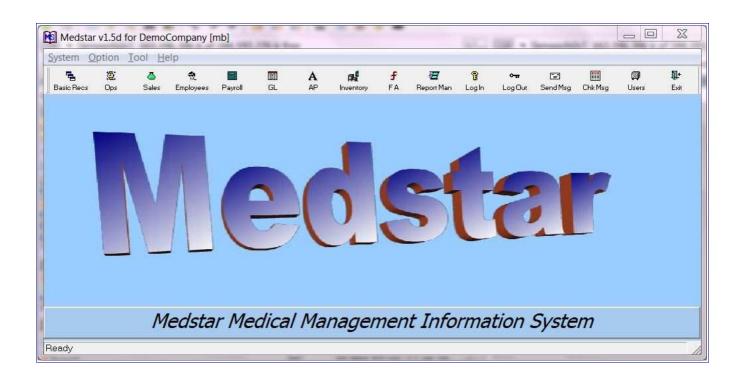
Presenting...



An Integrated Medical and Accounting Management Information System for Hospitals

A NITDA e-Solve National Software Competition Entry

PRESENTED BY:

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1. Core objective

Our application Medstar is an integrated medical records and accounting management information system for hospitals.

2. How it works

Medstar is a modular application, with functions grouped in modules. Some modules can work without others but all share the same database when present. First a look at the general application features, then the features of some of the different component modules.

2.1. General application software features

2.1.1. Security

Each user of the system has an ID, a personal password, and a list of permitted activities (in every module). The database is encrypted.

2.1.2. Data entry

Entering data in Medstar is through spreadsheet-like browse lists and data entry forms. Lists present several rows (records) of data on the screen while a form shows just one row for easier viewing. Browse lists are used to manage records with few data fields, while forms are used for records with many fields. Browse lists are resizable grids, with movable and resizable columns. On each data entry form or list, buttons and commands are available for data management (insert, delete, retrieve, update, sort, etc). In addition to normal text entry, the standard Windows data entry controls are also used, such as listboxes, combo lists, checkboxes and radio buttons. Dates allow for 4-digit years.

2.1.3. Reporting

Formatted reports when generated may be viewed on screen or printed. A Report Manager tool is available for managing reports generated and stored on the hard disk or the database. The data entry screens also have Print buttons to produce quick print-outs of data on the screen. The formatted reports have special markers like user and date stamps and page number.

2.1.4. Auditing

There is an audit table with restricted access in which the user ID, date and time are recorded for all entries, exits and operational activities within Medstar. So data changes and who made them are logged. Certain transactions may also be printed and corrected prior to posting.

2.1.5. Referential integrity

The RDBMS ensures that data integrity is maintained at all times. Values that should be defined in look-up tables must exist before records are saved at all. Similarly before any record can be deleted, it must not have other records depending on it, unless these will also be deleted automatically.

2.1.6. Parametrization

Medstar uses a parameter table as well as look-up tables to hold data that control how it works. The parameter table holds important variables most of which some users will be able to modify. Users will also be able to maintain the look-up tables. As much as possible, embedding of data values in program code is avoided.

2.1.7. Data Backup

Backing up of the database is one of the functions handled by a utility of the RDBMS. However it is possible to call up the utility to perform this function from within the Medstar application at any time, with all utility parameters supplied automatically.

2.1.8. Instant Messaging

This facility allows users of Medstar to exchange messages. System-generated messages will also be possible, such as to alert designated users of certain situations, possibly with audio prompts. So when a patient visits, the doctor could be alerted with a message. When a message is sent, it will pop up at the receiver's workstation within 5 seconds or less, or whenever the recipient logs into the system.

2.2. Functional modular features

There are up to nine integrated modules in the system, two for core medical records and functions. However some modules will be optional. The medical modules are Basic Records and Operations. The accounting modules are General Ledger, Sales, Inventory Control, Employees, Payroll, Accounts Payable and Fixed Assets. The same chart of accounts defined in GL will be available in each of the other modules. From the other accounting modules will flow transactional information to the GL. Their functions are listed below.

