CS 440-HEALTH INFORMATICS

Sukhen Dey, PhD

ABSTRACT

Health care professionals and providers are increasingly becoming information-dependent. It is the 'mission-critical' information and 'computing – informatics' infrastructure that is predominantly responsible for providing timely information to health professionals like the doctors and nurses to improve patient outcome. This is a CS Seminar Course which offers a systems orientation to Health Informatics.

sukhen dey, phd

Computer Science Seminar – CS440

Health Informatics

Spring – 2017

Course Description

This is an advanced-level seminar course, offered by the Computer Science department. Health care professionals and providers are increasingly becoming information-dependent. It is the 'mission-critical' information and 'computing – informatics' infrastructure that is predominantly responsible for:

- Providing timely information to health professionals like the doctors and nurses.
- Protecting data and keep patient health information, confidential and private.
- Improving patient outcome, safety and coordinated care.

This course will provide a general overview of:

- The origin, practice and components within the U.S. healthcare system.
- The building blocks of Health Informatics.
- The role of Health IT in orchestrating the design, structure, and relationship between patients, providers, covered entities and public health.
- The structure of healthcare data such as the HL7, ICD-10 and other international coding standards.
- The recent attacks and 'root causes' of Cyber-Security, patient record breaches and a general framework of HIPAA guidelines, including encryption standards

- In addition, the course will demonstrate general operations of health information systems such as:
  - Electronic Health Record
  - Hospital Information System
  - Clinical Decision Support System
  - Pharmacy Management System

Added emphasis is placed on the notion of interoperability, common healthcare database architecture, structured query language (SQL), building and maintaining patient portals and mobile health.

The course will be offered by Sukhen Dey, PhD, Associate Professor of Computer Science, during Spring of 2017. Professor Dey has crafted a Simulated Health Informatics System with over 5000 mocked patient records, which will be incorporated in demonstrations, lectures, lessons and assessments.

Course Objectives

By the end of this course students should be able to:

- Illustrate the overall framework of the U.S. healthcare system
- Articulate an understanding of Health Information Technology and its components
- Understand and demonstrate the architecture of Health I.T databases and Patient Health Record Management
- Illustrate selected Health Record Data Breach incidences and common causes of a security breach, estimated cost impact and HIPAA implications.
- Understand and demonstrate the typical functions within various Health Information Systems
- Practice simulated patient data entry in an Electronic Health Record along with searching patients, record patient problems, allergies and reactions, medical histories, compose digital SOAP notes, schedule patient encounter appointments, submit electronic medication orders and generate patient charts
- Generate reports to understand the business aspects of practice management
- Articulate typical functions within Clinical Decision Support System (CDSS) along with public repository of the International Classification of Diseases – 10 (ICD-10)

The following pages show screens of the simulated Health Informatics System, architecture and developed by Professor Dey.


