Dr. Wanene EHR system documentation

Requirement

1. Tabs for
    a) Medical record
    b) Billing and finance
    c) Pharmacy (Include stock entry of drugs in stock and acquisition of more through admin request)
    d) Different MOH forms (MOH form 302, 303,304,305,306,308,309,310,311,312,400,402,401,403,404,406,407, 708,500,501,502,600,601,602,603,700,703,802,803,902,801,902,1000 ,1001 and ability to add more according to MOH guidelines
    e) Triage tab
    f) Referrals tab with printable formats
    g) Appointments
    h) Treatment plan
    i) Trends and analytics for admin
    j) Reference tab for ICD-10 and Medscape's
    k) Prescriptions
    l) Patient data (For patient) only includes name age gender prescriptions appointments payment methods emergency contact
2. Different levels of access
    a) Admin
    b) IT
    c) Nurses
    d) Receptionists
    e) Radiologists
    f) Treatment room nurse
    g) Finance
    h) Pharmacy
    i) Patient
    j) Triage nurse
3. Web-based with mobile responsiveness with clean intuitive design with minimal clicks and ability to pin and customize landing page to have most viewed tabs first
4. Ability to have a speech to text input method that is intuitive
5. Login landing page with password protected log ins and 2FA in compliance with HIPPA and Data protection laws
6. On log in there should be a login screen with hospital name at the top and depending on the role and access given have general hospital analytics queue for the patients to be seen alerts from hospital to see what is missing what is in low supply etc.
7. Advanced search feature on the doctor admin etc. Landing page that can search patient by name UPI Etc.

8. Icons in a grid formation of all the tabs with easy to interpret symbols of what each tab entails like a pill for pharmacy etc.
9. Upon clicking an icon, the rest of the tabs go into a side bar that is always on screen and easy to access and customize the order

Outline on different tabs/ modules
Medical record tab

- **UI Elements**:
    - Form fields: Full name, DOB, gender, phone, email, address, national ID, NHIF number, emergency contact.
    - Unique Patient Identifier (UPI)
    - Photo upload (**optional**, for ID verification).
    - Tabs within tab: History, Encounter, Diagnosis, Plan.
    - **History**: Timeline of past visits, allergies, chronic conditions (e.g., HIV, diabetes).
    - **Encounter**: SOAP format text boxes (Subjective, Objective, Assessment, Plan).
    - **Diagnosis**: Dropdown with ICD-10 codes, search bar for quick lookup (e.g., malaria, hypertension).
    - **Plan**: Prescription form, referral option, follow-up scheduler.
    - All components of a basic medical report including presenting complaint history of presenting medical history family history social history review of systems physical examinations diagnostic tests assessment and diagnosis treatment plan digital signature and verification of the attending doctor
- **Features**:
    - Search bar to check for existing patients (avoid duplicates).
    - Auto-fill for returning patients via UPI or phone.
    - “Save and Proceed” to triage or appointment.
    - Constant auto-save feature
    - Clinical decision support: Pop-up alerts for drug interactions or guideline reminders (e.g., ART protocols).
    - Template picker for common conditions (HIV, TB, antenatal care).
    - Voice-to-text option for notes (for doctors with limited typing time).
    - Collapsable subsections to avoid cluster

Triage

- **UI Elements**:
    - Vital signs input: BP, pulse, temperature, weight, height, oxygen saturation.
    - Pain scale slider (0–10).
    - Chief complaint text box (with autocomplete for common issues like fever, cough).
- **Features**:
    - Queue status: Shows patient’s position in line.
    - Alerts for abnormal vitals (e.g., BP > 140/90 highlighted in red).