2.2.1. Basic Records

This is the core medical module. This comprehensive module handles the management of basic patient information, from registration to discharge. When a patient is registered, the module sets up the necessary records for the patient's basic data, admission details, discharge details, accounting data as well as drug administration details. One of its main functions is maintenance of daily attendance registers which could be referred to at any point in time for reference as well as statistical reporting. Some of the important reports from this module include patient list, attendance register, attendance history, admission and discharge lists, registration and drug history. Key components of the module are Patient Billing, Case Notes and Appointment Scheduling.

2.2.2. Operations

This module complements the Basic Records with specialized data management facilities in the following areas: Lab test chemicals/setup; ante-natal; counseling; surgery; x-ray; ultrasound scan; lab test results.

2.2.3. Inventory Control

This is a comprehensive module which monitors the movement of drugs from delivery to filling of prescriptions to expiry. It maintains supplier accounts, monitoring invoices and payments; tracks drugs issue to patients and various sections; maintains reorder levels and monitors use of dangerous drugs. Different batches are maintained per drug, with supplier information, supply date and expiration date. One of its key functions is maintenance of drug profiles of vital technical details. Some of the reports of the module include detailed drug report, drug profile, drug usage analysis, missing drugs lists, requisition list, expiry report and dangerous drugs list. The module also handles other non-drug inventory like general consumables.

224 Sales

This module correctly tracks all bills, and payments made by patients. Company-sponsored patients are handled as well as self-sponsored ones. Some of the important reports from this module are invoice, statement of account, account aging, and covering letters for statements.

2.2.5. Fixed Assets

The fixed assets register is maintained by this module. Net present value calculations as well as depreciation are automatically made. The module features are: Assets classification; lab/general equipment; other assets; depreciation & write-offs; transfers between locations.

2.2.6. Employees

This module allows for management of staff records from date of appointment to date of resignation. The staff record maintained includes the usual name and address, department and contact details, as well as areas of expertise, specialty and other similar data. The module features are: Professional and administrative personnel records management; leave tracking; medical expenses; storage and retrieval of various images (signature, passport photo) and RTF documents; next-of-kin's name, address and phone number; addresses, various phone/fax numbers/email addresses, etc.

2.2.7. Payroll

This module complements the Employees module in automating accounting operations in the hospital and clinic. It allows for management of staff pay records from date of appointment to date of resignation with cumulative figures for payments, tax and other deductions. Tax calculation is automatic as well as loan monitoring, overtime and other variable items. Sample reports include staff list by post or specialty, payroll history, payslip, bank and cash salary analysis, payments and deductions register, as well as a number of payroll analysis reports.

2.2.8. Accounts Payable

This module monitors the accounts of contractors and other creditors. It will be used for generating purchase orders and monitoring activities on such orders including deliveries and payments. Reports to be generated include: Payment schedule; Creditors List.

2.2.9. General Ledger

Last but not the least, the General Ledger module is at the center of the accounting system. This facilitates administration of the hospital or clinic by providing standard, debit-credit ledger accounting functions. Other modules can send information (transaction journals) to the GL if desired. The module features are: Professional ledger accounting (maintaining bank, cash and journal ledgers); instant account balance look-up; on-demand trial balance, balance sheet, income statement, statements of account; budgeting and bank reconciliation.

3. Technologies used

Medstar is a client/server application. The development of the client component of Medstar, an executable Windows application, was done using Sybase PowerBuilder, one of the fastest RAD (rapid application development) tools presently available for database applications. The server-based database was created using SQL Anywhere also from Sybase, now an SAP Company. The present capacity of SQL Anywhere is over 12 terabytes, limited only by hard disk capacity. SQL Anywhere is mainly compatible with Sybase's (and Microsoft's) SQL Server, for big organizations with much higher storage or processing requirements. It runs on a wide variety of platforms: Microsoft Windows, Linux, Sun Solaris, Mac OS, etc. Client to server communication is via ODBC or native database calls on a TCP/IP network.

