payment types as indicated by the treasury division
- System should be able to interact with patient portal and accept payment made using the patients portal.
- System should have ready to use payment gateway integrations
- System should have built in API's/ feature to capture the details while doing a card related transaction.
- System should allow users to be able to do retrospective billing.
- System should be able to handle multiple payment modes for a single invoice settlement.
- System should support multi level approvals for any required functionality.
- System should be able to produce a patient ledger to the treasury at any given time.



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- System should be able to generate the provisional/draft invoice for all the admitted patients.
- System should provide us an option to define packages with all business rules applicable to them.
- The system should be able to note that settlement has been made for patients for discharge
- The system should be capable of handling / monitoring / updating Rewards Card-type transactions
- The system should be able to accommodate Promissory note
- The system should be able to Viewing Pending Accounts and perform settlement based on patient payment
- The system should be able to perform Transmittal (HMO, Company) of information
- The system should be able to set a standard account code and update as necessary
- The system should be able to support inter-laboratory cash/other payment scheme transactions with affiliated laboratories with the institute.
- The system must be able to print customized official receipt upon approval of the Bureau of Internal Revenue (BIR).
- The system should be able to monitor credit lines and payment updates for institutions having Memoranda of Understanding / contracts / agreements with the NKTi (e.g., Lab-to-lab referrals)
- The system should be able to perform functions related to official receipts
 - O.R. Validation List
 - Multiple O.R. dates
 - O.R. Checking
 - O.R. posting of sales and charges
- The system should be able to perform Posting Transaction to Cash Receipt Journal
- The system should be able to perform PF Monitoring
- The system should be able to perform Cash Count
- The system should be able to perform messaging functions across all departments
- The system should be able to receive Advisory Alerts
- The system should be able to handle multiple treasury locations
- The system should be able to handle remittance management
 - Remittance Collection per Department (OPD)
 - Remittance Collection per Doctor (OPD)
 - PF Collectibles Posting Report
 - PF Collectibles Posting Report (Detailed)
- The system should be able to produce the following reports:



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- Treasury's Report by Shift
- Cancelled O.R.
- Accounting O.R. Validation List Report (Detailed, Summarized)
- Cash Receipt Summary Report
- Treasury's Report
 - Treasury's Report (by location)
 - Treasury's Report (formatted)
 - Treasury's Report (PF Withholding Tax)
 - Treasury's Report (A/P Doctors formatted)
 - Treasury's Report (A/P Doctors)
 - Treasury's Report (Pharmacy)
 - Treasury's Report (Discounts)
- Daily IPD Collections
- Daily OPD Collections
- Daily IPD Collections of PF
- PF Collections Report
- Payments History
- PF Other Payment Report

The Treasury system should also be able to provide functions for Disbursements through an automated daily processing of Checks and Disbursement Vouchers, with automatic calculation of processed and issued checks, as well as disbursement of staled and cancelled checks. The Treasury system should also be able to communicate with equipment that will facilitate check writing. The Treasury system shall include but not limited to the following:

- The system/system should be able to generate daily summary of the following:
 - List of Unclaimed Checks
 - List of Vouchers for Check Preparation
 - Check Register
 - Summary of Voucher types (MOOE, PS, EO & CO), to be included in the preparation of the Daily Cash Position
- The system/system should be able to generate the following reports;
 - Monthly Accountability for Accountable Forms –
 - For General Fund Account
 - For Special Project Account
 - Summary of Voucher Types (MOOE, PS, EO & CO)



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- Summary of CANCELLED, REQUESTED CANCELLED and STALED CHECKS
- Reports of Checks Issued
- Disbursement Reports (Semi-Annual/Annually);
 - Comparative Reports for – General Fund and Special Fund Accounts
 - Comparative Reports for the Total Number of Check Issued for General Fund and Special Project Account
 - Comparative Reports of Voucher Types
- The system/system should be able to generate a Disbursement Voucher representing reimbursement of Registered Medical Practitioner's Professional Fees based on the summary of professional fees
- The system/system should be able to generate a Disbursement Voucher for the replenishment/liquidation of cash advances – General Fund and Special Project:
 - able to generate a Petty Cash Fund Record based on the approved Petty Cash Voucher
- The system/system should be able to generate Daily Cash Position for General Fund and Special Project Accounts based the Collection and Disbursements made
- The system/system should be able to generate Credit Card Collection Report based on the issued Official Receipts and payment made by the Credit Card Company
- Treasury' Report – issuance of Official Receipt for Dollar payment (formatted)

The Proponent shall develop and implement all required integration or linkages with the depository banks of NKTi whether required connectivity is online/website, via cloud, or physical media.

1.5.2 Administrative Information Management Systems

The administrative information management systems (AIMS) support encompassing a diverse set of hospital functions such as human resources, payroll, and personnel services, procurement, inventory among others. These applications portfolio extends from very large mission-critical enterprise systems to small departmental applications and includes both internally developed and vendor supplied applications.

AIMS also would contain functions of the information resource management, the public information office, and the business records office. The administrative System is aimed at streamlining the



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information processes and end-user support across departments, using messaging systems, ticketing systems, document management systems, among others.

1.5.2.1 Integrated Logistics Management Information System

Integrated Logistics Management Information System is complete system that covers generation and consolidation of all PPMPs into a comprehensive Annual Procurement Plan (Indicative and Approved). The system likewise generates Purchase Requests, Notices of Awards, Purchase Orders or Job Orders or Contracts, Notices to Proceed and Inspection and Acceptance Reports. This will also include the Property Accountability Management System.

1.5.2.2 Procurement System

The procurement Process System shall be compliant to Republic Act 9184 and its Implementing Rules and Regulation and to other related laws.

All generated Project Procurement Management Plant (PPMP) from each end-user/Implementing Unit shall be classified accordingly.

All approved PPMP shall be consolidated into Annual Procurement Plan to be approved by the Head of Procuring Entity (HOPE) and which later can be amended/updated/supplemented, to be approved by HOPE. All Purchase Request issuance by end-user shall be emanated from approved PPMP. No procurement shall commence of any item without approved Purchase Request (PR).

The Procurement System should be able to monitor the different bidding documents related to the NKTi operations. The Procurement System should likewise be able to support creation and update of the annual procurement plan with ability to conduct projections. Tracking of document status should be supported. There should also be an interoperability layer between the BAC Secretariat and the Procurement Division such that purchase orders can be created with better justifications and support. Likewise, status reports of bids should also be seen in the system of BAC, as well as in a more general update page common to all high-level staff members of departments involved in bidding. Cost centers could likewise use the Procurement System to monitor the status of the bids. Document management systems (such as those for minutes of the meeting) should likewise be supported.



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The Procurement System should be capable to conduct an online submission of bid and shall comply to the requirements of GPPB specifically Resolution No. 12-2020 or any other issuances related to the matter.

It should also comply to the following government issuances and shall able to generate the following reports as follows:

- Generation of PPMP of all end-users;
- Generation of Consolidated Indicative Annual Procurement Plan with subsequent generation of Approved Annual Procurement Plan (APP) and subsequent Amended APP whenever necessary;
- Generation of Procurement Monitoring Report in compliance with GPPB reportorial requirement
- Generation of Agency Procurement Compliance Performance Index to be submitted to GPPB and Malacañang / Compliance to Early Procurement requirement in relation to Administrative Order No. 25 Interagency Task Force (A025 IATF) Memorandum Circular no. 2018.1 dated May 2018.
- To comply with other reportorial requirements as may be required by law

Provision for a System for procurement by electronic means pursuant to RULE III – PROCUREMENT BY ELECTRONIC MEANS as per RA 9184

The winning bidder shall provide a procurement website base dedicated for NKTi Procurement Activities indicating but not limited to:

- a. Procurement Opportunities (Bidding and all Alternative Modes of Procurement including the status of each project with notice to all prospective bidders regarding the recommendation of award, whenever applicable)
- b. List of PhilGEPS Registered Suppliers linked to PhilGEPS
- c. Supplemental/Bid Bulletins
- d. BAC and SBAC Compositions and their respective project
- e. Agency Award Notices linked to PhilGEPS (automatic updates)

The Procurement System should generate the following reports but not limited to:

1. Enhanced Purchase Order and Job Order generation
 - Derive details from the Purchase Request (PR)
 - Linked to the results of bidding, and other mode of procurement



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- PO/JO generated should contain complete and vital information/details
 - 2. Generation of reports:
 - Summary of Purchase Request (PR) vs Purchase Order (PO) or Job Order (JO) generated
 - Total PO/JO generated per month and annually
 - PO/JO generated per Buyer (based on user ID) per item/category
 - Summary of PO/JO per mode of procurement (Bidded, SVP, DC, NP, EP)
 - Cancelled PO/JO, items
 - 3. Monitoring of turn around time from receipt of PR to generation of PO/JO
 - Performance of individual Buyer/Staff
 - Performance of the Division
 - 4. Petty Cash Voucher generation
 - Link to Purchase Request
 - Generation of summarized petty cash voucher per month
 - 5. Tracking system (status of PO)
 - Delivery schedule/extension
 - Fully served and cancelled items by supplier/s
 - If settled (paid)
 - 6. Suppliers Performance Evaluation
 - From End-user
 - From Supply Management Division
 - Procurement Division
- Note: Consolidated and tallied*
7. Procurement Monitoring Report (PMR)

1.5.2.2.1 Supply Management System

The Supply Management System will be made of systems that involve the delivery, acceptance, supply inventory and tracking, and supplies management, including Semi-expendable and fixed assets management. This would ensure that all equipment, health devices, and hospital supplies are tracked efficiently. Barcodes will be used for efficient tracking purposes.

- This System should be easy to use for the end users of NHIMS
- This System should generate printed reports that satisfy correct data validation procedures
- This System should observe interoperability with other Systems in the NHIMS



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- This System should be able to support Network Messaging to all end-users
- This System should be able to support Advisory Alert
- This System should be able to support notifications on incoming transactions on the corresponding System
 - Notification for new purchase requests
 - Notification for warehouse interactions
 - Notification for inventory management interactions
- This System should support the following features
 - Charging Return Sales / Purchases
 - Adjustment Report
 - Allotment (disbursement, returns)
 - Senior Citizen Sales
 - Expiring Items Report
 - Reorder Items Report
 - Charges Log
 - Allotment Summary Report
 - Sales Log
 - Income Proof Sheet
 - Consumption Report
 - FIFO report
 - Receiving per Supplier Report

1.5.2.2.2 Purchasing, Warehouse, and Inventory information management System

The warehouse system should be able to support barcoding technology for supplies inventory and tracking of supplies. It should follow a centralized library of all product nomenclature in the hospital. Report generation should be supported by the System. The System should be able to automate requisition of materials from the warehouse and track the delivery of those requested materials to the requesting department or office.

The inventory system should be able to facilitate processes that are related to the inventory functions of the procurement division. This should include inventory acceptance reports, property/equipment cards, and fixed assets report generation, among others.

- This system should be able to accommodate entry and submission of purchase requests
 - This system should be able to track purchase requests from different submitting entities



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- This system should be able to monitor annual procurement plan and verify the purchase request through this process
- Purchase Request Online Approval using Digital Signature
- Cancel a purchased order and reflect changes in a dashboard
- This system should be able to accommodate entry and submission of Personnel Order and Job Order
 - This system should be linked to the Bids and Awards Committee abstract of bidding
 - This system should be able to provide On-line request of services/items from other ancillaries
 - Purchase Order with Items Ordered Report
 - Purchase Order with GL Account Report
- This system should be able to generate the following reports
 - Reports on Number of PR/PO/DV/PCF processed
 - Reports on quantity PO'd as against NOA /Abstract of bids
 - Equipment Ledger: Historical data on repairs of equipment
 - Report on expiration of stocks (FIFO)
 - Able to generate report on cancelled PO/IAR
 - Able to generate report on discounts, freebies negotiated with supplies
 - Produce other reports necessary for Procurement, data assessment
 - Able to generate template for commonly used / issued Documents

1.5.2.2.3 Central Supply Information Management System

The CSSU section should be linked with all offices and departments of the NKTi, primarily used for the monitoring and tracking of supplies dispensed from the department. All requests can also be monitored using this system. The system must be able to generate the following reports but not limited to:

- Monthly Inventory report of all Medical Supplies
- Stock level of Medical supplies at SMD that are available at CSSU
- Oxygen Consumption per Station/ per day/ monthly
- Adjustment of returned supplies for in and out patient.

1.5.2.2.4 Warehousing System

- The system should be able to facilitate the management of Warehouse Requisition Issue Slips (WH-RIS)



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- End users should be able to create a request for RIS
- Warehouse department should be able to view the RIS for reconciliation
- The WH-RIS should use existing product nomenclatures in the hospital
- Stock monitoring should be integrated using barcode technology (one- or two-dimensional)
 - Notifications should be supported, such as those reaching critical level point

1.5.2.2.5 Inventory System

- The system should support an inventory system that has the following features
 - Inventory System (location, category)
 - Inventory Movement Report
 - Monthly Consumption Report
 - Quarterly Consumption Report
- The inventory system should use existing terminologies and nomenclatures used in the hospital.
- The system should be able to generate a report on products being stocked by the hospital
- The system should support the use of Property acknowledgement receipt and Inventory Custodian Slip
- The system should also accommodate the exporting of data into the equipment ledger for faster accounting processes

1.5.2.2.6 Fixed Assets and CMMS System

- This system should be able to support asset maintenance and track the following:
 - Acquisition & Disposal
 - Depreciation & Allowance
 - Depreciation History
 - Equipment Monitoring
 - Equipment Log History
 - Repairs & Maintenance
 - Fuel consumption
 - Odometer tracking
 - Destination and travel tracking
 - Barcoding of all supplies
- The system should be able to perform computations internal to the application
 - Depreciation Computation
 - Generate Depreciation Period



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- Depreciation Expense
- Depreciation Expense Formatted
- Disposed Assets
- The system should be able to perform tasks related to assets information:
 - Assets Info
 - Assets Depreciation History
 - Assets List
 - Assets List (with GL)
 - Acquired Assets

1.5.2.2.7 CSSU System

- The system should be able to perform management of Sales(inpatient, outpatient, walk-in, charge-to, HMO)
- The system should be able to perform On-line request of services/items from other ancillaries Income Proof Sheet
- The system should be able to perform Charging Return Sales / Purchases
- The system should be able to perform Allotment (disbursement, returns)
- The system should be able to perform Receiving
- The system should be able to perform Stock Inventory Posting (Date & Time Cut-off) and monitoring
- The system should be able to perform Items Monitoring
- The system should be able to produce the following reports:
 - Supplies Expiration Report
 - Sales by Items (Charge & Cash)
 - Supplies Pricelist
 - Alert users for expiring / reorder items
 - Adjustment Report
 - Reprinting Charge slip
 - Search Receive items
 - Item File Maintenance
 - Purchase Order
 - FIFO type of inventory system
 - Online Purchase Requisition
 - Purchase Request Online Approval using Digital Signature
 - Canvass Manager
 - Purchase Order with Items Ordered Report
 - Purchase Order with GL Account Report
 - Receiving per Supplier Report
 - Inventory System (location, category)
 - Inventory Movement Report



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- Monthly Consumption Report
- Quarterly Consumption Report
- Senior Citizen Sales
- Expiring Items Report
- Reorder Items Report
- Charges Log
- Allotment Summary Report
- Sales Log
- Consumption Report
- Request Services on all Ancillary Department
- The system should be able to handle Messaging across different departments
- The system should be able to receive Advisory Alert

1.5.2.3 Human Resource Management Systems / Human Capital Management System

The human resource management System will involve all transactions related to human services of the NKTi, from management of applications, to the management of employment appointments, contract preparations and renewals, benefits processing, and retirement processing, among others. The main functions of the HRM System would be personnel information management, payroll management, and time attendance management.