- "Send to Consultation" button.
- Colour coded for triage with green being normal orange abnormal and red urgent
- Realtime queue update
- Ability for triage nurse to assign triage colours and also algorithm to see abnormal values and give suggestions

Pharmacy

- **UI Elements**:
  - Prescription list: Drug name, dosage, duration (pulled from Clinical Module).
  - Inventory table: Drug name, quantity, expiry date.
  - Dispense form: Quantity issued, patient instructions.
  - Adverse reactions tab
  - Route of administration of medicine
- **Features**:
  - Stock alerts (e.g., "ARVs below 100 units").
  - Barcode scanning for dispensing accuracy and accountability
  - Integration with KEMSA for reorder requests.
  - Method to confirm from pharmacy that payment has been made with adapts drawn from the finance and billing

Laboratory

- **UI Elements**:
  - Test order form: Dropdown for common tests (e.g., CBC, malaria smear, CD4).
  - Results entry: Numeric/text fields, with normal range indicators.
  - Results history table.
- **Features**:
  - Critical value alerts (e.g., haemoglobin < 7 g/dL).
  - Auto-upload from lab equipment (if integrated
  - "Notify Clinician" button for urgent results.
  - Clean table layout, with filters for pending/completed tests.
  - Ability to Cam scan results and use AI to easier upload data onto the system

Billing

- **UI Elements**:
  - Invoice generator: Services (consultation, lab, drugs), quantities, costs.
  - NHIF claims form: Pre-filled patient details, service codes.
  - Payment tracker: Cash, mobile money (e.g., M-Pesa), insurance.
- **Features**:
  - Real-time NHIF API integration
  - Receipt printer integration.
  - Daily revenue dashboard.
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Bedrest Management

- **UI Elements**:
  - Bed allocation map: Visual grid of wards and beds (occupied/free).
  - Ward round notes: Text box for daily updates.
  - Discharge summary form: Diagnosis, medications, follow-up plan.
- **Features**:
  - Bed availability alerts.
  - Auto-transfer of outpatient data to inpatient.
  - Discharge checklist to ensure completeness.
- **Design**: Interactive bed map, with collapsible patient details.

Reports

- **UI Elements**:
  - Report picker: MOH 731 (HIV), MOH 405 (outpatient), custom financial reports.
  - Filters: Date range, department, condition.
  - Export options: PDF, Excel, KHIS-compatible format.
- **Features**:
  - Auto-populate MOH reports from patient data trends
  - Visual charts (e.g., disease trends, revenue).
  - Schedule recurring reports.

Patient Portal (Accessible via Web/Mobile)

- **UI Elements**:
  - Dashboard: Upcoming appointments, recent lab results.
  - Profile: Personal details, NHIF status.
  - Messages: Secure chat with hospital staff.
- **Features**:
  - Appointment booking/rescheduling.
  - SMS reminders (via integrations like ETS).
  - Payment history view.
  - Drugs administered already
  - Prescription and treatment plans given

Additional Features required

- Search Bar: Global search across patients, prescriptions, and reports (top-right corner). Notifications Panel: Slide-out panel for alerts (e.g., low stock, critical results, NHIF claim rejections).
- Help Section: Built-in tooltips and a searchable FAQ for common tasks (e.g., “How to submit MOH 731”).
- Customization: Admin settings to enable/disable tabs based on hospital size (e.g., hide inpatient for smaller facilities).
- Accessibility: High-contrast mode, keyboard navigation, and screen-reader support.
- Suggest feature button