4. Why consider Medstar?

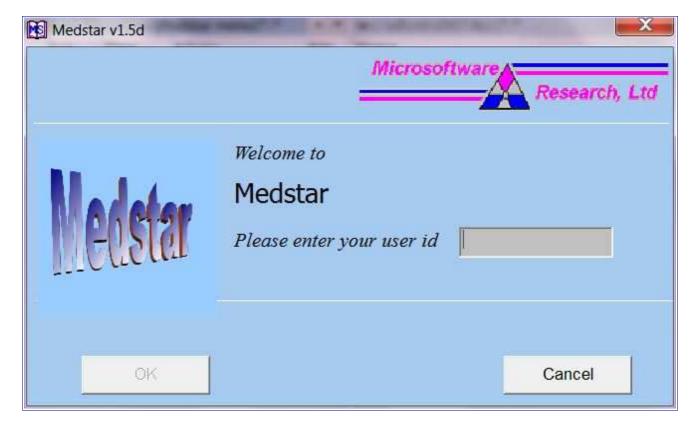
Medstar is a secure, low-cost and scalable solution. It can be adopted by small hospitals as well as large establishments. It is a new software solution that could go a long way in automating hospital operations in the country and elsewhere.

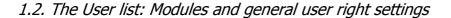
 Medstar MIS - NITDA	l e-Solve National	Software Comp	etition

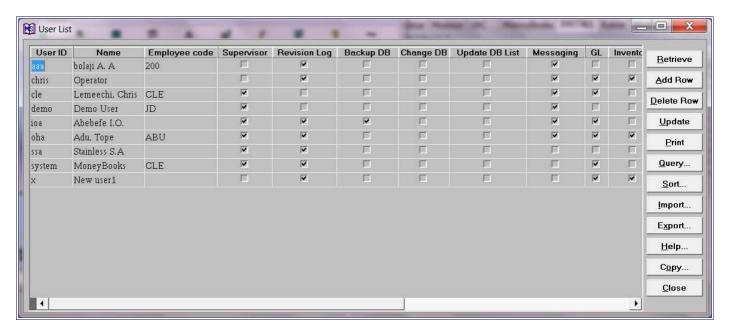
This is a documentation of the user interface, screen shots taken from various modules of Medstar.

1. User security

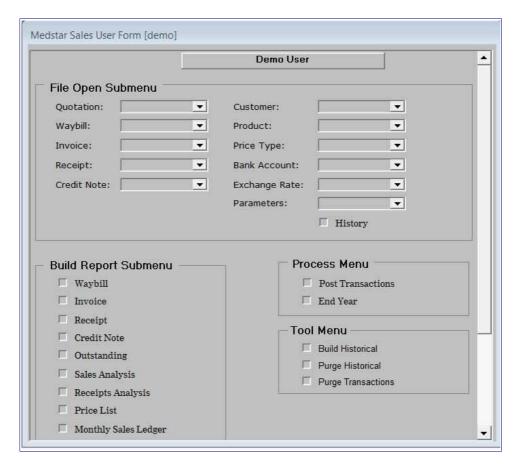
1.1. Login screen for User ID and password entry