The System should also support monitoring of training of personnel with their respective role in the hospital. This System will ensure that all information and processes related to human resources of the hospital will be stored and tracked in the System.

The time and attendance management should be able to monitor the staff's attendance in required departmental, sectional, and hospital-wide conferences. Report of tardiness, absenteeism, and deliberate disregard for the activities and events required for the staff at the NKTi should also be seen in this system.

Actionable items should likewise be capable of being updated by the HR Division and be viewable to department chairs and the executive staff. The human resource management System will also include the payroll system, which will enable all employees, full-time and contractual, to have payroll-related transactions facilitated through the Systems.



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- The System should have a contract management system
- The System should be able to provide an Employee's 201 File
- The System should be able to perform Alerts & Notifications for Employees Birthday, Upcoming activities & events
- The System should have a scheduling system
 - The System should have an Appointment Scheduler
 - The System should have a Training Scheduler
- The System should have a system for monitoring NKTi applicants
 - Applicant Tracker
- The System should be able to perform quality monitoring checks to NKTi employees

- The System should be able to provide processes for employee privileges
 - Travel Order
 - Leave List
 - Leave Posting & Scheduler

- The System should be able to conduct meeting management
 - Minutes Editor
 - Minutes of Meetings

- The System should be able to perform employee management
 - Violations & Warnings
 - Memos & Warnings
 - Memo Creator
 - Plans
 - Workforce Plan

- The System should be able to produce reports but not limited to the following:
 - List of Employees Report
 - Workforce Inventory
 - Gender and Development
 - Employees Dependents

- The System should be able to generate the following government required reports, but not limited to:
 - GSIS
 - BIR
 - PhilHealth
 - PhilHealth Accreditation for medical personnel
 - PAG-IBIG Fund



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- Statement of Assets and Liabilities Network (SALN)
 - Personal Data Sheet (PDS)
 - Freedom of Information
 - Data Privacy
 - Department of Budget and Management
 - Department of Health
 - Civil Service Commission
 - Commission on Audit
 - Office of the Ombudsman
- The System should be Integrated with Payroll Manager

1.5.2.3.1 Payroll Management System

The system should be able to:

- Perform Timekeeping Entry (Integrated with Biometric Devices)
- Generate Daily Time Record
- perform Duty Rostering
- Access Employee's File
- Perform Payroll Information
- Payroll processing and Transaction
- Mid-year and year-end bonus Processing
- Alpha List Generation
- Generate the following reports:
 - Payslip
 - Monthly GSIS Report
 - Monthly PhilHealth Report
 - Monthly PAG-IBIG Report
 - Monthly Withholding Tax Report
 - Monthly / Semi-monthly Loans Remittance Report
 - Lists of Employees Credited to ATM
 - Lists of Employees Not Credited to ATM
 - Payroll Report Summary (Employee)
 - Payroll Report Summary (ROD)
 - Payroll Report Summary (Administration)
 - Payroll Listing
 - Payroll Journal Entry
 - Rate Per Day (per department)
 - Rate Per Day (All)
 - Monthly Report of New Employee
 - Monthly Report of Resigned Employee
 - Monthly Report of Other Deductions



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- Monthly Report of Other Income
- Payroll Report Summary of Deductions (Tabular)
- Payroll Report Summary of Earnings (Tabular)
- 13th and 14th Month Pay Report (Tabular)
- 13th and 14th Month Pay Report (Detailed)
- Alpha List Report
- Alpha List Report (Formatted)
- Tax Refund
- Representation and Transportation Allowance (RATA)
- Other special payroll
- The system should have the following utilities:
 - Payroll Period Setting
 - Deductions Setting
 - Employee Earnings Setting
 - Other Deductions Setting
 - Deduction Tables
 - Holidays
 - Office/ Duty Hours
 - Duty Code
 - Departments
 - User Manager

1.5.2.3.2 Personnel Database

This System should cover maintenance of the Personnel 201 records of NKTi employees; monitoring of attendance; monitoring of benefits such as leaves, loans, contributions; and assistance for NKTi training programs. Each of the functionality can generate various types of reports needed by the user. With the employee records centralized in a database, the HR-Masterfile 201 can easily generate reports, which are important aids in management decisions.

Each personnel must have access to his/her records for specific field for updating and viewing of information. The system must include audit trail for every change made.

1.5.2.3.3 Time and Attendance

This System should maintain records of employees' time, attendance, overtime and / or undertime that are used for payroll. It interfaces with an electronic time capture device for timekeeping of employees. In addition, it also supports manual data entry of summary of attendance for field employees. Time and attendance



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records are processed by the system yielding figures on the total number of hours late, undertime, overtime and absences.

The system should be able to accomplish schedules for each employee, per shift, per department.

The system should be able to track compensatory day off (CDO) of employees that earn overtime.

1.5.2.3.4 Leaves and Benefits

This System should maintain records of employees' compensation, benefits, loans and leaves, which are used for payroll computation. It monitors employee compensation such as basic salary, allowances and other incentives. It also tracks leave credits, monitors the status of loans and monitors deductions and contributions to government agencies.

The system should be able to provide the following reports:

- Vacation Leave
- Sick Leave
- Availment of Annual Medical Check-up
- Emergency Leave
- Privilege Leave
- Maternity Leave
- Paternity Leave
- Forced Leave
- Calamity Leave
- Solo Parent Leave
- Special Leave for Women

1.5.2.3.5 Recruitment, Selection and Placement

Recruitment process management is the most basic feature of Human Resource Management System. This function handles communication with applicants, from job description creation to job offer presentation, with notifications throughout the process. Essentially, the feature manages the functions recruitment system to attract potential employees to an organization.

In addition, recruitment process features manage non-candidate facing responsibilities that are needed to create an opportunity in



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the first place. This includes the hiring team duties of requesting the establishment of a new role, evaluating budget constraints and eventually, having the job approved and beginning the search for talent.

- Job Requisition
- Job Approval
- Job Description
- Job Offer Extension
- Email Notifications

Job Postings

Job posting features are another crucial piece of recruitment software contributing directly to the goal of candidate sourcing and engagement. Employers can advertise job openings on various channels, including through their website, online ads, job boards and on social media. A process that may have been arduous without recruitment software is simplified with this feature, as businesses can post on multiple job sites almost automatically. With an expansive candidate base, more qualified applicants will respond to job postings, bringing in the perfect person for the job.

- Premium Job Board Posting
- Free Job Board Posting
- Industry-Specific Job Board Posting
- Social Media Job Posting

Applicant Tracking System (ATS)

Human resource departments assess potential employees throughout the application process, from job posting to selection. With an applicant tracking system, resume information is stored and evaluated automatically through the tool. An ATS takes on the task of filtering through candidates based on employer specifications. The system automates communication throughout the hiring process, alerting candidates of important updates. An ATS is an all-inclusive system for the management of administrative recruiting functions.

- Candidate Pre-Screening
- Auto-Response
- Candidate Evaluation
- Employee Referrals
- Talent Pool Management



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Candidate/Employee Management

Once an opening is filled, the process of acclimating an employee to the company environment can begin. Onboarding features start the process of new employee orientation by making sure all necessary information is filed and verified — this includes background and reference checks, tax records, and standard identification forms. Recruitment software can manage the documentation that follows the hiring of a new employee.

- Information Verification
- Background Check
- Reference Check
- Engagement Monitoring
- Onboarding
- New Employee Management

Employment Application Management

Provides a portal for people to submit applications along with a place for the Recruitment Staff to view and evaluate candidates. Documents are sent to an inbox made specifically for resumes so hiring teams can access application materials in a central, organized location. Applicants can look at the status of their resume through this portal.

- Applicant Login
- Customizable / Configurable Employment Application Form
- Resume / CV Upload
- Resume / CV Extractor
- Resume / CV Inbox

Career Portal Development

- Branded Company Job Site
- Job Widgets
- Opportunity Updates
- Mobile Capabilities
- Single Click Application Button

Reporting and Analytics

- Recruitment Reporting
- Data Analysis
- Report Sharing

1.5.2.3.6 Talent Management System



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i. Learning and Development System

1. Learning Management

- a. The system should support the creation of different learning content and items such as:
 - i. Creation of curricula and programs to structure learning content.
 - ii. Creation of various assignment methods, such as automatic, mass, and self-assignments
- b. Learning items can be assigned to learners (employees)
- c. Learners can search and browse learning catalogues for learning items.
- d. Approve courses as supervisor
- e. With built in learning items and resources and must support uploading of externally sourced learning items and resources.
- f. Review learning history of a learner and track the learning process
- g. Track L&D accomplishments
- h. Should have a platform or support for mobile learning
- i. Automatic update of the learning history of a learner after successful completion a course
- j. Automatic generation and printing of certificates and rosters
- k. Provides multiple learning formats such as instructor-led and online learning platforms (Virtual Learning Environment – Self Directed Learning)
- l. The system should have an integrated talent management application (onboarding, performance, and goals).

2. Learning Evaluations and Assessment

- a. Should support multi-level evaluation in Learning
 - i. Level 1: Reaction (Learner feedback for completed courses)
 - 1. Assign questionnaires for learning item
 - 2. Answer questions in questionnaires
 - 3. Analyze questionnaire responses
 - ii. Level 2: Knowledge
 - 1. Create quizzes as straightforward tests
 - 2. Create exams based on new questions or questions from the question library
 - 3. Determine the learning item completion metrics
 - 4. Answer quiz and exam questions
 - 5. Determine learning event completion status



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- iii. Level 3: Behavior
 - 1. Multi-approach feedback system
 - 2. Create questionnaire survey to determine behavioral changes applied in the workplace
- iv. Level 4: Result / Impact
 - 1. Design Key Result Area (KRA) objectives for Level 4 evaluation
- b. Pre-defined evaluation reports should be available
- 3. Mobile and Offline Learning
 - a. With a mobile application to allow learners and instructors to review learning content and history.
 - b. Learning items should be available for online mobile access and during offline.
 - c. Offline learning content should be accessible through downloaded PDF or learning content player
 - d. Learners can access their learning assignments or search for courses in learning catalogues
 - e. Must provide access for downloading Learning and Development certificate of completion.
- 4. Learning Competencies
 - a. Configurable L&D needs assessment and competency gap assessment templates.
 - b. Automatic L&DNA and competency gap assessment reporting system
 - c. Must be able to build an integrated system of competencies and dedicated learning events
 - d. Capability to associate competencies with learning items and programs
 - e. Create learning activities in a development plan in Career Development Planning based on competencies assigned to learning items
- 5. Goal Setting and Performance Management

Integrated Performance Management System (Goal and Performance Management System)

 - a. Goal Management



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- i. Configurable and customizable goal (Commitment) plan with various approaches including but not limited to balanced score card
 - ii. Customizable library goals (major final output)
 - iii. Create goals and targets in Office, Department / Division, and Individual Performance Commitment Report (O/D/I PCR).
 - iv. Cascade goals and targets down the organization (top-down)
 - v. The system should be integrated with Performance Management
- b. Performance Management
 - i. Configurable format in Performance Management (General Appraisal, 360-degree Review, etc)
 - 1. 360 Degree Review
 - a. 360/Multi-rater template
 - b. Job Competencies (Core and Functional)
 - c. Multi-level selection of participants / raters
 - d. Manager processes employee's participant list
 - e. 360 Degree Report Review
 - ii. Alignment of activities with Performance Goals
 - iii. Activity progress tracking should be available
 - iv. Must be able to provide coaching advice during review
 - v. Tracking of achievements by time and performance goals
 - vi. Customizable performance review template with sections for performance goals, core, and functional competencies
 - vii. Must be able to perform performance target calibration (should have a performance calibration template)
 - viii. Electronic Signature of Performance Review Form (O/D/I PCR)

6. Succession Management

The system facilitates the following:

- a. Creates succession plans
- b. Nominate the most suitable candidates based on the succession hierarchy (next-in-rank position) by position
- c. With interactive display of the Succession Organizational Chart
- d. Graphically view the status of a team and manage talent pool:
 - i. Managing MDF (metadata framework) talent pools
 - ii. Associating talent pools with roles



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- iii. Managing MDF talent pool members
- iv. Viewing succession org chart
- v. Searching for potential successors
- vi. Generating performance-potential matrix report
- vii. Nominating successor by position (non-MDF position)
- viii. Implementation method based on formless nomination
- ix. Create presentation for succession nomination
- x. Automated creation of potential successors based on pre-defined competency models / framework
- xi. Viewing lineage chart
- xii. Viewing employee's nomination
- xiii. Viewing employee's nomination history

7. Career and Development Planning

Career Planning development involves the following:

- a. Identification of Key / Critical positions
- b. Creation of career path for each key / critical position
- c. Create and perform role readiness assessment for employees
- d. Identification of competency gaps towards considered job role
- e. Create, maintain, and view all employee development goals

8. Coaching and Mentoring

A platform for conducting coaching and mentoring. The system should be able to:

- a. Open an enrolment for mentoring program
- b. Capability to send invitation to mentors and mentees to participate in the program
- c. Supervise and monitor mentoring program
- d. Progress and terminal report templates for Coaching and Mentoring Program

9. HR Reporting Metrics and Analytics

With reporting and analytics features, Users can generate reports such as but not limited to:

- a. HR Metrics in Talent Acquisition
 - i. Time to hire (TAT)
 - ii. Cost per hire (total cost of hiring / the number of new hires)



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- iii. Early turnover (percentage of recruits leaving in the first year)
- iv. Time since last promotion (average time in months since last internal promotion)
- b. HR Metrics related to Revenue
 - i. Revenue per employee (revenue/total number of employees)
 - ii. Performance and potential (the 9-box grid)
 - iii. Billable hours per employee
 - iv. Engagement rating
- c. Other HR Metrics
 - i. Cost of HR per employee
 - ii. Ratio of HR professional to employees (e.g. 1:60)
 - iii. Turnover (number of leavers/total population in the organization)
 - iv. HR Software utilization
 - v. Absenteeism (Absence percentage)

1.5.2.4 Information resource management system

The information resource management system would serve to facilitate the processes under the responsibility of the information resource management office (IRM). This would include technical support for all information technology concerns of the NKTi. The Systems should support a customer relation management system which can be used to track application bugs, report IT concerns, and obtain feedback from the end users of the Systems. The information resource management should also be able to use Systems for the inventory and management of IT products and services of NKTi, messaging through SMS across all human resources of the NKTi, system administration for all systems inside NKTi, and the use of the Systems for future charging processes.

1.5.2.5 Public information office system

The public information office system should have access and management to Patient Health Record (PHR) and Electronic Medical Record (EMR) to be able to assist patients and their companions/visitors with regards to room location and assignment, results of laboratory and diagnostic procedures, and results of executive check-up.



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1.5.2.6 Business Record System / Document Management System

The business record system will serve to manage all business documents at the NKTi. This will include a Document Management System that is barcoding ready.

Accounts Management

- The system should have a one-time pin (OTP) for password.
- The system should have a password reset tool to be managed by the end user requester via email.
- The system should notify the administrator thru email for new request for change password.
- The system should have a link to user account profile.
- The system should have an avatar upload feature.
- The system should have user management to create new user accounts with specific roles such as employee, manager and administrator.
- The system should have a storage allocation meter per user that can track the used and unused storage to the account.
- The system should have configuration for allocating storage per user with real time update in every movement of the storage capacity.
- The system should have a group management to create new groups with specific roles per folder.
- The system should be capable to use Google Login or Active Directory as login authentication.