Integrated Health Informatics Syst
Home
Patient Record Management
Document Management
Scheduling Management
eRx Order Management
Lab Order Management
Secure Messaging System
Billing System
Patient Chart
Financial Reports
Patient Outcome Reports
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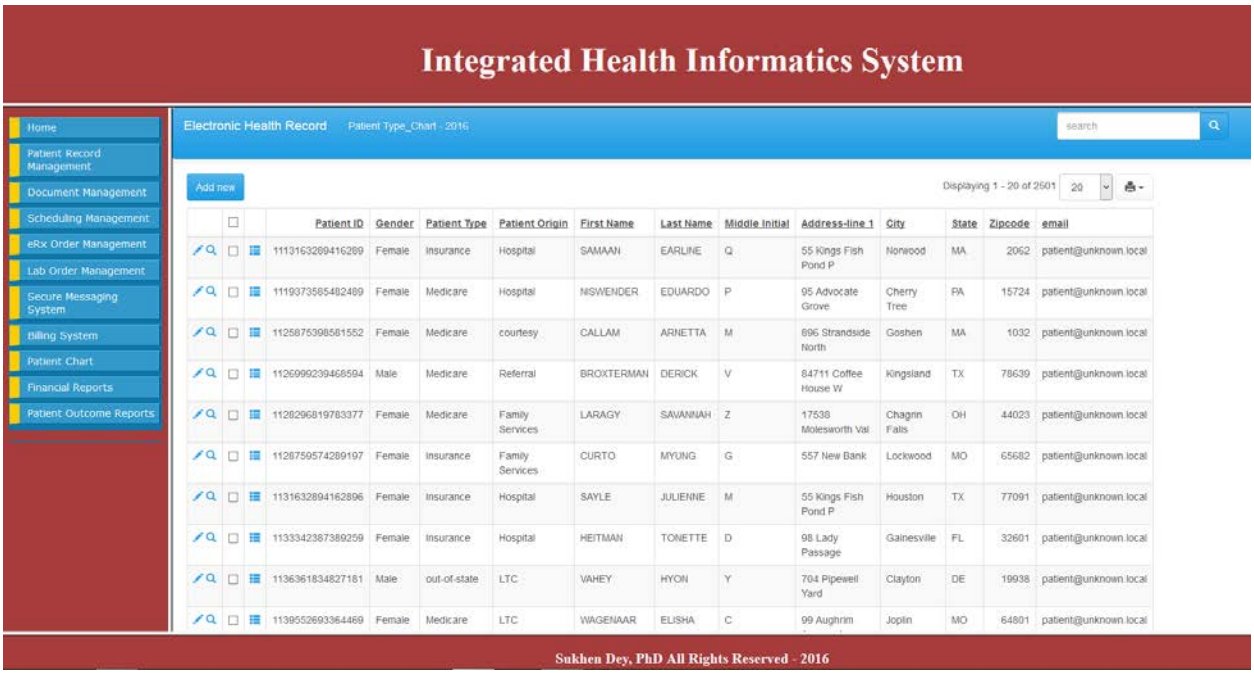
Integrated Health Informatics System
Home
Patient Record Management
Document Management
Scheduling Management
eRx Order Management
Lab Order Management
Secure Messaging System
Billing System
Patient Chart
Financial Reports
Patient Outcome Reports
Electronic Health Record
Patient Type_Chart - 2016
search
Add new
Displaying 1 - 20 of 2501
20
Patient ID
Gender
Patient Type
Patient Origin
First Name
Last Name
Middle Initial
Address-line 1
City
State
Zipcode
email
1113163269416289 Female Insurance Hospital SAMAAN EARLINE Q 55 Kings Fish Pond P Norwood MA 2062 patient@unknown.local
1119973565482489 Female Medicare Hospital NISWENDER EDUARDO P 95 Advocate Grove Cherry Tree PA 15724 patient@unknown.local
1125875398581552 Female Medicare courtesy CALLAM ARNETTA M 696 Strandside North Goshen MA 1032 patient@unknown.local
1126999239468594 Male Medicare Referral BROXTERMAN DERICK V 84711 Coffee House W Kingsland TX 78639 patient@unknown.local
1126296819783377 Female Medicare Family Services LARAGY SAVANNAH Z 17538 Molesworth Val Chagrin Falls OH 44023 patient@unknown.local
1126759574289197 Female Insurance Family Services CURTO MYUNG G 557 New Bank Lockwood MO 65682 patient@unknown.local
1131632894162896 Female Insurance Hospital SAYLE JULIENNE M 55 Kings Fish Pond P Houston TX 77091 patient@unknown.local
1133342387389259 Female Insurance Hospital HEITMAN TONETTE D 98 Lady Passage Gainesville FL 32601 patient@unknown.local
1136361834827181 Male out-of-state LTC VAHEY HYON Y 704 Pipewell Yard Clayton DE 19938 patient@unknown.local
1139552693364469 Female Medicare LTC WAGENAAR ELISHA C 99 Aughrim Joplin MO 64801 patient@unknown.local
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Integrated Health Informatics System

- Home
- Patient Record Management
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- Scheduling Management
- eRx Order Management
- Lab Order Management
- Secure Messaging System
- Billing System
- Patient Chart
- Financial Reports
- Patient Outcome Reports

Primary * Cathy Norton

Subjective Patient complains about frequent abdominal pain. He wakes up at night with dry throat and chest pain. Initial diagnosis is GERD with mild signs of stomach ulcer.