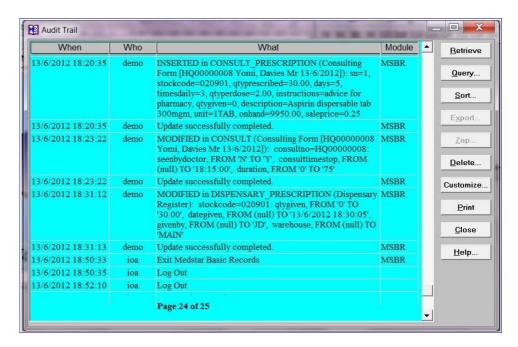




1.3. A typical User Form : Specifying what non-supervisor can do in a module

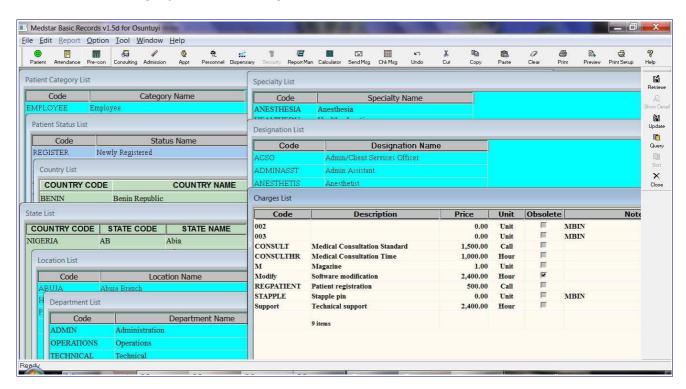


1.4. The Audit Trail: Who did what, when and where.



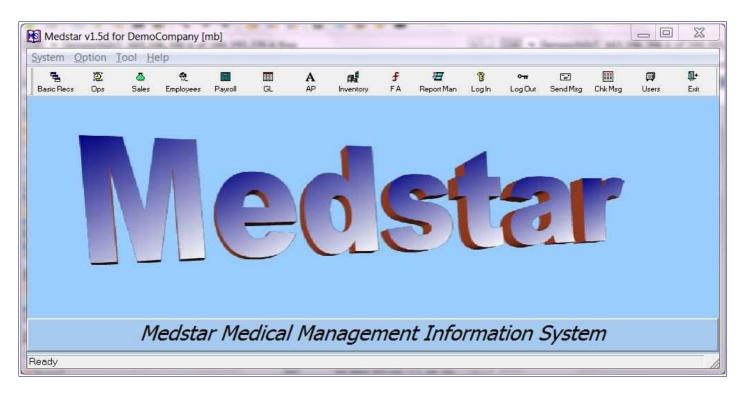
2. Parameter data entry

From Patient Category down to Charges.



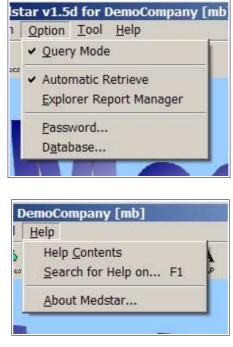
3. Main Screen and Features

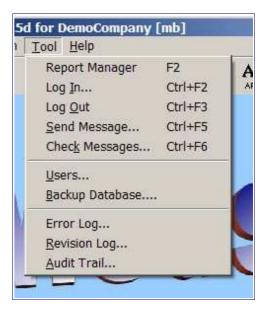
3.1. The main screen: From here different modules are launched.