Records Management

- The system should have a Record Management – It can archive and purge document based on the retention period that was set. It has an advanced record retention and disposition that manage and organize the active and inactive files
- The system should have a notification for archived and for archiving documents based on the set expiration date of each uploaded record.
- The system should have a dashboard for private and public folders, uploaded documents and notifications.
- The system should have no limit in creation of folders and sub folders.
- The system should have a breadcrumb in folder path.



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- The system should have a public repository where users can only view the uploaded/created record in assigned public folder.
- The system should have Document Tracking/History – efficiently track the movements and activities of electronic documents.
- The system should have a private repository where only permitted users and groups are allowed to view and edit a record.
- The system should have lock feature for folder.
- The system should be capable to assign user and groups to specific folder.
- The system should have a workflow management for automating a process per folder.
- The system should have a conditional process in workflow management such as:
 - a. Workflow process should have condition in getting the file name.
 - b. Workflow process should have condition in getting the index.
 - c. Workflow process should have condition in getting the authors name.
 - d. Workflow process should have condition in getting the date uploaded.
- The system should be capable to upload a single or bulk scanned document
- The system should be capable to read Optical Character Recognition (OCR) – It convert images into searchable machine encoded text.
- The system should have Watermark – It can embed watermark on the images stored in the system.
- The system should have an Indexing – It can provide unique classification through the document metadata or indexes extracted from the documents' contents
- The system should have Document Tagging functions/features – It capture a metadata (tagging) of electronic documents that creates database mining when information is needed.
- The system should have Document Linking – It can link documents to a certain documents that can build child or parent relationships. It also allows users to link and organize documents into a logical form.
- The system should have no limits in index field.



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- The system should have a field for upload date and expiry date for archiving purposes.
- The system should have an automatic archive feature.
- The system should have a Document Version Control – It provide check-in/check-out facility that prevent the documents from being overwritten or deleted. The documents can be updated by any user who has permission to update.
- The system should be able to set the parameters for archiving.
- The system should be able to upload an index file in csv format and automatically link the attributes in designated file names without any limit.
- The system should be able to capture specific index in uploaded document and automatically fill up the designated fields.
- The system should be able to route records to one or more user accounts.
- The system should be able to route two or more tasks in single or multiple accounts.
- The system should be able to route a document in a hierarchy level with two or more personnel.
- The system should be capable to sign a document using digital signature.
- The system should be capable to plot the exact x and y axis for insertion of digital signature by the assigned user.
- The system should be capable to add two or more signature in single document.
- The system should be capable to view the previous document uploaded.
- The system should have Add notes functions/features – It can add notes to a particular document.
- The system should have Document Life Cycle management – able to set retention periods and purging schedule of each document.

Search and Retrieval Management

- The system should be capable to search data such as index, file name, date, author name, uploader name, document type and content of the scanned document.
- The system should have an advance content search that can search OCR scanned documents.



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- The system should have a filtering in search result to easily track the documents.

Reports Management

- The system should be capable to count all the uploaded records by folder or user.
- The system should be capable to count all the pages in every record uploaded.
- The system should be capable to display the accumulated storage and total storage capacity.
- The system should be capable to display the uploaded record of each user account.
- The system should be capable to display the total deleted record of each user account.
- The system should be capable to display the activity of each user account with date stamp.

Notification Management

- The system should have Email Notification functions/features – It notify the user his/her pending actions in the workflow features of the document management system.
- The system should be capable view real-time notification in dashboard.

Integrated Signature Pad

- LCD Screen
 - Display Type: F-STN Positive Reflective
 - Screen Diagonal 50096.0 x 60.0 mm (4.5 inch - 3.77 x 2.36 inch) or better
 - Resolution 320 x 200 pixels
- Pad and Pen
 - Technology: Electromagnetic Resonance (EMR) or better
 - Active Area: 95.98 x 59.98mm, 3.77 x 2.36 inch or Manufacturer standard size
 - Resolution: 2540 lpi (non-interpolated)
 - Communication Interface: USB
 - Pen: Active EMR Pen
 - Pen tether Opening: Yes
 - Connectivity: USB Cable Locking System

1.5.2.7 Executive information management system



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The executive information management System is intended to provide a system for use by the management board of the NKTi. This executive information System of the NHIMS will include a dashboard that the management can use for high-level hospital decisions. This System is also intended to display summary reports of services rendered by the different departments of the hospital. Furthermore, the executive information System will have linkages to the other Systems needed by the executive staff. This would allow the executive staff to have non-edit access privileges to the reports made by the departments, more importantly to the cost center departments.

- This System should be able to provide the management staff of NKTi with the capability to view reports from the different departments on their performance and operations.
- The administrative information System should be easy to use by the end users.
- This System should allow viewing of cost center cash flows from which the interval can be adjusted as required by the hospital administrator and/or the NKTi management staff members
- This System should be able to classify, as needed, reports into departments, units, and personnel when applicable
- This System should be able to have a calendar of activities, with option to include holiday inputs
 - This calendar of activities should be viewable and modifiable from the front-end of the system
- This System should be able to provide the management staff of NKTi to access a dashboard that would provide them with real-time information on the performance and operations of the hospital.

1.5.2.8 Queuing Management System

The NKTi One-Stop Shop facilitates multiple services that translate to multiple queuing courses of action to comply a certain desired result. Hence, these individual multiple desired result originates from one step which is the issuance of queuing number that later progress to the desired end result. The Queuing Management System (QMS) must issue a ticket number to the client according to their query. The client must then take a seat in the waiting area and watch the client facing screens which will display the queue of ticket numbers for each of the available service agents. Whenever it is the client's turn to be attended to, the TV monitor or the multimedia display will show the ticket number and the agent desk number. While waiting to be



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serviced the client facing screens will play infotainment videos to make the wait for the client more pleasant.

Below are the minimum technical and functional requirements of the QMS.

Issuing of Ticket

1. The ticket dispensing kiosk should have the capability to display a number of query types as defined by the NKTi for the client to select from.
2. The ticket dispensing kiosk should be able to issue uniquely numbered tickets (i.e. No number duplication).
3. Have the capability for the ticket dispensing kiosk to issue a ticket based on the service or enquiry type that is selected by the client.
4. The ticket dispensing kiosk must have the ability to print the content within the ticket with certain information highlighted e.g. ticket number in a bigger font, bold and date and time stamp in smaller font, etc.
5. Ticket reprinting capability is an advantage. This will be used e.g. when there is a printer jam.
6. Early warning when consumables i.e. thermal paper reach low level marks.
7. Alerting if there is a technical problem with the kiosk.

Client Queuing

1. The system should be able to handle both linear and virtual queuing principles. Linear queuing is when the client actually queues in a queue in front of the servicing agent. Virtual queuing is when the QMS do the queuing for the client and the client is called to be serviced by the correct client service agent.
2. While waiting, the QMS should have the capability to play entertainment and other relevant informative content on the client facing multimedia display.

Servicing the Client

1. The system must be able to match clients to client service agents that will provide the best service to the client.
2. The system must provide the ability to adjust service levels should acceptable waiting times are exceeded or should client service agents become idle.



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Queue Management Application

1. User Administration/management to manage client service agent access.
2. System administration to allow a NKTi One-Stop-Shop user to apply basic configuration changes without requesting support from the service provider.
3. Control/Configuration for ticket dispensing kiosk.
4. Control/Configuration for the agent workstations and roles.
5. Control/Configuration for various types of information displays.
6. Control/Configuration for the audible and display alert notifications

Service Agent's Activity

The agent's servicing the client should have the ability to do the following, via a PC based application (for function selection purposes):

1. Start the service time, as they welcome the client.
2. Stop the service time, as the client's query is resolved or escalated (and the client has left the cubicle and the agent completed the wrap-up activities.
3. Calls for the next person in Queue.
4. Pend the ticket, if there is a no show from client. The client position in the queue will then be moved down the queue a pre-configured number of places or to the bottom of the queue and will be given another chance to be serviced.
5. Reroute the ticket, if unable to resolve the query or in case of a different query to what the ticket says.
6. Close the desk, so that the agent desk is not active to service clients.
7. Activate/ Reactivate the desk to start receiving the clients.

Supervisor's Activity

The supervisor managing the queue management operations should have the ability to do the following:

1. Monitor the average waiting time per service type.
2. Communicate with the Agent via the Queue management application and provide support and assistance as required.
3. Start / Stop the Queue management operation, as a beginning of the day / End of the day activity.
4. Monitor and measure queuing performance.



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5. Command center functionality/dashboard.
6. Must have the ability to manage the client service agent's (CSA's) availability roster, based on supervisor discretion.
7. Capability to provide a supervisor/manager dashboard view to monitor the queue.
8. Capture a duty roster for the day, Agent's availability such as lunch, coffee and body breaks per agent.
9. Use the application to predict the workload and agent contingency required for servicing the expected load of clients.

Consumables

Thermal papers for the QMS system must be provided by the NKTi.

Integration Requirements/Capabilities

1. More attentive service for elderly, disabled and technologically-inept clients, by pre-identifying their service query upfront.
2. The display screens must have the capability to display infotainment contents either from the QMS system itself or from an external source (e.g. TV signal, set-top box).

Queue Management Reporting Requirements

The Queue Management System must have real time reports but not limited to the following:

1. Average and longest waiting time per service type.
2. Average service time (per client):
 - a. Per Service type
 - b. Per Service Desk
 - c. Per User (Client Only)
3. Average ticket issuing load.
4. Report delivery scheduler.
5. Client feedback report per service type per agent.
6. Dashboard that must be available to the supervisors:
 - a. Number of clients serviced
 - b. Type of clients serviced
 - c. Average waiting times
 - d. Average service times
 - e. Number of abandoned tickets
7. Number of cases per query type, to identify a root cause for seasonal influx in order to react proactively in the future.
8. Must be able to track patient's transactions on real-time



1.5.2.9 Short Message Service (SMS) System

SMS System is a text messaging service system that should be integrated within the Hospital Information Management System. The system should use standardized communication protocols to enable mobile devices to exchange short text messages to mobile phones that uses Global System for Mobile (GSM). The messages can typically be up to 160 characters in length, though some services use 5-bit mode, which supports 224 characters.

- Provide access to a local telecom using SMS gateway solution for unlimited text service to all networks. The cost of sending/receiving SMS shall be shouldered by the Proponent.
- The system should have the following Application User Interface:
 - Doctors Directory
 - Basic Information (Name, Department, Specialty)
 - Contact Information
 - Push Message
 - Message Classification (Keyword for filtering)
 - INFO: Routing Standard Information
 - URGENT: Urgent notice / need
 - EMERGENCY: code blue/ stat requirement
 - Push Message: Keyword Filter + Remarks
 - Auto Text features for patients' schedules and appointments reminders
 - Receive Message (Relay Keyword/Classification)
 - ACKNOWLEDGED – Receiver received message, no urgent action needed
 - DECLINE – Receiver cannot make the request due to more urgent issues
 - MOVE – Receiver accepts request but can tend to at a later time
 - Multiple SMS Group Sending
 - Multiplatform SMS Client Software
 - MS Window Based 32 and 64 bit (XP, Windows 7 and Windows 8 and newer version of MS Windows)
 - Web Based (Compatible in all kinds of Internet browser)
 - Admin Monitoring
 - User Management
 - LOGIN – who pushed / received message
 - Message History – filterable by the keyword



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- Log Reports
 - Add / Edit / Delete user

1.5.2.10 Additional Mobile App Features

- Care Coordination - a Mobile app which is integrated with EMR, with Secured Messaging across multi disciplinary roles within the Hospital by creating Department wise & Role wise messaging groups in a controlled & moderated environment
- Clinician App with voice to text conversion feasible for ordering medicine and services from the App with closed loop integration to EMR/CPOE
- Capability to integrate Mobile App with LDAP Servers &/OR Active Directory Services
- Broadcasting SOS and Code Red/Blue message across Clinicians and Hospital Staff instantaneously
- Follow up Visits made possible wide Patient App and instant messaging along with video calls between clinician and patients - which is secured, HL7 - FHIR compliant & Zero foot print

1.5.2.11 Website Design and Development

The website design and development of the NKTi Dynamic Website must be in accordance with the Department Information Communication and Telecommunication (DICT) Office Administrative Order No. 39 using Government Web Template (GWT) and Government Web Hosting Service (GWHS).

Deliverables includes the following but not limited to:

1. New look and feel
 - Following the NKTi branding guidelines, design a new look-and-feel for the NKTi site capturing the different functionalities.
 - Ensure a consistent visual language on the new site by introducing fixed styles in templates ensuring consistency in fonts, formatting, icons, images, layout techniques.
 - The new look and feel should be adapted to homepage, sections, subsections and the following components of the site: article template, resource webpage template, publication/guidance webpage template, event webpage template.



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- Standard page elements including header, footer, tabs, persistent navigation, contact us, email and page print options should be included in the new templates.
 - The new templates should guarantee that most recent content on the site is captured in automatically in the homepage in an organized way following specific categories, tags or other custom taxonomies.
 - All section and subsection webpages should incorporate functionalities to guarantee the latest information on that section and sub-section is displayed (news, resources, publication/guidance, country stories, events).
2. New sections
- Based on the agreed templates, develop new web sub-sections to the NKTi site based on, but not limited to the structure, functionalities and features.
 - The new subsections webpages should incorporate functionalities to guarantee the latest information on that sub-section is displayed (news, resources, publication/guidance, events).
 - A total of 1,000 numbers of new pages and posts will be developed using the new templates.
3. Functionalities to include in the new templates
- The following features will be guaranteed through the new templates outlined in section 1 & 2:
- Add feed links;
 - Responsive design;
 - Social sharing features – including facebook share by text selection and facebook feed by handle and hashtag.
 - Multiple page styles and custom post types;
 - Language options feature in resources and guidance templates;
 - Search function by news, type of publication, type of resource, events, and issue;
 - Search resources by free text;
 - Interactive map;
 - Signup for latest news;
4. Patient Portal
- The Patient's results must be accessible thru online portal.
 - The portal must have Multi Authentication Factor in compliance to Data Privacy Act.



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- The results stay online with the duration of two months.
- The portal must comply of the standards of Philippine Data Privacy Act.
- The portal login must have One Time Password (OTP) in compliance of the Data Privacy Act.
- The portal must have auto logout features within 2 minutes.
- The portal must have encryption and Secure Socket Layer (SSL) Certificate.

5. Emailing System

- The emailing system must have email encryption.
- The emailing system must comply of the Standards of Philippine Data Privacy Act.
- Emailing of result.

1.6 Application Systems: Hospital Information Systems (HIS)

1.6.1 Clinical Information Management System

The clinical information management will serve as the electronic health record of the NKTi and therefore has to be accessible and usable by the health professionals through a desktop, laptop, and mobile device (tablets, smartphones). All departments, divisions, sections, clinical units, and outpatient clinics that facilitate patient management will be interconnected in the systems through the clinical information System. The clinical information System will also be interconnected with all core systems of the Systems. It is important that systems will be made available to all wards, departments, units, and offices, using appropriate desktop devices and/or tablet computers. The clinical information management System will also serve as point of interoperability with other existing systems in the NKTi, such as the laboratory information management system, radiology information system, picture archiving and communication system, PhilHealth Z Benefits Tracking System (Z-BITS), PhilHealth eClaims and Forms, among others. The electronic health record should be able to accommodate easy accessing of Philhealth ICD-10 diagnosis and RVS code by the health professionals during consultations and rounds at bedside.