Objective
VITAL SIGNS: Weight 86.7 kg which is 191 lbs, blood pressure 174/114, pulse 103.
HEENT: Conjunctivae pink. Sclerae anicteric. Oropharynx clear.
NECK: No lymphadenopathy or thyromegaly or JVD.
LUNGS: Clear to auscultation and percussion

Assessment GERD, Ulcer, Acid Reflux, Mild Hypertension

Plan
Elevated Head Rest
Skip spicy food
Nexium 50 MG 3 / Day
Lab Test Ordered: Upper GI

Type the code you see above:

*

Integrated Health Informatics System

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Allergies, Add new

Patient [1126999239468594]

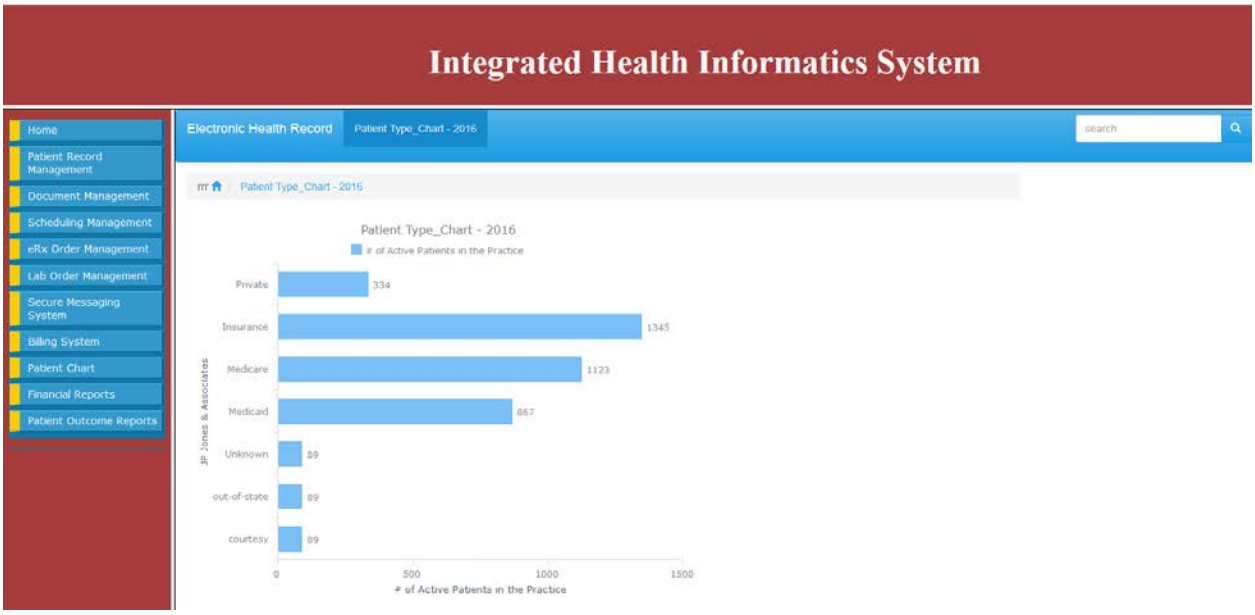
Patient ID	DOB	Gender	SSN	Patient Type	Patient Origin	Image	First Name	Last Name	Middle Initial	Address-line 1	Address-line 2	City	State	Zipcode
1126999239468594	5/10/2003	Male	999190570	100 mg	100 mg		BROXTERMAN	DERICK	V	84711 Coffee House W		Kingsland	TX	78639