3.2. The System Module menus

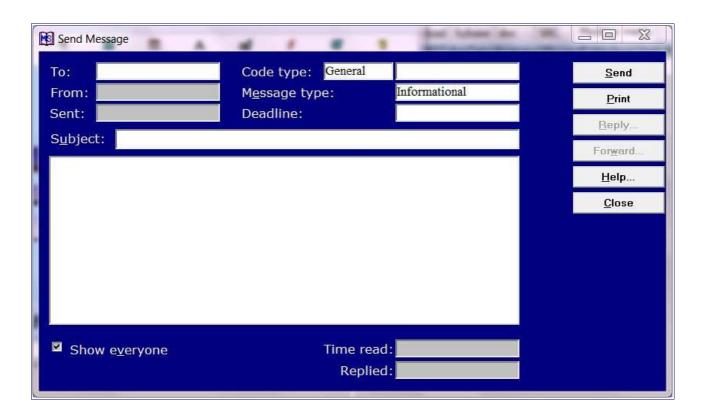




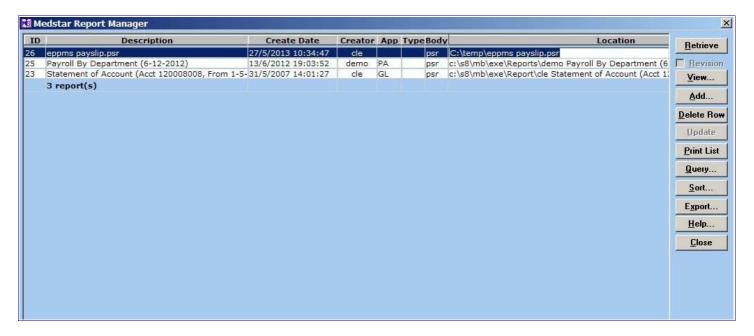


3.3. Instant Messaging screens

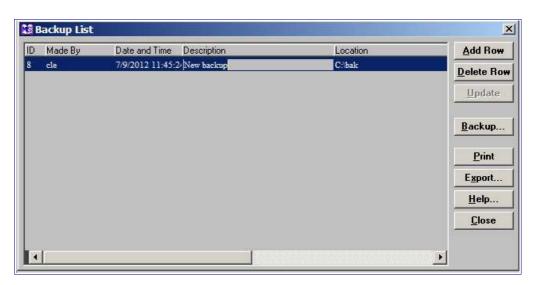




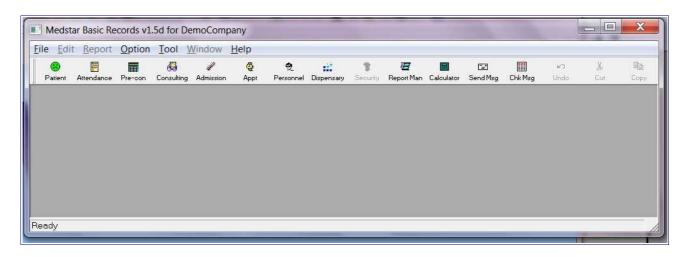
3.4. Report Manager: For managing generated and saved reports

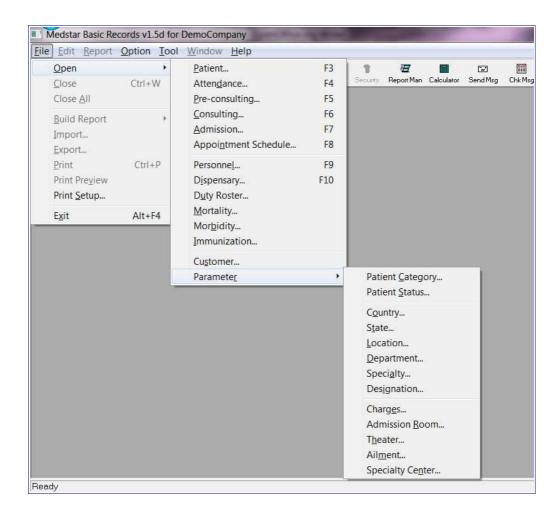


3.5. Backup List



3.6. The Basic Records Module

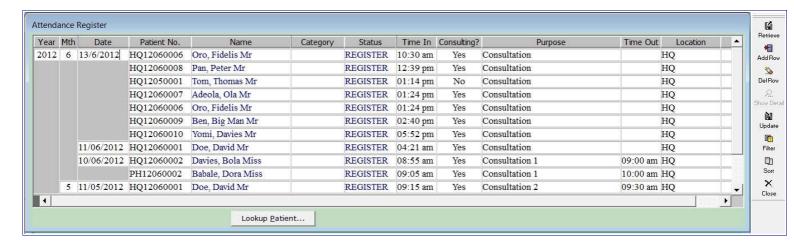




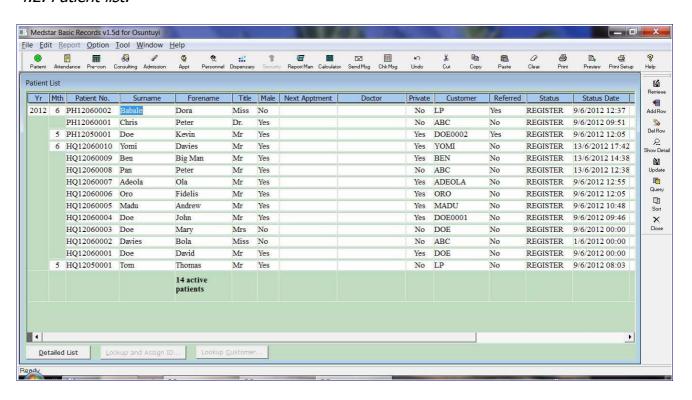
4. What happens when a new patient is registered?

Customer code assigned if private. Bill tables (waybill,invoice) are created with registration charge.

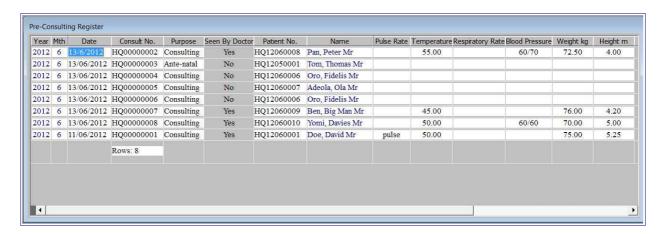
4.1. Attendance register, with editing toolbar by the right



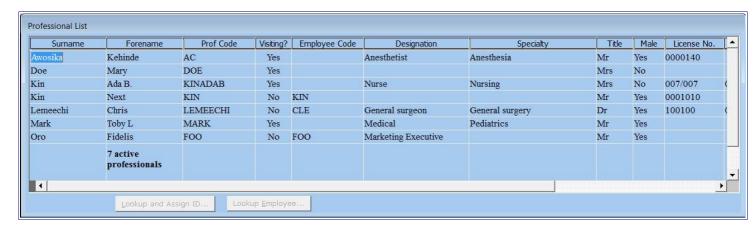
4.2. Patient list.