- Ability to operate in offline mode and store data in house for a while then upload when internet is back
- Integration with medical text like ICD-10, ICD-11, Medscape for autocomplete of sentences, offering suggestion bubbles for meds and treatment plans
- Ability to print prescriptions on hard copy and linking to hospital printers
- Ability to incorporate digital signatures like the ones used in banks
- Auto populate ability from the medical records to all other applicable modules e.g. Name auto populates on all but can be edited in subsequent areas without influencing others inorder to be able to get different readings over time
- Log viewer and audit logs for every action and by who and when
- Timestamp ability in all functions
- Customizable dashboard with pinning drag and drop features
- Onboarding tutorial for the system that is heavily simplified
- Ability to see triage notes summary from the medical report tab at a glance
- Voice command integration of both English and Swahili with translate feature
- Telemedicine integration linking an AI system/ chatbot that can analyse patient data for telemedicine situations and refer to the doctor with a notification about queries from patients
- Ability to pin notes or data e.g. DNR policy, Sulphur allergy
- Add claim status on insurance e.g. pending approved rejected etc.
- API connections with KHIS, DHIS2, and NASCOP for seamless data submission.
- Ability to intergrade sent in data like lab reports from external sources
- Use basic AI to analyse trends (e.g., seasonal malaria spikes) and suggest resource allocation.
- Add a “Smart Search” feature to predict patient records based on partial input (e.g., phone number prefix).
- self-service options: request prescription refills, download lab results, or pay bills via M-Pesa.
- Include health education content (e.g., videos on HIV adherence, antenatal care).
- Send automated reminders for appointments, medication, and NHIF renewals in Swahili/English.
- Allow two-way communication (e.g., confirm appointment via reply)
- Add a module to monitor staff activity (e.g., patients seen per doctor, prescriptions filled per pharmacist)
- Use historical data to predict drug stock needs (e.g., ARVs during rainy seasons).
- Add a reorder suggestion tool linked to KEMSA.
- Include fields for traditional medicine use in patient history

Sample Workflow (Patient Visit) ideal visit

1. **Reception**: Staff opens “Patient Registration,” searches for patient by phone/UPI, or registers new patient → assigns to triage.
2. **Triage**: Nurse opens “Triage,” enters vitals → sends to “Outpatient Queue.”
3. **Consultation**: Doctor opens “Clinical Module,” reviews history, adds encounter notes, prescribes drugs → sends to pharmacy.

4. **Pharmacy**: Pharmacist opens “Pharmacy,” dispenses drugs → marks as complete.
5. **Billing**: Cashier opens “Billing,” generates invoice, processes NHIF/mobile payment → prints receipt.
6. **Reporting**: Admin opens “Reports” at day’s end, generates MOH 405 and revenue summary.

<u>Data Privacy and Protection</u>

Goal:

To ensure that the following is maintained

1. Least Privilege: Users only access what’s necessary for their role.
2. Auditability: All actions (view, edit, delete) are logged with timestamps and user IDs.
3. Granularity: Permissions are module-specific (e.g., Clinical vs. Billing) and action-specific (e.g., read vs. write).
4. Dynamic Roles: Admins can adjust permissions for temporary needs (e.g., locum doctor).
5. Privileged access: Only Admin and IT can change what different roles do and can assign accounts to different roles

<u>Basic Outline of roles and access levels</u>

1. **Receptionist**

- **Modules Accessible**:
  - Medical Record (read and write access for basics like name age sex UPI contact NHIF number close kin only)
  - Triage (write vitals, read queue).
  - Billing (view invoices, process payments).
  - Appointments (schedule, view).
- **Permissions**:
  - Create/edit patient demographic data (name, phone, NHIF number).
  - View triage queue and assign patients.
  - Generate receipts and process payments (cash, M-Pesa, NHIF).
  - Cannot view clinical notes, lab results, or prescriptions.
- **Restrictions**:
  - No access to Clinical, HIV, MCH, Pharmacy, or Lab modules.
  - Cannot edit financial reports or inventory.

2. **Nurse**

- **Modules Accessible**:
  - Triage (full access).
  - Clinical Module (limited write, full read).
  - Inpatient (full access for ward notes).
  - Patient Registration (read and write).
- **Permissions**:
  - Record vitals and triage notes.
  - View patient history, diagnoses, and prescriptions.
  - Add encounter notes (e.g., vitals during ward rounds).

    - Manage antenatal care, immunizations, and growth charts.
    - Update bed allocation and discharge summaries.
- **Restrictions**:
    - Cannot prescribe medications or finalize diagnoses.
    - Limited HIV module access (view ART status, no edits).
    - No access to Billing, Pharmacy, or Reports

3. Doctor/Clinician

- **Modules Accessible**:
    - Clinical Module (full access).
    - HIV Care (full access).
    - Forms (full access)
    - Pharmacy (write prescriptions, read inventory).
    - Laboratory (order tests, view results).
    - Inpatient (full access).
    - Patient Registration (read-only).
- **Permissions**:
    - Write encounter notes, diagnoses, and treatment plans.
    - Prescribe medications and order lab tests.
    - Manage ART regimens and viral load tracking.
    - Edit form records (e.g., delivery notes).
    - View and update inpatient records.
    - Receive critical lab result alerts.
- **Restrictions**:
    - No access to Billing or financial reports.
    - Cannot edit inventory or dispense drugs in pharmacy
    - Limited Reports access (view clinical metrics only, e.g., HIV trends).