For general specifications, all clinical information systems should be able to accommodate patient search and retrieval of information, input of notes, computerized patient order entry, patient monitoring,



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laboratory request and result viewing, diagnostic procedure request and result viewing, charging, medication prescription, messaging, alerts and reminders, co-management, inter-departmental referral, clinical decision support system, room information and transfer, patient tracking, notes and documentation, patient discharge notice, readers fee, professional fee and professional fee sharing, and entry of customized templates based on the departmental terms of reference prepared by the NKTi clinical units, offices, and departments. The clinical information system should support an efficient management of health data using barcode technology. Patient's barcodes should be scannable using the system's barcode reader. Medical devices and ancillary systems used for the patients should also be barcode-ready. The systems should have linkages with the Asset & inventory System. System should be capable to generate quick consultation note. This would enable the department to determine the status and other data related to the devices inquired. In addition to the general system requirements, the Systems should be able to cater to the specific functionalities of the following systems:

1.6.1.1 Registration, Admission, and Discharge Information Management System

The registration, admission, and discharge (RAD) information management system is the point of intersection of the clinical and administrative functions of the hospital, and serves as the first and last encounter of the Systems with a patient for that given admission or consult. A master patient index will serve as the primary information identifier connecting the hospital and administrative Systems together. The RAD system will also facilitate patient transfer from NKTi to another institution, coordinating with the medical records section the printing of transfer documents. The RAD system should be able to do a barcode printout that can be worn by the patient and make the patient immediately identifiable and searchable in the system using the system's barcode reader device.

Thus, this module shall provide the section with but not limited to the following:

- a. The module shall have an access to the patient's registration profile for the basic information
- b. The module shall have an access to open the existing established profile to be able to encode and complete the patient's data needed for medical confinement.
- c. The module shall provide room status and admission on real time.



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- d. The module shall be able to capture information on the patient for discharge
- e. The module shall provide the System for the advance schedule of admission, room reservation and transfer to preferred room.
- f. The module shall provide mode for the complete process of admission.
- g. The module shall use the Bar-coding system of patient profile.
- h. The module shall have an access to the picture captured from patient's registration.
- i. The module shall control the line-up of admission, transfer and discharge. The Proponent shall provide a queuing system.
- j. The module shall provide daily, weekly, monthly and annual reports.
- k. Shall communicate with other cost centers such as Nursing, Housekeeping and other offices.
- l. Shall have an access on the various transactions such as payment, clearance and physical discharge.
- m. The module shall provide communication to his Attending Physician automatically as soon as the patient admitted thru the SMS.
- n. The system should be able to notify Credit and Collection Office for patients with previous confinement balances. The module shall be able to notify the Credit and Collection and other offices that would be relevant to patient's admission.
- o. Shall have access to print and provide PhilHealth requirements
- p. The system should be capable of identifying patients' classification and possible changes of classification (from service to pay or pay to service)
- q. The system should have an option for data entry. Patient and staff are able to encode data.
- r. The system shall require patient consent prior to finalization of registration records. Patient's signature is required.
- s. For Patients identification, the system should be able to incorporate the use of biometrics
- t. The system should be able tag patients that requested confidentiality for security purpose.
- u. The system is able to capture patient's picture and signature
- v. The system is able to capture picture of the document/s or ID presented for validation
- w. The system is able to print patient records
- x. The system is able to print daily reports (Patient record)
- y. On Patient Records Revision, the system shall be capable of the following but not limited to:
 - Able to revise patients records based on the following:



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- i. Upon presentation of pertinent ID/papers/records to prove that the current data encoded is incorrect
 - ii. Upon the request of the patients or his/her relative.
- Able to capture patient's picture and signature
 - Able to capture picture of the document to support the request revision
 - Able to capture picture of the corrected ID
 - Able to trace the detailed transactions for each patient (audit trail)
 - Able to notify/communicate for approval of the request to approving authority
 - Communication to various offices pertaining the approved correction
 - Print daily report (Patient request to correct)
 - Capable of merging data of patients with multiple hospital numbers.
- z. On Patient Admission, the system shall be capable of the following but not limited to:
- Determine the status of Rooms on a daily and real time basis (as to vacant rooms and unoccupiable rooms)
 - Real time of schedule of admission to available room rate
 - Communication to patient regarding their schedule of admission thru SMS
 - Print deposit slip, patient consent, credit suspension, Philhealth forms, Room waiver, admission checklist (information prior to admission),
 - Create and print reports such as daily room transfer history, daily admission, daily discharge, turn around time of vacant room to room assignment, turn around time of admission, turn around time of daily discharge,
 - Create and print monthly, semi-annual, quarterly and annually report of admission, discharge, room status (occupiable and unoccupiable), bed utilization per ward, per room, NKTi employee admission, History of Bed Capacity,
 - Communicate admission to Nurse Station for admission, Attending Physician for admission and Housekeeping Section for room preparation
 - Communication of status of room preparation
 - Use Bar Code enabled NKTi ID as a patient ID card
 - Option to correct, change patient records



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- Communication for patient to submit to financial advisory and create and print report
- Discharge status as to payment of hospital bill, issuance of clearance, physical discharge
- Patient feedback through mobile app
- Previous confinement balances, notification
- Include patient's classification as pay or service patient
- Shall have access to the pictured captured from patient's record
- Showcase the room status and admission status on real time
- Shall control the line up of admission, transfer and discharge (using queuing system)
- Shall provide the section with daily, weekly monthly and annual reports such as Occupancy Rate, Census, Company Sponsored, VIP, Emergency and Elective Admission.

1.6.1.2 Radiology Information System and Picture Archiving and Communication System (RIS/PACS)

The system should be able to provide a complete Radiology Information System and Picture Archiving and Communication System (RIS/PACS) (RIS/PACS) and integrate with the existing or future system of the radiology department, including the existing radiology information system and the picture archiving and communications system. Should the Radiology Department decide not to continue with the existing RIS/PACS, the Systems should be able to provide functionalities for the Radiology Information System, with the ability to control PACS viewing from inside the systems computer terminal. The system should have integrated radiology orders and Billing, doctor's prescription and radiology orders for radiology work list and reporting, radiology and imaging services work list generation, radiology reporting, PACS integration with radiology modality work list, online report publishing, radiology stock consumption analysis, adherence to regulatory compliance, third party device integration (Bar coding and the use of HL7 and DICOM standards), radiology-related master data control and management and remote referral system.

The Radiology Information System should have the following functionalities but not limited to:



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1.6.1.3 Laboratory information management system

The Laboratory Information System (LIS) should be able to provide a laboratory reception kiosk that would enable the patients to use barcoded patient bracelets or barcoded cards to monitor laboratory requests, register and order laboratory tests, print out laboratory results, check status of laboratory examinations, update current billing statements and generate charge tickets and official receipts

The laboratory information system should be able to interface with any and all partially-automated and fully-automated laboratory equipment that is capable / intended to work with such a system. The laboratory information system must have the capability of handling / performing international-standard workflows in anatomic pathology (including histopathology, electron microscopy and renal pathology), virology, special chemistry, clinical chemistry, serology, blood banking, blood donor recruitment and processing, hematology, clinical microbiology, clinical microscopy, clinical immunology, transplant immunology, molecular (PCR) testing, molecular and cellular therapeutics, cellular assay, flow cytometry, FISH and cytogenetics.

Furthermore, the LIS should be capable of the following but not limited to:

- laboratory administrative management
- monitoring of turn-around time
- monitoring and reporting of quality control
- scheduling / monitoring calibration and preventive maintenance
- generating censuses, logbooks, registers, test result summaries, other statistical analysis on test results and data
- performing and monitoring of quality indicator performance and statistics
- performing / managing telepathology functions
- append additional tests to current patient samples already in the lab with previously-made requests
- schedule actual testing for laboratory tests on particular scheduled running days
- archive patient samples for easy retrieval and/or disposal after a set number of time
- alert system for critical values



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- capable of automated sending of results in short message system (SMS) texts and email with encryption
- capable of generating test results print-outs through self-help kiosks through wrist band barcode or patient ID barcode
- capable of self-registration of patient data and test requisitioning with generation of charge slips through self-help kiosks through wrist band barcode or patient ID barcode
- capable of online test requisitioning either through intranet (within the NKTi) or remotely by internet through a patients portal
- capable of allowing online access and printing of test results through patients' portal
- capable of receiving and acknowledging online payment systems e.g. pay maya, paypal, ali pay etc.
- capable of monitoring/summarizing/reporting charge slips/tickets
- capable of handling an intelligent queuing system for registration and charging, payment and specimen collection activities
- does online electronic signature and validation
- transmits test results to the originator of the test requisition selectively (tests viewed are limited to only those requisitioned by the floor/individual)
- capable of monitoring and storing all changes made to any test result(s) and recording who made the change(s)
- possesses standard or higher security features against hacking, viruses, malware
- All charging, messaging, alert and notification features apply in this department's system.

1.6.1.4 Pathology information management system

Pathology management system would include an archiving system for surgical pathology specimens from which a registry can be created and analyzed. The Department of Pathology and Laboratory Medicine will be in charge of setting the specifications for the archiving system. All charging, messaging, alert and notification features apply in this department's system.

1.6.1.5 Hematology and transfusion medicine information management system



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The transfusion medicine system should be able to perform functions of reporting blood transfusion reactions as well monitoring the progress of patients who would be transfused with blood and blood products. All charging, messaging, alert and notification features apply in this department's system.

1.6.1.6 Surgery information management system

The surgery information management system should be able to cater information needed for pre-, intra-, and post-operative procedures of patients, as well as operative technique documentation ability. The system should have linkages to laboratory, radiology, patient business record, as well as other departments and units of NKTi which can be of help in the management of patients for operation. All charging, messaging, alert and notification features apply in this department's system. The surgery information management system should also linked to OR scheduling. System should also provide flexibility to the user to define the Dossier details with every procedure.

1.6.1.7 Cardiovascular catheterization management system

This system is focused on activities related to charging of procedures done and supplies used at the section. The System should be able to accommodate functions for generation of monthly income report, monthly census for out-patient and in-patient, for service and pay and for different services such as cardiology, vascular, and radiology. The System should be able to process consignment transactions, emergency procurement of cathlab devices, as well as transaction of cathlab devices among different cathlabs in the Philippines. Special charging procedures on stents, balloons, guiding catheters, PTCA wires, among others, should be supported in the Systems system. All charging, messaging, alert and notification features apply in this department's system. Radiology Imaging System should support remote reporting against the image or document sent for approval using the mobility apps teleradiology.

1.6.1.8 iVASC information management system

The iVASC system should facilitate result entry, edit and viewing of vascular diagnostic procedures related to the unit. The system should also facilitate data entry for new patients and data for old patients. The system should facilitate unit procedure charges and release of all official results. The system must be linked to billing, nursing and



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philhealth systems. All charging, messaging, alert and notification features apply in this department's system.

- Facilitates result entry and edit of vascular diagnostic results.
- Facilitates data entry for new patients and data edit for old patients (Using the iVASC Patient Forms).
- Facilitates viewing of iVASC patient document entries and vascular ultrasound results.
- Facilitates Unit procedure charges and release of results for admitted and outpatients.
- Facilitates Unit Census Reports (per procedure, per In- and Out-patients, and per Private and Service).
- Facilitates Income Reports (per room rate on admitted patients including ER and Out-patients).
- Facilitates Supplies Monitoring and Inventory Reports (all unit supplies).

Further, the module must be link to the following:

- Nurses module - refer to No.3 module description.
- Accounting module - refer to No. 5-6 module description.
- MMID module - refer to No. 7 module description.
- Medical Records module- refer to No. 5 module description.

1.6.1.9 Anesthesia information management system

The anesthesia system should be able to incorporate all forms being used by the department for pre-, intra-, and post-operative care. Reports should likewise be made available for generation. All charging, messaging, alert and notification features apply in this department's system shall include the following but not limited to:

- a. Bookings System, Report repository System, Analytics System and Admin System that shall be accessible via web browsers within National Kidney Transplant Institute, as well as from other venues via secure login portals.
- b. The architecture of the AIMS Systems shall comply with HL7 standards, ensuring seamless bi-directional integration to HIMS.
- c. AIMS shall have the capability to integrate with HIMS so reports generated by each System are automatically uploaded to HIMS, through an integration engine, specifically:
 - a. Anesthesia report from the Intraoperative System
 - b. Recovery report from the Recovery System



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1.6.1.10 Urology information management system

The urology information management system should be able to cater information needed for pre-, intra-, and post-operative procedures of patients. The system should have linkages to laboratory, radiology, patient business record, as well as other departments and units of NKTi which can be of help in the management of patients for operation. All charging, messaging, alert and notification features apply in this department's system.

1.6.1.11 Organ transplant information management system

The organ transplant system should be able to provide a registry for all donors and recipients of kidney transplant procedures. An evaluation, approval and queuing system should also be implemented for more efficient monitoring of organ transplant procedures. All charging, messaging, alert and notification features apply in this department's system.

1.6.1.12 HOPE information management system

HOPE should be able to be given access to clinical information (labs, tissue typing, tissue cross matching, imaging, ECG, etc) for patients enrolled in the cadaver receipt program. The system should likewise given access to the Electronic Medical Records. This should facilitate evaluation when a cadaver donor is available. All charging, messaging, alert and notification features apply in this department's system.

1.6.1.13 Internal medicine information management system

The internal medicine information management system should be able to cater information needed for pre-operative risk assessments of patients, with the proper forms and reports. The system should generate medical data reports ex: (Admitting History and PE, Clinical abstract, Discharge summary, etc). The system should have linkages to laboratory, radiology, patient business record, as well as other departments and units of NKTi which can be of help in the management of patients. The Systems should be able to support data migration for this information management system should the section be using the Systems instead of the homegrown information management system. All charging, messaging, alert and notification features apply in this department's system.



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1.6.1.14 ICU information management system

The ICU system should be able to allow remote monitoring of all patients by the ICU consultant, either inside the ICU room or in an authorized client computer with access to Systems. The ICU system should also be able to cater remote orders with proper authentication at both ends of the remote consultation procedure. The system also should include the general requirements of the Nursing Management Information System. The system should be capable of generating data for general reports as desired by the end user. The system should generate income reports needed by the ICU from different cost center such as pharmacy and central supplies. All charging, messaging, alert and notification features apply in this department's system. The system should likewise be capable of using barcode system in the processing of the patients transactions.

1.6.1.15 Non-Invasive Cardiac (NCL) Laboratory Information Management System

This system should have access to laboratory and radiologic imaging results that are pertinent to the patients being attended by the NCL. This should be integrated with the functions of the cardiovascular laboratory. This system must be able to access, store, and retrieve data from the NHIMS.

All charging, messaging, alert and notification features apply in this department's system.

The system must be able to generate the following reports:

- Daily, Monthly, Quarterly, Semi-annually and Annually Census: Facilitates Unit Census Reports (per procedure, per In- and Out-patients, per diagnosis and per Private and Service);
- Daily, Monthly, Quarterly, Semi-annually and Annually Income Reports (per room rate on admitted patients including ER and Out-patients).
- Annual ECG of NKTi employees
- Daily, Monthly and Annual Census: Turnaround Time of Patient Care per procedure
- Supplies Monitoring and Inventory Reports (all unit supplies).
- The system should be able to allow scheduling and appointment per procedure.



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Further, the module must be linked to Accounting, Nurse, Supply Management, and Medical Records Systems.