4.3. Pre-consulting register.



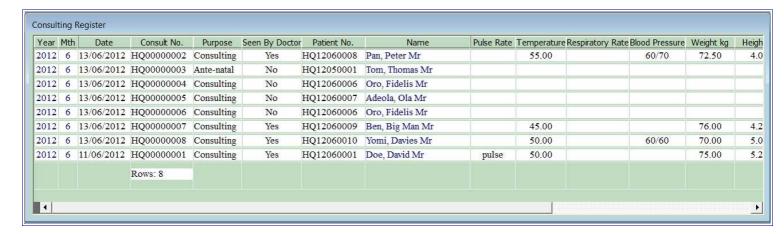
4.4. Professional list: The doctors, nurses and other professionals



5. When patient consults doctor?

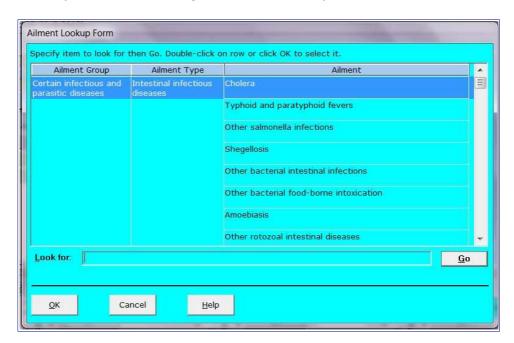
Doctor makes his notes, including diagnosis and prescription

5.1. Consulting register



5.2. Consulting form





5.3. Ailment Lookup Form: While diagnosis window is open.

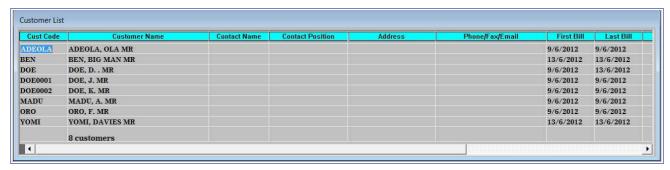
Doctor sets the stopping time: duration is calculated. Doctor indicates patient seen: Consulting charge is billed.

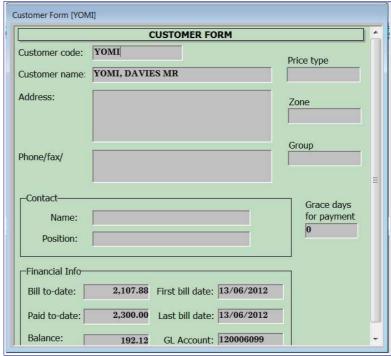
6. When doctor's prescription is filled?



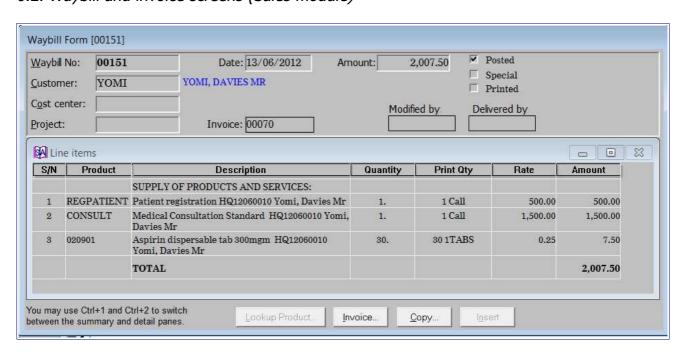
When prescription quantities are entered and updated: They are added to the bill and deducted from on-hand quantity. (Waybill and Invoice updated.)