Patient Id * 1126999239468594

Allrg Desc

Date *

Public Site


Integrated Health Informatics System
Home
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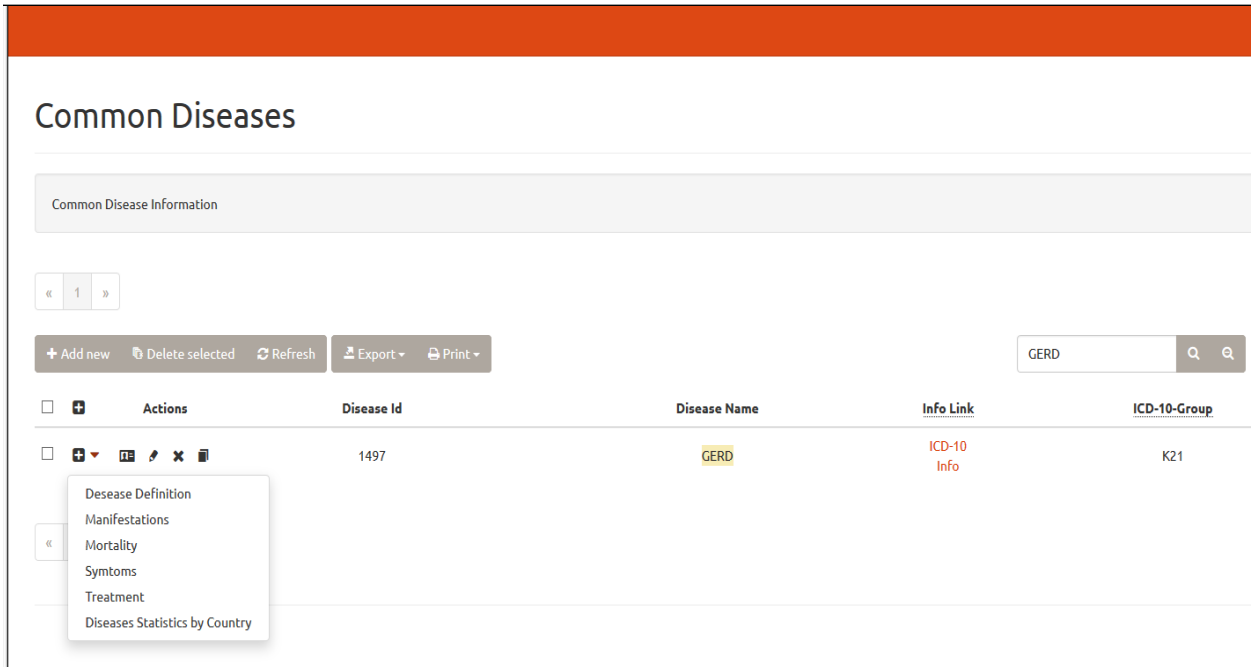
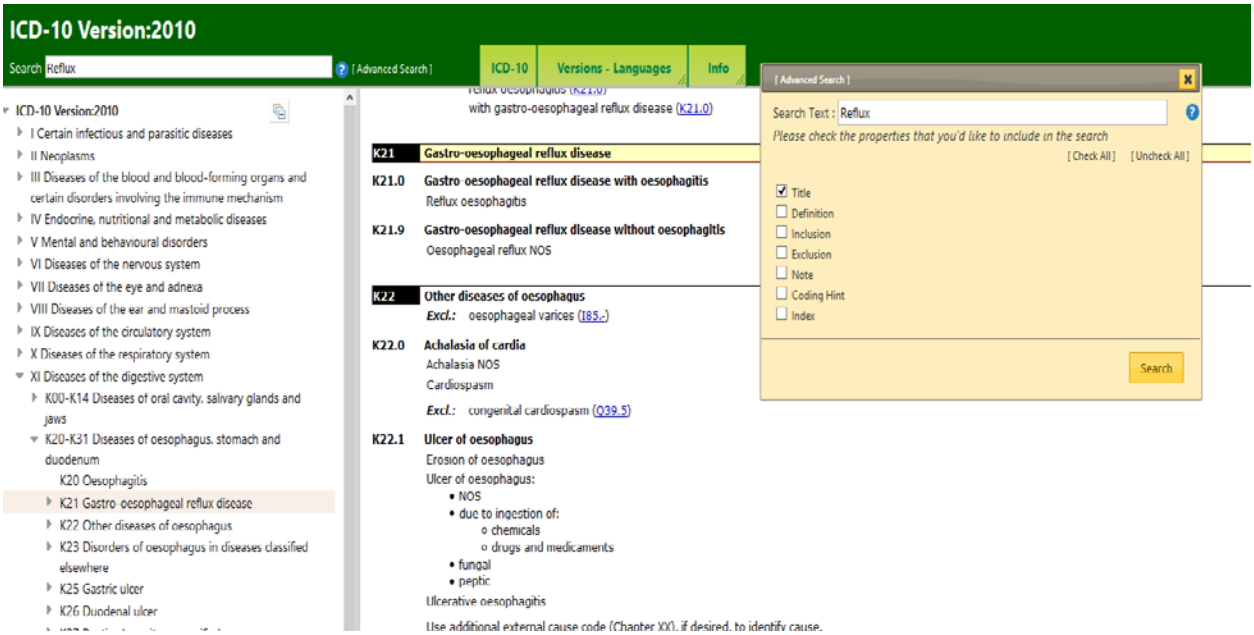
Lab Order Management
Secure Messaging System
Billing System
Patient Chart
Financial Reports
Patient Outcome Reports
Electronic Health Record
Patient Type_Chart - 2016
search
Patient Type_Chart - 2016
# of Active Patients in the Practice
Private
334
Insurance
1345
Medicare
1123
Medicaid
867
Unknown
89
out-of-state
89
courtesy
89
JP Jones & Associates
0
500
1000
1500
# of Active Patients in the Practice