1.6.1.16 Pulmonology information management system

Pulmonology system should be able to have access to view results of laboratory and imaging results that are pertinent to the department, such as ABG, PFT, among others. The system should be able to support queuing and charging for the rent of respirators. The system should also be able to assess the functioning and condition of the respirators, and integrate with the procurement and property offices as necessary. All charging, messaging, alert and notification features apply in this department's system.

1.6.1.17 Neuro-physiology information management system

The system should be able to communicate with laboratory results related to the management and treatment of neuro-physiology patients. All charging, messaging, alert and notification features apply in this department's system.

The system should be able to perform the following functions:

- Data entry for new patient
- Data edit for old patient
- New result entry for new patient
- Old result edit for old patients
- Test charge slip generation to facilitate payment of procedures for outpatient test request
- Test fee charging for outpatient request
- Official results generation
- Census report generation
- Income request generation
- Supplies monitoring to facilitate periodic inventory

1.6.1.18 Oncology information management system

The system should be able to facilitate entry of information related to patients with oncological diseases. Guidelines and standard methods of practice for the treatment and management of oncological diseases should be available as a reference library for the end users. All charging, messaging, alert and notification features apply in this department's system, but not limited to:



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- The system also should include the general requirements of the Nursing Management Information module.
- Patient order, patient diagnostic and laboratory request and result viewing.
- The system should generate comparative (previous years vs present year) and general reports needed by Onco and report of income and expense. As well as:
 - Daily, Monthly, Semi-Annual, and Annual Census: Admission and Discharge.
 - Daily, Monthly, Semi-Annual, and Annual Census: Registered Procedures.
 - Daily, Monthly, Semi-Annual, and Annual Census: Morbidity and Mortality Rate
 - Daily, Monthly, Semi-Annual, and Annual Census: Occupancy Rate
 - Daily, Monthly, Semi-Annual, and Annual Census: Turnaround Time of Patient Care
 - Daily, Monthly, Semi-Annual, and Annual Census: Patient Diagnosis, Patient classification: pay or service, old or new, and mode of payment
- All charging, messaging, alert and notification features apply in this department's component.
- On reports generation particularly on patient charges, the system should be able to consolidate/breakdown the contents of chemotherapy packages/procedures.
- The system is able to generate in excel form a detailed summary of charges report
- All inputs/reports in the system could be printed
- All inputs/reports in the system could be generated/exported in excel format.
- It should also be capable of barcoding system for patient care processes.
- All charging, messaging, alert and notification features apply in this department's component.
- On patient registration, the system should enable the user to specify the patient's mode of payment: Philhealth/GL/HMO/etc. Also, enable the user to specify if the patient is old/new, and if pay/service.
- Upon discharging, the system should enable the user to indicate if the patient is 'Cleared of charges'.

1.6.1.19 Physical medicine and rehabilitation information management system



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The system should be able to assist the patients at the Physical Medicine and Rehabilitation (PMR) section in terms an electronic registry for their patients, as well as data entry and information retrieval. The system should be able to provide monthly report for audit reports (ex: paid and unpaid procedures), census (pay and service categories), professional services, consignment, PF, and all others as seen in the department Terms of Reference submitted for PMR Section. All charging, messaging, alert and notification features apply in this department's system.

This system should be able to facilitate patient management related to physical medicine and rehabilitation. All charging, messaging, alert and notification features apply in this department's system.

1.6.1.20 Lithotripsy information management system

This system should facilitate the management of patient information for in-patient and out-patient cases having ESWL procedure. This system should be able to access the PACS, as well as view the results of the radiologic procedures prior to lithotripsy procedures. The lithotripsy section will be procuring its own digital ultrasound and fluoroscopy machine. Hence, the system should be able to communicate with the machines using HL7 protocol, and store images in the Systems. All charging, messaging, alert and notification features apply in this department's system.

1.6.1.21 Endoscopy information management system

The endoscopy system facilitates patient data gathering and information processing using forms that are already available in the endoscopy unit. The system should also support drawing functionalities for endoscopic findings. All charging, messaging, alert and notification features apply in this department's system.

1.6.1.22 Nuclear medicine information management system

The system should be able to assist the patients at the nuclear medicine section in terms an electronic registry for their patients, as well as data entry and information retrieval. The patient should be able to provide monthly report for audit reports, census, professional services, Readers fee, PF, PF sharing, and all others as seen in the department Terms of Reference submitted for nuclear medicine. All charging, messaging, alert and notification features apply in this department's system.



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1.6.1.23 High Immunosuppression Care Unit Information Management System (HICU)

The HICU system should facilitate all processes and functions related to the management of patient at HICU. The system should include the general requirements of the Nursing Management Information System. The system should be capable of generating data for general reports as desired by the end user. The system should generate income reports needed by the HICU from different cost center such as pharmacy and central supplies. It should also be capable of barcoding system for patient care processes. All charging, messaging, alert and notification features apply in this department's system. The system must include the following reports but not limited to:

- Income reports from different cost centers such as pharmacy and central supplies
- Patient analysis
- Unit Based Masterlist
- Statistical Census
- Number of laboratory and radiology procedures

1.6.1.24 Adult-nephrology information management system

This System will facilitate the monitoring and management of adult renal patients, with linkages to the clinical and patient business record Systems. This should be able to incorporate all forms being used by the Adult-nephrology department. Currently, the Adult-Nephrology section is using a homegrown information management system. The Systems should be able to support data migration for this information management system should the adult-nephrology section be using the Systems instead of the homegrown information management system. The Systems for the adult-nephrology section should have a relative advantage in terms of interoperability with all other common features of the Systems, such as cross-linkages, messaging, direct information exchange to finance departments, among others. All charging, messaging, alert and notification features apply in this department's system.

Report and printing of Forms include the following but not limited to:

- Out-Patient First Consult Form
- Out-Patient Follow Up Form



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- History and Physical Exam (Admission)
- Discharge Home Instructions and Course in the Ward
- Philhealth New Claims Form 4 (CF4)
- Hemodialysis Order Form
- CKD Registry and CKD Follow Up Form,
- Clinical Abstract for Acute Kidney Injury, Chronic Kidney Disease Patient, Dialysis Initiation, Living Kidney Donor, Native or Graft Renal Biopsy, New Kidney Transplant Patient and Post Kidney Transplant Patient
- Pre-Transplant Evaluation Form for Kidney Transplant Recipient and Donor.
- Patient / Medication Prescription. Generating report for Census (Count the number of Patient-Old and New Patients, Count Total Visit of Patient, Count according to Region, Patients according to Age, Gender, Diagnosis, CKD stage, KT Recipient, KT Donor, HD Patient)

1.6.1.25 Pediatric-nephrology information management system

This System will facilitate the monitoring and management of pediatric renal patients, with linkages to the clinical and patient business record Systems. This should be able to incorporate all forms being used by the Pediatric-nephrology department. All charging, messaging, alert and notification features apply in this department's system.

1.6.1.26 Hemo and Peritoneal Dialysis System

The Hemo and Peritoneal Dialysis System should facilitate inpatient and outpatient hemodialysis treatment. The dialysis center system should be able to automatically monitor patients on a computer, such that any change in the patient's condition will be seen by the attending physician. The Hemo and Peritoneal Dialysis System should also be able to perform patient tracking in such manner that if the patient is initially accepted in out-patient and then later on admitted at the emergency room, the information from the Hemo and Peritoneal Dialysis System would be automatically reflected in the patient's record on ER admission, thus avoiding double charges on PhilHealth. The hemodialysis center has its own billing, charging and payment system. Hence, the system should be able to allow the center to conduct its separate billing, charging, and payment system, and reflect the transactions in the NKTi accounting department allowing patients to use various modes of payment (Cash, Guarantee Letter from



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government funds, HMO etc.) without affecting the income report. The system should be able to view pending and previous charges made and transaction history including payments made by the patient. Along with this function, the center should be able to provide the reports for bills rendered for in-patient and out-patient, as well as statistical, income generation, and all other reports required by the section. The system also should include the general requirements of the Nursing Management Information System. All charging, messaging, alert and notification features apply in this department's system including viewing of results, laboratories, etc. The system should likewise be capable of using barcode system in the processing of the patient's transactions and should be able to generate patient, financial, and statistical report **as required but not limited to:**

- The system should be able to generate reports (per shift/day/month/quarterly/semi-annually/annually) and as required with breakdown according to: Old/New, age, sex, diagnosis, service/pay, out-patient/inpatient by priority (A,B and C), source of funding/payment, no. of performed HD/HDF/SLED/CRRT/HP/PAP/PEX/DPMAS per day/month, mortality and morbidity report, access, right or left CVC (IJ, Femoral, Perm Cath), AVF, or AVG, complications (chills/fever, headache, chest pain, dyspnea, hypotension, hypertension, hypoglycemia, bradycardia, tachycardia, nausea and vomiting, lightheadedness/dizziness, access malfunction, and decrease in sensorium or unresponsiveness).
- The system should be able to generate routine monthly, quarterly, and annual reports such as: cost/expenses/income and financial reports, patient's compliance to treatment (attendance monitoring), daily patient's census per shift/per day/per month/quarterly/semi-annually/ and annually, special reports as needed for both individual patients and the facility as a whole.
- All patient treatment sheets and records at the NKTi Hemodialysis Unit should be stored in the electronic medical records (EMR) management system via document scanning format to effectively archive patient health record or information for a minimum of fifteen years, or as will be ordered by the management.
- The system should be able to view and process including printing of request for or notification for hemodialysis of patients from the wards, ICU and emergency room with required fields to fill up before other sections can process or send their request to hemodialysis in patient unit.



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- The system should be able to allow scheduling and appointment according to patient shift (1st, 2nd, 3rd, 4th shift) of hemodialysis treatment at the outpatient section of the center for slot availability alongside with attendance and compliance to dialysis monitoring system.
- The system should be able to generate patients General Treatment Information for viewing and creating patient data during emergency situations.
- The system should be able to link with other cost centers and departments such as Pharmacy for requisition of medicines applicable for cash and other payment transactions for both units, Radiology, Pulmonary and Laboratory request and viewing of results for the said units.
- The Systems should be able to track and assign patients to a dialysis machines for all the shifts. It should also monitor the current status of the dialysis machines i.e. In-use, for PM, On-standby.
- The Systems should be able to access the Philippine Renal Disease Registry as required by DOH i.e. New Patients on Hemodialysis.
- The Hemo Dialysis unit must be able to access and link to PHIC Dialysis Patients Database for registration and monitoring.
- Patient order, patient diagnostic and laboratory request and result viewing.
- Patient monitoring / tracking, real time dashboard of the status of diagnostic and laboratory procedures in the screen.
- The system also should include the general requirements of the Nursing Management Information module. The system should be able to provide online referral to the ICC, MSSD, iVasc, APECS, Women's Center, Peritoneal Dialysis and Hemodialysis Centers, Out-patient, etc.
- Access to scheduler for Operating Room cases.
- The System should be able to tally/monitor cumulative patient peritoneal dialysis related complications.
- The system should be capable to generate history of treatment of the patient as well as the peritoneal equilibration test results.
- The system should track and give alarm on patients claiming for PD Z-package benefits when they are admitted.
- The system should be intra-operable in different point of care of the PD unit. (CAPD Clinic, PD Warehouse, PD Unit), with especial access password.
- The provider should provide tablets for roaming nurses.
- Must see the total roster of patients



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- The system should be access/link PhilHealth Dialysis Database and generate report.
- CAPD Clinic:
 - Registration
 - Different Procedures and modalities
 - Charging
 - Scheduling of follow up check-up, and automatic messaging of the patient for their follow up check-up.
 - The system should be capable of tracking the total roster of PD patients and their status (Expired, Lost to follow up, Shifted to HD, Transferred to other Center, Transplanted, AKI)
 - The system should be capable for the referral of out-patient to other OPD services.
- Warehouse:
 - The system should be capable of tracking the total roster of PD patients and their status (Expired, Lost to follow up, Shifted to HD, Transferred to other Center, Transplanted, AKI)
 - The system should be capable of scheduling claims per day.
 - The system should track the procedural stages of claims of the patient.
 - The system could track real time numbers of claimed PD solution of the patient per year.
- The system should generate general reports needed by the ER and report of income from different cost center such as pharmacy and central supplies
 - Daily, Monthly and Annual Census: Admission and Discharge.
 - Daily, Monthly and Annual Census: Morbidity and Mortality Rate
 - Daily, Monthly and Annual Census: Reportable Infectious Cases
 - Daily, Monthly and Annual Census: Occupancy Rate
 - Daily, Monthly and Annual Census: Initiation, replacement and doctor who inserted the catheter.
 - Daily, Monthly and Annual Census: PD Z-Package report and demographics.

1.6.1.27 Out-patient division information management system

The OPD system should cater to all functionalities being implemented at the NKTi OPD by the time of implementation, **including but not limited to:** patient registration, pre-registration, patient queuing,



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patient management, medication prescription, laboratory ordering and results viewing, payment, and appointment / scheduling. The system should be able to generate reports based on the prevalence and incidence of diseases, and leading causes of consults. All charging, messaging, alert and notification features apply in this department's system.

1.6.1.28 Emergency room information management system

The ER component should facilitate all processes and functions related to the management of patients at the emergency room. Since the emergency room will have a high switching cost from using a manual based system, Systems should be able to accommodate change management protocols that will allow the staff members of the ER to adapt to the Systems. The ER component should cater to all functionalities needed for patient management at the emergency room setting, **including but not limited to:**

- The system should have a real time dashboard of the status of the Emergency Room including Actual Census, Admission and Discharges, Procedure Room Line-Up, Operating Room Line-Up. Chairman and Nurse Supervisor's dashboard that could be accessed online
- Admission transfer and discharge, triaging (include timing).
- Patient management, able to provide clinical pathway of emergency cases.
- Code management, able to track the duration, and medication s given.
- Patient order, patient diagnostic and laboratory request and result viewing, and
- Patient monitoring / tracking, real time dashboard of the status of diagnostic and laboratory procedures in the screen.
- The system also should include the general requirements of the Nursing Management Information module. The system should be able to provide online referral to the ICC, MSSD, iVasc, APECS, Women's Center, Peritoneal Dialysis and Hemodialysis Centers, Out patient, etc.
- Access to scheduler for Operating Room cases.
- The system should generate general reports needed by the ER and report of income from different cost center such as pharmacy and central supplies as well as the admission fee rate at ER. As well as:
 - Daily, Monthly and Annual Census: Admission and Discharge.