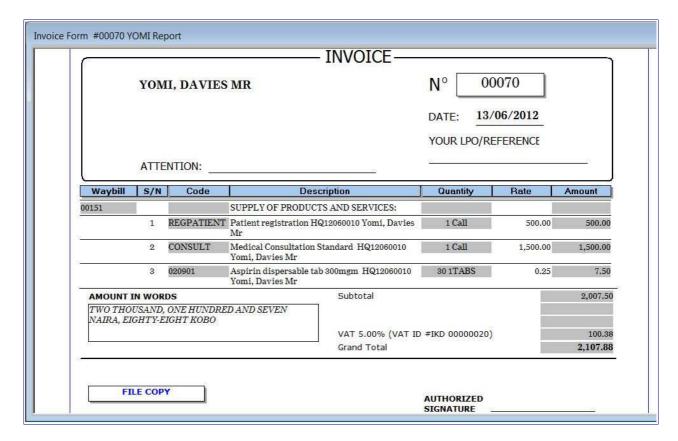
6.1. Customer screens (Sales module)





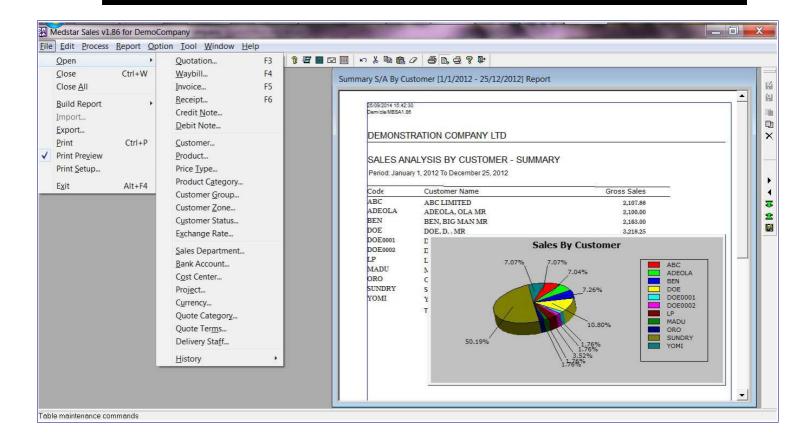
6.2. Waybill and invoice screens (Sales module)





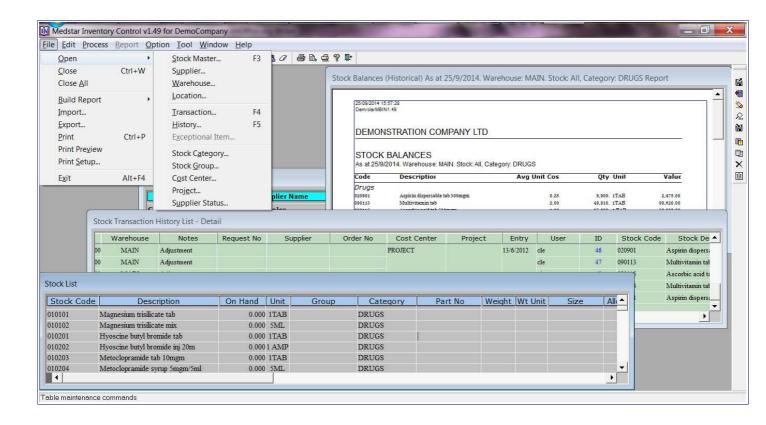
Invoices are approved and then posted (in Sales). Receipts are recorded.