4. Pharmacist

- **Modules Accessible**:
    - Pharmacy (full access).
    - Prescription module (read-only for prescriptions).
    - Patient Registration (read-only).
- **Permissions**:
    - View and dispense prescriptions.
    - Manage drug inventory (stock levels, expiry dates).
    - Request reorders via KEMSA integration via admin approval.
    - View patient allergies to verify prescriptions if any
- **Restrictions**:
    - Cannot write prescriptions or edit clinical notes.
    - No access to Lab, forms, HIV, Inpatient, or Billing.
    - Cannot view financial reports.

5. Lab Technician

- **Modules Accessible**:
    - Laboratory (full access).
    - Lab request forms (read-only for test orders).

    - Patient Registration (read-only).
    - Medical report ((Partial read and partial write)
- **Permissions**:
    - Enter and upload test results.
    - View test orders and patient demographics.
    - Flag critical results for clinician alerts.
- **Restrictions**:
    - Cannot edit clinical notes or prescribe.
    - No access to Pharmacy, Billing, MCH, HIV, or Inpatient.
    - Cannot generate reports.

6. **Cashier/Billing Officer**

- **Modules Accessible**:
    - Billing (full access).
    - Patient Registration (read-only).
    - Appointments (read-only).
- **Permissions**:
    - Generate invoices and process payments (NHIF, cash, M-Pesa).
    - Submit NHIF claims and track statuses.
    - View patient demographic data for billing purposes.
- **Restrictions**:
    - No access to Clinical, Pharmacy, Lab, forms, HIV, or Inpatient.
    - Cannot edit patient records or view medical data.
    - Limited Reports access (financial summaries only)

7. **Hospital Administrator**

- **Modules Accessible**:
    - All modules (read-only by default, selective write).
    - Reports (full access).
    - Human Resources (full access, KPI system).
- **Permissions**:
    - Generate and export MOH reports (e.g., MOH 731, 405).
    - View financial and clinical dashboards (e.g., revenue, bed occupancy).
    - Manage staff schedules and performance metrics.
    - Override billing disputes (e.g., NHIF claim rejections).
    - Audit user actions (e.g., “Who edited patient X’s record?”).
    - View and track stock in pharmacy
    - Assign roles
    - Manage user accounts
    - Monitor system errors
    - Restore and initiate backups manually
- **Restrictions**:
    - Cannot write clinical notes, prescribe, or dispense drugs unless explicitly granted.
    - Limited patient data edits (e.g., only for administrative corrections).

8. **Patient (via Patient Portal)**

- **Modules Accessible**:
  - Patient Portal (limited access).
- **Permissions**:
  - View personal health records (lab results, prescriptions, appointments).
  - Book/reschedule appointments.
  - Pay bills via M-Pesa or card.
  - Update contact details
- **Restrictions**:
  - Cannot edit clinical data or view other patients' records.
  - No access to internal modules (e.g., Pharmacy, Reports).

Additional requirements

1. Authentication: Username/password with 2FA for high-privilege roles (Admin, IT).
2. Authorization: Role-based access control (RBAC) with granular permissions (e.g., "Doctor: Write Clinical Notes").
3. Audit Trail: Log all actions (e.g., "Nurse Jane viewed patient X's record, 13/04/2025 09:32").
4. Session Management: Auto-logout after 15 minutes of inactivity to prevent unauthorized use.
5. Data Masking: Hide sensitive fields (e.g., HIV status) from roles like Receptionist unless explicitly permitted.
6. Temporary Access: Allow short-term roles (e.g., locum doctor) with auto-expiring permissions.