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- Daily, Monthly and Annual Census: Registered Procedure Room cases.
- Daily, Monthly and Annual Census: Morbidity and Mortality Rate
- Daily, Monthly and Annual Census: Reportable Infectious Diseases (can be transmitted to DOH or other agencies needing report)
- Daily, Monthly and Annual Census: Occupancy Rate
- Daily, Monthly and Annual Census: Turnaround Time of Patient Care
- Daily, Monthly and Annual Census: Overstaying patient and Service Classification by Specialization.
- Daily, Monthly and Annual Census: Report of incidence and sentinel events during the shift.
- Monthly report for reason inter-agency referral
- Monthly report of notifiable diseases and non-communicable diseases
- An alert system of the same name of patient should be present (First, Middle, and Last Name). As well as High Alert Patient (prone to complaint).
- It should also be capable of barcoding system for patient care processes.
- All charging, messaging, alert and notification features apply in this department's component.
- System should have capability to define the emergency room layout and use the same to keep the beds and assign the doctors.
- The system has the capacity to manage and facilitate daily Multi-disciplinary team rounds data from, Physicians, Nurses, Medical Social Service should be unified through tablet and computer on wheels (COW).
- Can view availability and status of rooms and pending discharges.
- The emergency room account of the patient should be linked with the In-patient account when the patient is admitted in the ward. Processes such as return of supplies and medication and revocation of laboratory and diagnostic procedure may be facilitated either as Emergency Room patient or as In-patient.
- All inputs in the system could be printed in the chart format
- See others specifications related to nursing management system



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1.6.1.29 Operating room information management system

The operating room system should be able to facilitate operation scheduling, including those coming from the out-patient department, emergency room, ward, ICU, as well as scheduled operations from doctors whose patients have not been admitted to the NKTi. The operating room system should be able to support barcoding of operating equipment and supplies, and tracking of these equipment related to the patients that have utilized the equipment, health professionals who handled the equipment, and hospital staff accountable for the equipment. The OR system should also have the ability to produce case registries and the necessary reports required by the OR complex, as well as those required by the Department of Health. The operating room information management system should also be able to perform analytics on the different OR procedures, including the time and supplies needed for a given OR procedure.

1.6.1.30 Industrial clinic information management system

The system should be able to monitor admission and consultations of employees of NKTi. The system should also be able to perform pre-employment and annual Physical exam. The system should also be connected with the human resources System, but still maintain the patient-physician confidentiality environment, allowing only the designated physician to see the patient's data, but the HR department being allowed to see the services rendered for the patient (for salary deduction). All charging, messaging, alert and notification features apply in this department's system.

1.6.1.31 Infection control information management system

The infection system should be able to follow-up patients with possible communicable/infectious diseases. The system should be capable of collating reports from different care areas and the laboratory department for the monitoring of patient devices and culture. All charging, messaging, alert and notification features apply in this department's system.

The system should be capable of:



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- A. Follow up patients with possible communicable / infectious diseases and surveillance of Healthcare associated infection. Likewise, the System must link to the following but not limited to:
 - 1.1 All wards
Viewing of all patients admitted. Verification of patients identified to be suspected/ confirmed communicable / infectious diseases and those suspected with nosocomial infection.
 - 1.2 Doctors' Clinic
Gather patient's data identified with nosocomial infection after discharge from NKTi (within 1 month after surgery)
 - 1.3 Outpatient Department
Gather patient's data identified with nosocomial infection after discharge from NKTi (within 1-month post surgery); viewing of patients with notifiable diseases
 - 1.4 Lab. – Microbiology
Viewing all laboratory per patient identification; immediate isolation and tagging of patient/s with multi-drug resistant organisms
 - 1.5 Emergency Room
Viewing all admitted patients (current and previous) monitor patients with communicable / infectious diseases; patients for admission and expired patients; list of patients newly inserted of central vascular catheter (CVC), total number of newly inserted CVC (monthly)
 - 1.6 Hemodialysis
List of patients on regular HD treatment (in & out-patient) prior to identification / declaration of nosocomial infection
 - 1.7 Peritoneal Dialysis
List of patients newly inserted of PD Catheter
- B. IPCC System – Notice of Referral. Follow up patients with possible communicable / infectious diseases; surveillance of



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Healthcare associated infection; surveillance and reporting of notifiable diseases. Likewise, the System must link to the following but not limited to:

- 1.8 Operating Room
Viewing of all cases (daily; monthly). Viewing of surgical procedures as basis for monitoring surgical site infection
- 1.9 Admitting Section
Verification of patients' data, room, service classification, total # of admissions & discharges
- 1.10 Medical Records
Review admission history; verify signs & symptoms of infection / progress reports, vital signs and specific antimicrobials administered; Census classification (Pay and Service)
- 1.11 Radiology Department
Monitor chest radiographs to validate signs & symptoms of respiratory infection, ultrasound results
- 1.12 Laboratory Department
Monitor laboratory results, particularly: CBC & culture & sensitivity, etc. to validate signs, symptoms of infection
- C. IPCC System – Reports. Surveillance activities. The System must link to the following but not limited to:
 - 1.13 Human Resource Division
Monitor attendance to IPCC trainings: induction & re-orientation
 - 1.14 Pharmacy Division
Surveillance of antibiotic rotation
 - 1.15 Operating/Recovery Room
Surveillance of pre-operative antibiotic (prophylaxis) Monthly reports; Mandatory reports; Statistical reports; OR KT census
 - 1.16 Admitting Section



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- a. Daily report - Admission logbook; Daily Admission and discharges; Daily expired patients; Alphabetical list of admitted patients
- b. Other reports - Monthly statistical reports
 - Monthly discharges / area
 - Monthly discharges / Department / case
 - Census classification (Pay and Service)

1.17 Cardiac Catheterization Radiology Unit
Monitor procedures done

1.18 Hemodialysis (Main & Annex)
Viewing of total number of HD procedures per access classification (central line / AV graft)

Total number of census per day / month (classified as in and out-patients)

1.19 Emergency Room
Monitor invasive procedures; Total Cases per month. All patients (current / previous registered)
Reports: Census report; Daily ER Admission and discharges; Daily ER expired patients
Update ER patient records

1.20 Radiology
Viewing Ultrasound / CT Scan / MRI results

1.21 All Wards
Monitoring of Patients' Device and Healthcare-associated Infection Checklist

1.22 Microbiology
Immediate viewing of results classified as MDRO

1.23 Internet
Link to PIDSR (Philippine Integrated Disease Surveillance and Response) in reporting to DOH; RESU and QCESU and Mandatory link to TB notification.

1.6.1.32 Doctors' clinic information management system



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- The doctor's clinic information management system should be able to support functions found inside doctor's clinics at the hospital.
 - Patient search
 - Clinical history and physical examination
 - Diagnosing Capturing
 - Problems List
 - Care Plan and Order Set
 - CDSS
 - Physician order entry system
 - Results viewing
 - Management and therapeutic modalities
 - The system should be able to support a financial portal that would enable the physicians to view received professional fees from the different sources.
 - The system should be able to support generation of reports
 - Patient registry
 - Physician income and receivable report
 - Diagnosis and leading causes report
 - The system should be able to transfer patients to- and from- the admitting section.
 - The system should have a provision to support off-site access to the doctor's clinic information system.
 - The system should be capable of requesting for procedures and medicines.
- 1.6.1.33 FISH laboratory
- The system should be able to support all charging, messaging, alert and notification features apply in this department's system.
- 1.6.1.34 Pallative Care
- The system should be able to support all charging, messaging, alert and notification features apply in this department's system.
- ENHANCED CHARGING SYSTEM.
 - Our current charging system is only a ride-on to Med Sys Visual Nurse & Visual ER where there were errors occurring every time we charge
 - Out Patient ready (for future purposes)
 - REPORTING AND DOCUMENTATION CONCERNS



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- Daily and Monthly Palliative Care Census
- Palliative Care Patient Registry
- Creation of Graphic Reports based from the census (Old vs New patients; ER vs In patients; Age; demographic Locations; No. of days referred to the unit etc.)
- Monthly Financial Report (base on palliative care charges made)

1.6.1.35 Breast Center

The system should be able to support all charging, messaging, alert and notification features apply in this department's system.

1.6.1.36 CAPD

The system should be able to support all charging, messaging, alert and notification features apply in this department's system.

1.6.1.37 REDCOP

The system should be able to support all charging, messaging, alert and notification features apply in this department's system.

1.6.1.38 Liver Center

The system should be able to support all charging, messaging, alert and notification features apply in this department's system.

1.6.1.39 Nursing Information Management System

The nursing department provide individualized quality patient care using the nursing process to meet patient care needs from admission to home management. The Nursing System shall **include but not be limited to the following requirements:**

- The System should be able to perform Request on each care units
- The System should be able to perform Auto Posting of Charges to Billing
- The System should be able to perform On-line request to Pharmacy, CSR/Stock Room
- The System should be able to perform On-line requests to services on each care units
- The System should be able to perform Request Log (will be able to see list of processed request).



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- The System should be able to perform Inventory Transactions (Warehousing)
- The System should be able to support May-Go-Home Setting
- The System should be able to support Clearance Alert Setting
- The System should be able to perform viewing and searching for Online Results
- The System should be able to perform Diet List Entry, connected with nutrition and dietary department
- The System should be able to perform the following:
 - Diet Charging Entry
 - Housekeeping Alert
 - perform Linen Alert
 - Online Billing
 - Room Transfer
 - Online Scheduler Request (OR, Ambulatory Urology, etc)
 - Alert for Incoming Patients
 - Medication Administration Process
 - Clinical Record
 - Nurse Kardex
 - Drug & IV Drug with additives administration
 - Patient Drug Profile
 - Nurses Progress Notes
- The system should be able to view accredited accounted HMOs of the patients
- The system should be able to monitor rooms that are ready for occupancy
- All inputs in the system could be printed in the chart format.
- Discharge notice
 - Discharge diagnosis entry (ICD-10 and RVS Code)
 - Tagging for ECU procedures (add-ons and upgrades)
 - Maintain Room and transfer
 - Preparation and printing of Death Certificate to a Death Certificate Form from the National Printing Office
 - Vital signs entry
 - Nurses notes and doctors notes
 - Send the notification to SMS dedicated for discharge activity authorizations
- The System should be able to produce the following reports:
 - Patient Listings per Station
 - Daily Diet Summary Report
 - Lists of Completed Chart Report (Discharged)
 - Lists of Incomplete Chart Report (Discharged)



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- Operating Room
 - Out-Patient Transactions
 - Dashboard of patients' status
 - Notification of paid transactions
 - Discharging Out-patient
 - Continuous charging even after midnight, no cut-off until the patient is discharged.
 - Generation of operations Technique and Anesthesia Record and access to it by Billing Section
 - System should be enable viewing of the official receipt and deposits for out patients
 - Report should indicate number of use per machine/ sterilizer(both in and out patient)
 - System should be able to generate reports of daily and monthly procedures, balance of supplies, and daily reports of specimen sent to laboratory
 - Scheduling
 - Online scheduling by Nursing Wards and Doctor's Clinic
 - Summary of Surgeries Performed at the end of the day
 - Access by Anesthesia Department to the Scheduled Cases
 - Complete Anesthesia record with related forms and integrated workflow.
 - Charging of Disposable / Reusable Supplies
 - Automated issue of doses predefined with the procedure
 - Reports Generation
 - Official Receipt list for the day
 - OR utilization reports
 - Financial Report
 - Daily and Monthly inventory of supplies
 - Itemized income and expenses
 - Number of use per machine/sterilizer
 - List of Summary of Daily and Monthly Procedures
 - Balance of Supplies
 - Daily List and Summary of Specimen sent to laboratory
- Connected to Laboratory System:
 - List of Lab tests per scheduled pick-up time



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- List of Pending Lab tests
- Flowchart of Lab results per test for ease of comparison, not just during present confinement but even out-patient labs and previous admissions
- CAPD
 - Philhealth Portal
 - Access to ER, MSSD re: PD pts on board
 - Access to Admitting Section for admitted PD Patients
 - Access to OPS re: PD Pts follow-up
- Connected to Medical Records
- Online request for retrieval of charts, requests for documents, etc.

1.6.1.39.a Nursing Administrative Services

The Nursing Services Department is the largest department in terms of manpower and its equivalent administrative documentations. Patient care information coupled with those data that are administrative in nature comprise the bulk of the required data for the office. In the interest of having a database that is connected to most administrative and clinical sections/divisions/departments, the Nursing Service - Administrative System would require the following minimum specifications:

1. The System should be able to save, retrieve, sort, and print data entered.
2. The System should be interfaced with installed printer/scanner programs of the computer.
3. The System should enable the creation of applicants' database and the placement of picture. This aspect should be secured with access limited only to the Nursing Services Office.
4. The System should enable the creation of staff profile and placement of picture. This aspect should be secured with access limited only to the Nursing Services Office.
5. The System should enable the creation of a library for hospital and departmental orders, memos, circulars which are easily retrieved, sorted by year, viewable and printable.
6. The System should enable the creation of a library for researches, quality improvement projects, protocols, etc by nursing staff which are easily retrieved, sorted by year, viewable and printable.
7. The entire System should be secured. Password prompts should be made for actions that include editing, saving, and printing of data. Passwords should be required for access in the restricted staff profiles.



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8. The system should have a real time dashboard database of the status of care areas. The System should have viewing access to all patient care units in the Nursing System such as wards, central supply and sterilization unit, cardiac catheterization and radiology unit, medical oncology unit, dialysis units, emergency room unit, etc.
9. The System should be able to perform searching, viewing and printing of online results.
10. The System should be able to view the inventory reports of cost centers such as the Central Supply and Sterilization Unit, Medical Oncology, etc.
11. The System should be linked to the Human Resource Management Division's personnel database (including staff profile, leave requests, schedule of duties, etc.)
12. The System should be able to produce the following reports:
 - a. Patient Listings per Station
 - b. Lists of Completed Chart Report (Discharged)
 - c. Lists of Incomplete Chart Reports (Discharged)
 - d. Summary of available and filled Plantilla and Non-plantilla positions with differentiation as to position.
 - e. Summary of leave filed and approved for each nursing staff
 - f. Lists of schedule of duties encoded and not encoded
 - g. Generation of rosters schedules
 - h. overtime reports

1.6.1.39.b IANAHP

The System should be able to support masterlist of Programs, academic faculty, trainees, and link nurses. The System should support online registration of the participants for short and long term courses. It must be capable of online scheduler, academic calendar and Library of courses. Academic calendar should be linked to other units and clinical areas. The system should be able to support all charging, messaging, alert and notification features apply in this department's system.

1.6.1.40 Clinical Drug Information Management System

The Clinical Drug Information Management System (CDIS) enables authorized users to access, manage, share and safeguard patients'



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medication histories. A CDIS can reduce prescription errors resulting in fewer adverse drug events such as drug-to-drug interactions.

1.6.1.41 Unified Disease Registry System

The system should be able to:

1. Provide standard recording and submission of reportable cases related to chronic non-communicable diseases, injuries, violence, and disabilities which are diagnosed or confirmed accordingly to the DOH.
2. Collect data that are essential for public health planning, use, and/or implementation.
3. Establish clear operating guidelines and/or procedures in the implementation of the registry system.
4. Define rules to protect the confidentiality of data.

1.6.2 Ancillary support services information management System

1.6.2.1 Medical records system (Electronic Medical Records)

All patient transactions at the NKTi will eventually be stored in the electronic medical records (EMR) management system format and kept for a minimum of fifteen years, or as will be ordered by the management. The medical records management system enables NKTi to effectively archive patient health record or information whether coming from NHIMS or through manual records via a document scanning and management system. The setup of NKTi uses DocuView document management system. The NHIMS should be able to integrate with the existing document management system, or have an internal DMS which is compatible with the existing hardware at the medical records section. The medical records management should also have the necessary linkages that will enable the System to electronically receive documents coming from wards, cost centers, and other areas where patient information was gathered. The medical records management center should be able to print the patient's medical record as needed. Physicians and other authorized members of the Medical Records division should be able to access in both desktop and approved secure mobile device running on Android, IOS or any mobile operating system, the patient's history and physical examination, enabling them to view, edit, or add patient information as necessary prior to patient discharge. Natural Handwriting ink-stroke and electronic signature capabilities and capture are important system requirement to minimize, if not totally eradicate paper usage



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within the hospital campus. Goal is to become environment friendly, green and electronic. The medical records section should also be able to facilitate charging of services related to documents.