7. The Sales Module



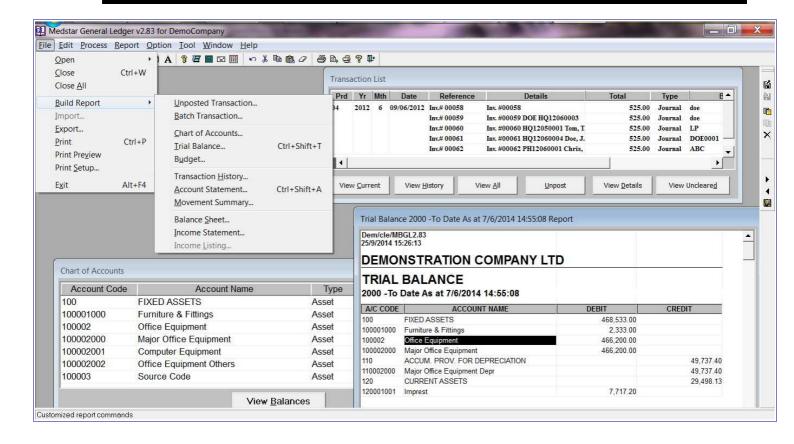


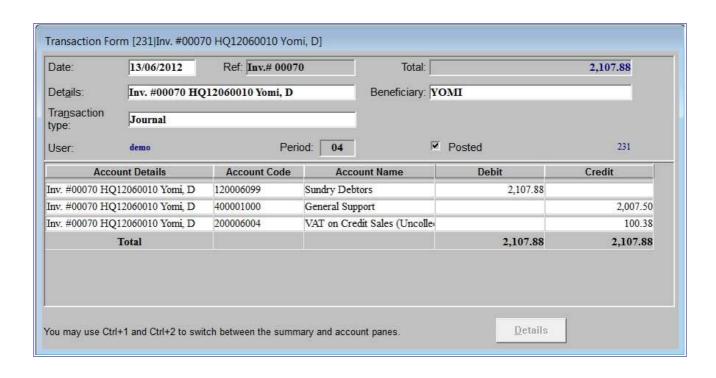
8. Inventory Control module



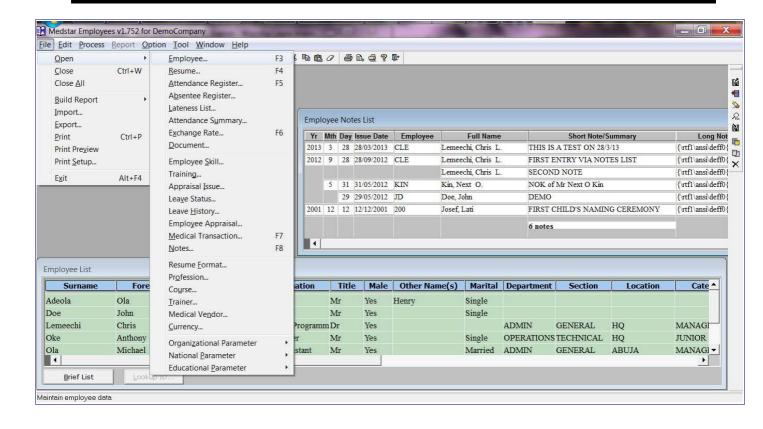


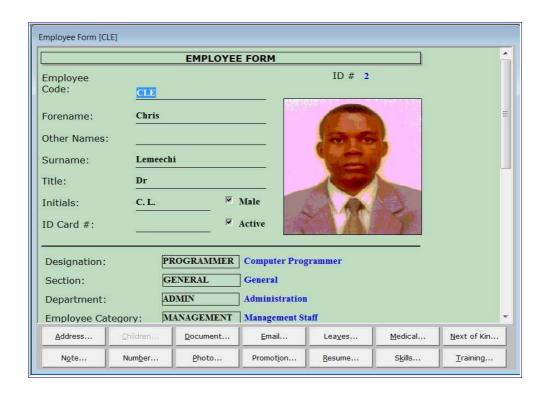
9. General Ledger module



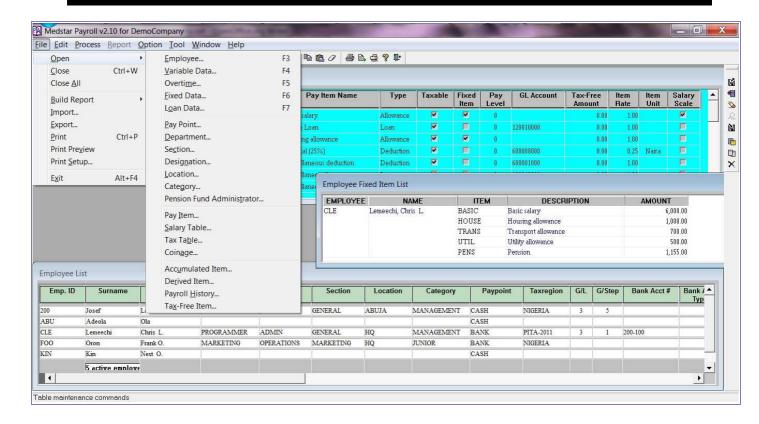


10. Employees module





11. Payroll module





12. Accounts Payable, Fixed Assets modules