The system must be able to generate the following but not limited to:

- No. of patients per week/month
- No. of patients per department
- No. of patients per physician
- Patients classification according to region/area
- Patients classification by age group/gender/demographics
- Patients classification by case/sub-specialty or disease or sickness or operation
- No. of admissions, readmissions, discharges, deaths, inter-agency referrals, and outcome of treatment
- Analysis of diagnosis, treatments, test results and outcomes across patients with similar cases
- Generation of inventory of patient registry and indices by disease and operation
- Preparation and printing of Death Certificate to a Death Certificate Form from the National Printing Office

The Proponent shall ensure implementation of any required enhancement, revision or customization 30 days before any deadline set by regulatory body such as migration to ICD-11 in the future. The Proponent shall likewise be responsible for the understanding and analysis base on listed terms of reference.

The medical records section should be able to create reports and submit records using the portals to DOH i.e. Non-communicable Disease Registries - Stroke, Cancer, Diabetes, Hypertension, etc.

Acceptance and release of medical record request report, report on the number of incomplete charts of Doctor, nurses and consultants.

1.6.2.2 Statistics system

Statistical studies are also done by the medical records section, therefore the NHIMS should be able to accommodate all reports and statistical studies required of by the NKTi staff. The statistics system should be able to generate report of admission, discharges, deaths and daily floor which can be selected by certain criteria defined by the statistics and medical records office. The system should be able to generate index reports such as disease, physician, operation, disease, and procedure indexes. The system should likewise be able to



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generate morbidity and mortality statistics consistent with ICD-10 definitions and compatible with the reporting system of the DOH information management services (IMS), Philhealth, Department of Budget Management. All reports made by the statistics system should be exportable to editable formats such as comma separated value file, spreadsheet file, among others.

1.6.2.3 Medical Social Services System

The medical social services (MSS) system should be able to facilitate documentation of patient's classification, socio-economic profile and services rendered as basis for discounting, statistical reporting, among others. The MSS system should likewise be able to link with other departments that would benefit from the information on the patient's socio-economic profile. It should likewise be linked with the financial management System in order to reflect the patient's socio-economic status immediately to all cost centers. The MSS should also be able to generate reports that are required by PhilHealth, as well as with the National Household Targeting System (NHTS). In addition, the NHIMS should be able to accommodate all reports that are needed by the medical social services section. The system should therefore be able to know the 4P's status of patients, if available. In addition to the patient profile classification, it also important to include the social – economic profile data sheet. MSS number should also be compatible with the barcode system that NHIMS will be integrated with.

1.6.2.4 Nutrition and dietetics system

The Nutrition and Dietetics Division (NDD) Therapeutic/Clinical section facilitates receiving of diet orders of daily admitted patients, change of diets and room transfers for currently admitted patients, as well as charging of in- and out-patients (including Medical Assistance Program/MAP transactions). This system should be linked with all areas in the NKTi that has a ward, such as the general ward, ICU, OPD, ER, among others. All charges done by the Nutrition and Dietetics Division should be reflected in the Billing Section. Since the Nutrition and Dietetics system would require daily monitoring of patients' diets, it should have an alert and notification system that will call for action from the division. Meal cards generated from the system should also be supporting a barcode technology that allows monitoring of meal availment using barcodes. The Nutrition and Dietetics system should likewise be linked to the Laboratory System such that they can monitor the laboratory results of patients to be used in adjusting the



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diet accordingly, and for diet instruction purposes. This system should likewise be able to detect possible side effects and complications resulting from administration of particular food systems to certain patients through a clinical decision support system. The system should also be able to perform automatic calculation of tube feeding based on the formula being used by the division.

The Nutrition and Dietetics Division is also responsible for food production and inventory of materials needed to produce food for the hospital. The food production function should be able to facilitate preparation of PR, and approved requests for functions that will require the services of NDD. This would include creation of package of menus with quotation, viewing, and charge slip functionalities, both for cash (e.g. paid caterings) and non-cash (e.g. IANAHP, REDCOP, BAC) transactions. The request function should also be made available such that both internal and external requests for room avilment with food services can be handled. This function should be integrated with the Housekeeping and Linen Section. As for the inventory, the NHIMS should be able to facilitate inventory of stock level of NDD food items (perishable and non-perishable), and have access and link with the MMID module. The NHIMS should provide monitoring and update functions for stock levels of food items, as well as create an inventory control system.

The system should be able to generate the following reports:

- Daily Meal Census
- Daily Tube feeding Census
- Tube feeding Charges (with and without MAP transactions)
- MAP Transactions
- Tube feeding Frequency Report
- Monthly Guest Tray/ in- and out-patient charges
- Monthly Diet Count
- Daily Discharge Notice Report
- Monthly In-patient Visitation and Diet Instruction Report
- Professional Services Report
- Diabetic and Liquid Diet Snack Report
- Inventory and Supplies Monitoring Report (Perishables & Non-perishables)
- Monthly cash and non-cash transactions for functions/caterings and all Nutrition Services
- Monthly Consumption Report - Direct Delivery and Requisition Issuance Slip



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1.6.2.5 Pharmacy medication inventory, prescription and administration system

The pharmacy information management system should enable all clinical departments of the NKTi to perform electronic medication prescription or e-Rx, inventory and charging for both in-patients and out-patients. It will be linked with all areas in the hospital that would require prescription and administration of medications. The centralized pharmacy information system shall have the ability to monitor the availability and conformity of all medicines. The system should be able to support charging of medications that are funded by guarantee letters from company sponsors or legislators and for cash transactions, processing of forward stocking items (consignment), and emergency procurement of medications, among others. While the Philippine government has not provided legislations on electronic prescription, the System should be ready for e-prescriptions.

The following Pharmacy form/data/report generation shall be expected of the system:

1. Monthly Report of Drugs & Pharmaceutical Supplies (Request & Issue Slip from Central Warehouse)
2. Monthly Report of Drugs & Pharmaceutical Supplies (Direct Purchase)
3. Monthly Report of Drugs & Pharmaceutical Supplies (Issuances from Pharmacy)
4. Monthly Issuance Report
5. Pharmacy Forward Stocking (Consignment) Distribution Report
6. Summary of Issuance and Acceptance Report (Petty Cash)
7. Petty Cash Fund Record Form
8. Petty Cash Voucher Form
9. Disbursement Voucher
10. Request & Issue Slip
11. Pharmacy Daily Sales Report per Shift
12. Report on filled and unfilled prescriptions for DOH
13. Number of line items per shift
14. Drug distribution report:
 - i. For cash transactions:
 - With discount
 - Without discount
 - ii. Charged to Guarantee Letter
 - iii. Inpatients
 - iv. ER patients
15. Forward Stocking Income Report



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16. Forward Stocking Inventory Report (per Medicine)
17. PDEA Semi-Annual Report
18. Controlled Drug Administration Sheet (PDEA Form)
19. Controlled Drug Requisition Sheet (PDEA Form)
20. Special Prescription Form for Dangerous Drugs (SPFDD) Sales Report
21. Local Order Permit Application for Dangerous Drugs Form
22. No. of Stocks (per medicine) issued to Wards
23. Medication Variance Report
24. Drug (PPMP) Monitoring Report
25. Special Purchased Medicines Monitoring Report
26. Actual Inventory of Medicines at Pharmacy
27. Viewing of cancelled transactions for inpatients and out-patients
28. Monthly Income Report from RIS issuances (Floor Stocks)
29. Top 20 drugs (quantity & peso value)
30. Option to Return Medicines (manually or automatic)
31. Provision and support for barcoding in the pharmacy (i.e., charging, inventory, dispensing)
32. Viewing of previous transactions per patient/medicine (cash, guarantee letter)

The pharmacy will be able to view in real time, the actual number of stocks available at the dispensing areas, warehouse and various areas with floor stocks of medicines. Furthermore, the system should alert the areas when stock levels reach the re-ordering level and if medicines are near expiry.

Support for Clinical Pharmacy practice and Antimicrobial Stewardship (AMS) program is also expected in the Systems. As such, any drug-drug interaction can be generated and displayed by the System. In addition, drug allergies of patients and possible adverse effects should be alerted to health professionals using the Systems through a clinical decision support system. The system should also be able to alert the prescriber and the pharmacy regarding duplication of requests (with regards to clinical use and if the medicine has just been dispensed to the same patient). Monitoring of specific antimicrobials dispensed to our inpatients should also be incorporated in the system with a notification before the “7th” day of use. The AMS Pharmacist should have access or rights to view laboratory results of inpatients in order to recommend the appropriate clinical interventions such as dose adjustments and de-escalation of antimicrobial therapy.



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All NKTi Doctors should be able to perform patient charting, progress notes, medical prescription, lab/radiologic orders using voice to text software (dictation) including their real-time electronic signature capture while working on their Electronic Practice Management (EPM) system on pen and touch-based tablet and/or mobile device and/or desktop with electronic signature pad.

1.6.2.6.a Computerized Physician Order Entry (CPOE)

This add-on module represents the ideal enhancement of pharmacological prescriptions. The Proponent must provide the following licensed Enterprise Grade Clinical Decision Support Programs such as: Wolters Kluwer's Up-to-date point of care reference, any drug reference database with drug to drug interaction like Medi-Span or Epocrates, it not only provides full information on drugs prescribed, but performs automated dosage suggestions based on the patients' conditions; as well as automatic evaluation of possible medication interactions. CPOE integrates the smart pharmacy provision processes enabling pharmacist to identify the doses prescribed by the doctors and prepare, assort, send or deliver accordingly, to the nursing area. This enables the pharmacist as well to define a selection of materials or supplies, such as swabs or syringe into kits (previously or by request), to be consumed and accounted for the application of specific doses.

CPOE interphases to consider are the following:

- Prescription based on the weight, sex and age of the patient
- Validation of the prescription of pregnant women
- Drug interaction
- Automatic dispensing system
- Integration with the stock of the pharmacy
- Batch management and expiration date
- Consideration of medication based on active diagnosis
- Preparation of compound medicines

The following functionalities shall be expected from the CPOE:

- Automatic notifications of drug interactions and dose recommendation (drug interactions: to drug, food, disease, age., etc.)
- Assigning care plan and interventions
 - Problem Detection



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- Intervention
- Completion Checklist
- Order Sets Content
- Care Plan Content

1.6.2.6.b Electronic Medication Administration Record (eMAR)

eMAR represents the last enhancement for the clinical processes. This submodule provides functionalities that will reassure the patients' safety when administering any drug prescription. Specific features such as automatically scheduled calendar, the automatic registry in the EMR and a mobile device app with barcode technology, are just a couple of examples that will ease the patient's treatment traceability and registry.

1.6.2.7 Linen and Housekeeping system

The linen and housekeeping system facilitates housekeeping processing on admission on discharge of patients. The system should be able to cater inventory and charging on patient's admission, duration of stay, and eventual discharge – accommodating functions such as additional request from admitted patients. The system should also be able to monitor rental of resident's quarters, various venues inside NKTi. A monitoring of rooms with information on housekeeping need should be made available through a dashboard accessible inside the housekeeping system.

1.6.2.8 Motorpool System

The motorpool system should provide an alert and reminder system for motorpool services needs by patients. The system should also be able to track the origin and destination of vehicles, estimated usage of fuel, and efficiency in transporting patients.

1.6.2.9 GSD / Engineering

- * The system should be able to support all charging, messaging, alert and notification features apply in this department's system.

1.6.2.10 HSES

- * The system should be able to support all charging, messaging, alert and notification features apply in this department's system.

1.6.2.11 CTRU



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* The system should be able to support all charging, messaging, alert and notification features apply in this department's system.

1.6.2.12 Medical education

* The system should be able to support all charging, messaging, alert and notification features apply in this department's system.

1.6.3 Telemedicine System

1.6.3.1 Patient Portal

The Patient Portal is a secure online website that gives patients convenient, 24-hour access to personal health information from anywhere with an internet connection. Using a secure username and password, patients can view health information such as but not limited to:

- Recent doctor visits
- Discharge summaries
- Medications
- Immunizations
- Laboratory Results

The Patient Portal must have the following features but not limited to:

Common Features

- Login feature with security
- Ability to search for necessary information with filters
- Capability to integrate with Single Sign-on Applications
- Integration with Payment Gateways – multiple mode transactions, Cards, Net Banking, Paymaya, etc.
- Ability for transaction traceability with protected Audit Trails
- Fully implemented Role Based Access Control
- Capability for alerts with multiple modes – SMS, Text Messages, e-Mails, etc.
- Capability to ensure Consent Based Data/Information sharing
- Availability of APIs for Integration with Authentication, Information Sharing

Citizen Portal

- Ability to register with Hospital Registration Number – Unique Identification Number or Medical Records Number



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- Ability to view EMR, Book Appointments (Audio, Video or Direct), View Diagnostic Results
- Ability view Prescriptions, Dosage Instructions, Medication Alerts, make Refill Requests
- Accessibility PHR (Personal Health Records)
- Ability to provide Consent for viewing of self/family EMR's
- Claims Submissions and Tracking
- Messaging capability with Physicians and Clinicians (chats)
- Audio-Video Conversation through secured channel
- Ability to receive public health alerts and instructions

1.6.3.2 Tele and Video Consultation

Tele and Video consultation is an aspect of Telemedicine which involves remote communication between patients and clinicians, or between clinicians and specialists. It is one of the earlier applications which primary care physicians could use to consult specialists

Common Features

- Ability to search for Doctors/Specialties/Departments/Units/Facilities
- Capability to integrate with Single Sign-on Applications
- Integration with Payment Gateways – multiple mode transactions, Cards, Net Banking, e-Wallets
- Ability for transaction traceability with protected Audit Trails
- Fully implemented Role Based Access Control
- Capability for alerts with multiple modes – SMS, Text Messages, e-Mails, etc.
- Capability to ensure Consent Based Data/Information sharing

Video Consultation

- Ability to complete Video Consultation between a Clinician & Patient
 - Schedule appointments with a Physician or Speciality Unit or Department from the Portal
 - Reschedule/Cancel appointments
 - Perform Video Call from home PCs, mobile phones, tablets
 - Save Video Call securely
 - Store the Data locally
- Multi-party Video Consultation – GP, Specialist & Patient GP, Health Worker & Patient etc
- Integrated 100% with Hospital EMR Application



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- Ability to access the EMR data while on the Video call
- Ability to share the information dynamically with Patient – texting, sharing of images, showing of records (Screenshare) etc.
- Ability to Order the Investigations & Medicine directly to Hospital Pharmacy & initiate Homedelivery/Sample collection etc during the Video Call
- Ability to send SMS to Patient Mobile when Video call is completed with Prescription or Visit Summary with instructions to the Patient
- Ability to dynamically allow Sponsored Video calls depending on the Insurance Policy or Corporate Plan attached to the Patient
- Ability to use the same mobile number for Family members consultation or provide alternate numbers
- Ability to automatically indicate the Video call as Follow-up call to a direct consultation done earlier
- Ability to message (texting/chats) the Hospital Staff prior to after the Video call from the Portal
- View Personal Health Dashboards
- View Family Health Dashboards

Video Consultation with Telemedicine Kit & Device Integration

- Allow the Health worker of Patient relative supported examination of the Patient remotely using Telemedicine Devices – secured Bluetooth or WiFi communications adhered to HIPAA and HL7 Protocols
- 100% integrated with EMR/HIS
- Ability to store results Online-offline, store & forward modes
- Light weight Kits so as to carry to remote locations by Health Worker or Paramedic

1.7 Systems integration and data migration for all functional departments of the NKTi

The Systems are expected to be integrated to all functional departments of the NKTi, including those which are already existing, excluding the current hospital information system which will be replaced by the Systems. Systems integration and data migration also incorporates workflows of every unit, department, clinic, or division that will use Systems for entry of hospital-related data, as well as retrieval and forwarding of reports.



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1.7.1 Systems integration with existing information systems, including but not limited to:

- a. Radiology information system
- b. Picture Archiving and Communication System
- c. Laboratory equipment interface
- d. Customer queuing management system
- e. PhilHealth Z Benefits Information Tracking System (ZBITS) - for Billing
- f. Hemodialysis software

The winning entity would be coordinating with the NKTi technical working group in order to be provided with the functional and technical specifications of the above-mentioned systems. It will also be the responsibility of the winning entity to provide system integrations of the different existing systems of the NKTi. It is also advised that there may be more information systems that NKTi currently uses, but have not been included in the list. It is, however, required for the winning entity to conduct an extensive data requirements analysis, such that the NKTi systems identified and requirements which are essential to the daily operations of the NKTi would have been properly identified, and made interoperable with the Systems.

The winning entity should coordinate with the NKTi departments for medical device integration using HL7 standard. The winning entity should be able to provide the said systems integrations at no extra cost to the NKTi.

The winning entity is advised, furthermore, that the systems being used by the laboratory and radiology departments shall be subject to upgrade during the implementation stage as may be required or deemed necessary by the respective end users.

1.7.2 Database migration

As part of the change management methodology, it is expected that the winning entity will implement a database migration protocol in such matter as to maintain, if not improve upon, the data integrity and quality experienced at the previously installed application. Likewise, the database migration activity shall planned and carried out in such that it will not interfere with the usual 24x7 operations of the hospital. Cost of data migration shall be borne by the winning bidder.



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1.7.3 Integration to the National Health Data Dictionary¹

The DOH National Health Data Dictionary (NHDD) aims to: 1. Establish a core set of uniform definitions relating to the full range of health services. 2. Promote uniformity, availability, reliability, validity, consistency and completeness in the data and incorporate national and international agreed protocols and standards wherever possible. 3. Promote the national standard definitions by being readily available to all individuals and organizations involved in the generation, use and/or development of health and health services information 4. Facilitate and promote the development of good data definitions across the health sector.

The DOH NHDD is intended for use by individuals and organizations responsible for maintaining or improving the health systems. It is designed to provide uniform definitions and/or specifications for data elements. The purpose is to foster greater uniformity among individual data elements chosen for use. The use of uniformly recorded data will eliminate the problems on incompatibilities and high costs of collecting, integrating, and/or linking the data.

Data elements in version 2.0 may not be complete as expected and existing ones need to be further reviewed and evaluated as being used. Users of version 2.0 are invited to contact the DOH-National Health Data Committee to provide comments and suggestions for improving the current dictionary. Further works will be done to enhance the DOH-NHDD as a result of using it, new progress in health data standards, advances in information and communication technology, and changes in data needs or requirements.

To assure that required changes are included in a timely manner, the DOH National Health Data Committee shall continue to exist.

1.7.3 Onsite Data Center

For assurance of the safety of NKTi data, an onsite and existing Data Center shall also be maintained and managed. The onsite data center inside the Hospital as part of the solution in case of disasters, shall

¹ DOH National Health Data Dictionary

https://uhmis.doh.gov.ph/pdf/nhdd/NHDD_v2_Jan_17_2011.pdf



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allow to continue using the systems without stopping the operation of the Hospital.

In the event that the new OPD Building is ready for occupancy, the existing Data Center shall be transferred to the new Out-Patient Department Building at no additional cost to NKTi. All necessary requirements in the transfer and operation of the Data Center shall be borne by the Proponent.

1.7.4 Cloud Data Center / Cloud Backup

Cloud backup or online backup shall be used for backing up data that involves sending copy of the data over a proprietary or public network to an off-site server.

For compliance to international Security Standards, the Proponent's Data Center or Cloud must be certified by the international standards ISO/IEC 27001:2013 and 9001:2015 or latest ISO Certification or equivalent international standard.

1.7.5 Compliance to Cyber Security and Data Privacy Protection Requirement

The implementation of the NHIMS shall be in compliance to the Cyber Security and Data Privacy Protection or R.A. 10175, R.A. 10173 respectively, and National Cyber Security Plan of the Department of Information and Communications Technology (DICT).

Likewise, the solution must comply to the international standards ISO/IEC 27001:2013, 27017:2015, and 27018:2014. These are the highest international standards in data centers security.

The compliance has to state with clarity and simplicity what the laws, regulations, and national plans declare as:

1. What to be achieved, prevented, maintained, and eliminated to secure the cyber infrastructure and to protect data privacy.
2. What threats and vulnerability to be identified and detected to prevent or to neutralize what the cyber security and data privacy regulations have defined as penalized violations

R.A. 10175 Cyber Crime Prevention Act of 2012	R.A. 10173 Data Privacy Act of 2012
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a. Illegal access	a. Unauthorized processing
b. Illegal interception	b. Negligence in access
c. Data interference	c. Improper disposal
d. System interference	d. Unauthorized purpose
e. Misuse of device	e. Unauthorized access
f. Fraud	f. Intentional breach
g. Forgery	g. Concealed breach
h. Identity Theft	h. Malicious disclosure
	i. Unauthorized disclosure
	j. Combination of unwanted act

3. What control measures to be developed, acquired, and maintained to protect cyber infrastructure and data privacy against known threats and their measured risks impact and probability.
4. What response, recovery and investigation availability, capability and capacity to be planned, designed, procured, installed and operated to neutralize and eliminate the security incidents that are associated to the violation of R.A. 10175 and R.A. 10173.
5. What security technologies to associate the mandated activities of R.A. 10844 National Cyber Security Plan 2022 to
 - i. Identify-Protect
 - ii. Detect-Response
 - iii. Recover-Investigate
6. What security technologies to associate the mandated security measures of R.A. 10173 – Rule VI
 - a. A security policy with respect to the processing of personal data;
 - b. Safeguards to protect their computer network against accidental, unlawful or unauthorized usage, any interference which will affect data integrity or hinder the functioning or availability of the system, and unauthorized access through an electronic network
 - c. The ability to ensure and maintain the confidentiality, integrity, availability, and resilience of their processing systems and services;



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- d. Regular monitoring for security breaches, and a process both for identifying and accessing reasonably foreseeable vulnerabilities in their computer networks, and for taking preventive, corrective, and mitigating action against security incidents that can lead to a personal data breach
 - e. The ability to restore the availability and access to personal data in a timely manner in the event of a physical or technical incident
 - f. A process for regularly testing, assessing, and evaluating the effectiveness of security measures
 - g. Encryption of personal data during storage and while in transit, authentication process, and other technical security measures that control and limit access.
7. What is the cyber security and data privacy risks map to associate priority and quality requirements for the security technologies to be acquired, source and procured.

1.7.5.1 Security Requirements Identification for Cyber Security

VIOLATION R.A. 10175	SECURITY INCIDENT	SECURITY CONTROLS	SECURITY TECHNOLOGIES
1. Illegal access 2. Illegal interception 3. Data interference 4. System interference 5. Misuse of device 6. Fraud 7. Forgery 8. Identity Theft	1. Website Forgery 2. Spam 3. Phishing 4. Intrusion 5. Website Defacement 6. Misappropriation of Resources 7. Denial of Service 8. Malware 9. Physical Intrusion 10. Malfunction 11. Loss or theft of mobile device 12. Trace Malfunction 13. Internal Deviant Behavior	1. Inventory and Control of Hardware Assets 2. Inventory and Control of Software Assets 3. Continuous Vulnerability Management 4. Controlled Use of Administrative Privileges 5. Secure Configuration for Hardware and Software on Mobile Devices, Laptops,	1. Configuration Management Database (CMDB) 2. Governance, Risks, and Compliance System (GRC) 3. Security Information and Event Management (SIEM) 4. File and Data Encryption Management (KPI) 5. Access and Identity Management 6. Anti-Virus and Malware Management



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	14. Rights or Privileges Usurpation or Abuse 15. Unauthorized access to servers through remote access points 16. Illicit Access to Internet 17. Deactivating of Logs Recording 18. Non-patched or poorly patched vulnerability exploitation 19. Configuration vulnerability exploitation 20. Security incidents on non-inventoried and/or not managed assets	Workstations and Servers 6. Maintenance, Monitoring and Analysis of Audit Logs 7. Email and Web Browser Protections 8. Malware Defenses 9. Limitation and Control of Network Ports, Protocols and Services 10. Data Recovery Capabilities 11. Secure Configuration for Network Devices, such as Firewalls, Routers and Switches 12. Boundary Defense 13. Data Protection 14. Controlled Access Based on the Need to Know 15. Wireless Access Control 16. Account Monitoring and Control 17. Implement a Security Awareness and Training Program 18. Application Software Security 19. Incident Response and Management 20. Penetration Tests and Red Team Exercises	7. Log Management System 8. Patch Management System 9. Vulnerability Scanners and Penetration Testing Tools 10. Intrusion Prevention and Detection Systems (IPS) 11. Firewalls and Next-Generation Firewalls (NGFW) 12. Log Management Systems (LMS) 13. Cyber Threat Intelligence Feeds and Vulnerability Measurement Databases 14. User Behavior Analytics 15. Application Code Security Test 16. End-Point Protection 17. E-mail Gateway Protection 18. Data Vault 19. File/ Storage Eraser 20. Data Backup and Recovery
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1.7.5.2 Security Requirements Identification for Data Privacy Protection

VIOLATION R.A. 10173	SECURITY INCIDENT	SECURITY CONTROLS	SECURITY TECHNOLOGIES
1. Unauthorized processing 2. Negligence in access 3. Improper disposal 4. Unauthorized purpose 5. Unauthorized access 6. Intentional breach 7. Concealed breach 8. Malicious disclosure 9. Unauthorized disclosure 10. Combination of unwanted act	1. Ransomware 2. Elevation of privilege into sensitive systems 3. Breaches in cloud-based, multitenant architectures 4. Denial of service 5. Data tampering 6. Identity theft 7. Insider threat 8. Questionable transactions 9. Corporate or foreign government espionage 10. Information disclosure 11. Compromise of DNS infrastructure enabling stealing and exfiltration of data 12. Anti-malware/Antivirus 13. Spoofing of identity or access credential 14. Drive-by Download	1. Security Policy 2. Network Protection 3. Confidentiality, Integrity, Availability, and Resilience Assurance of Processing System 4. Intrusion Detection and Prevention 5. Network Security Monitoring 6. Vulnerability Assessment and Penetration Testing 7. Backup and Data Recovery 8. Identity, Access, Privilege Management 9. Security Incident Management System 10. Data Loss Prevention 11. Encryption and Pseudonymization, Host-based encryption 12. Insider Threat Control 13. Third-Party Risk Management 14. Firewall/UTM 15. End-Point Protection 16. Email security	1. Configuration Management Database (CMDB) 2. Governance, Risks, and Compliance System (GRC) 3. Security Information and Event Management (SIEM) 4. File and Data Encryption Management (KPI) 5. Access and Identity Management 6. Anti-Virus and Malware Management 7. Log Management System 8. Patch Management System 9. Vulnerability Scanners and Penetration Testing Tools 10. Intrusion Prevention and Detection Systems (IPS) 11. Firewalls and Next-Generation Firewalls (NGFW) 12. Log Management Systems (LMS) 13. Cyber Threat Intelligence Feeds and Vulnerability Measurement Databases



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			14. User Behavior Analytics 15. Application Code Security Test 16. End-Point Protection 17. E-mail Gateway Protection 18. Data Vault 19. File/ Storage Eraser 20. Data Backup and Recovery
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1.7.5.3 Privacy Protection and Security Checklist based on HIPAA²

a. Technical Safeguards

Implementation Specification	Required or Addressable	Further Information
Implement a means of access control	Required of Vendor and NKTi	This not only means assigning a centrally-controlled unique username and PIN code for each user, but also establishing procedures to govern the release or disclosure of NHIMS during an emergency.
Introduce a mechanism to authenticate NHIMS	Required of Vendor	This mechanism is essential in order to comply with HIPAA regulations as it confirms whether NHIMS has been altered or destroyed in an unauthorized manner.
Implement tools for encryption and decryption	Required of Vendor	This guideline relates to the devices used by authorized users, which must have the functionality to encrypt messages when they are sent beyond an internal firewalled server, and

²<https://www.hipaaajournal.com/hipaa-compliance-checklist/>



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		<p>decrypt those messages when they are received.</p> <p>A minimum requirement for Advanced Encryption Standard with a key size of 128 bits (AES-128) as appropriate encryption standard.</p>
Introduce activity logs and audit controls	Required of Vendor	The audit controls required under the technical safeguards are there to register attempted access to NHIMS and record what is done with that data once it has been accessed.
Facilitate automatic log-off of PCs and devices	Required of Vendor	This function logs authorized personnel off of the device they are using to access or communicate NHIMS after a pre-defined period of time. This prevents unauthorized access of NHIMS should the device be left unattended.

b. Physical Safeguards

Implementation Specification	Required or Addressable	Further Information
Facility access controls must be implemented	Required for both the Vendor and NKTi	Controls who has physical access to the location where NHIMS is stored and includes software engineers, cleaners, etc. The procedures must also include safeguards to prevent unauthorized physical access, tampering, and theft.
Policies for the use/positioning of workstations	Required of NKTi	Policies must be devised and implemented to restrict the use of workstations that have access to NHIMS, to specify the protective surrounding of a workstation and govern how functions are to be performed on the workstations.



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Policies and procedures for mobile devices	Required for both the Proponent and NKTi	If users are allowed to access NHIMS from their mobile devices, policies must be devised and implemented to govern how NHIMS is removed from the devices if the user leaves the organization or the device is re-used, sold, etc.
Inventory of hardware	Required of NKTi	An inventory of all hardware must be maintained, together with a record of the movements of each item. A retrievable exact copy of NHIMS must be made before any equipment is moved.

c. Administrative Safeguards

Implementation Specification	Required or Addressable	Further Information
Conducting risk assessments	Required for both the Proponent and NKTi	Among the Security Officer's main tasks is the compilation of a risk assessment to identify every area in which NHIMS is being used, and to determine all of the ways in which breaches of NHIMS could occur.
Introducing a risk management policy	Required of Vendor and NKTi	The risk assessment must be repeated at regular intervals with measures introduced to reduce the risks to an appropriate level. A sanctions policy for employees who fail to comply with HIPAA regulations must also be introduced.
Training employees to be secure	Required of Vendor and NKTi	Training schedules must be introduced to raise awareness of the policies and procedures governing access to NHIMS and how to identify malicious software attacks and malware. All training must be documented.



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Developing a contingency plan	Required of Vendor and NKTi	In the event of an emergency, a contingency plan must be ready to enable the continuation of critical business processes while protecting the integrity of NHIMS while an organization operates in emergency mode.
Testing of contingency plan	Required of Vendor and NKTi	The contingency plan must be tested periodically to assess the relative criticality of specific applications. There must also be accessible backups of NHIMS and procedures to restore lost data in the event of an emergency.
Restricting third-party access	Required for both the Vendor and NKTi	It is vital to ensure NHIMS is not accessed by unauthorized parent organizations and subcontractors, and that Business Associate Agreements are signed with business partners who will have access to NHIMS.
Reporting security incidents	Required for both the Vendor and NKTi	The reporting of security incidents is different from the Breach Notification Rule (below) inasmuch as incidents can be contained and data retrieved before the incident develops into a breach.