Common Diseases
Common Disease Information
« 1 »
+ Add new
Delete selected
Refresh
Export
Print
GERD
Actions
Disease Id
Disease Name
Info Link
ICD-10-Group
1497
GERD
ICD-10 Info
K21
Desease Definition
Manifestations
Mortality
Symtoms
Treatment
Diseases Statistics by Country


ICD-10 Version:2010
Search Reflux
[Advanced Search]
ICD-10
Versions - Languages
Info
ICD-10 Version:2010
I Certain infectious and parasitic diseases
II Neoplasms
III Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism
IV Endocrine, nutritional and metabolic diseases
V Mental and behavioural disorders
VI Diseases of the nervous system
VII Diseases of the eye and adnexa
VIII Diseases of the ear and mastoid process
IX Diseases of the circulatory system
X Diseases of the respiratory system
XI Diseases of the digestive system
K00-K14 Diseases of oral cavity, salivary glands and jaws
K20-K31 Diseases of oesophagus, stomach and duodenum
K20 Oesophagitis
K21 Gastro-oesophageal reflux disease
K22 Other diseases of oesophagus
K23 Disorders of oesophagus in diseases classified elsewhere
K25 Gastric ulcer
K26 Duodenal ulcer
with gastro-oesophageal reflux disease (K21.0)
K21 Gastro-oesophageal reflux disease
K21.0 Gastro-oesophageal reflux disease with oesophagitis
Reflux oesophagitis
K21.9 Gastro-oesophageal reflux disease without oesophagitis
Oesophageal reflux NOS
K22 Other diseases of oesophagus
Excl.: oesophageal varices (I85.-)
K22.0 Achalasia of cardia
Achalasia NOS
Cardiospasm
Excl.: congenital cardiospasm (Q39.5)
K22.1 Ulcer of oesophagus
Erosion of oesophagus
Ulcer of oesophagus:
• NOS
• due to ingestion of:
o chemicals
o drugs and medicaments
• fungal
• peptic
Ulcerative oesophagitis
Use additional external cause code (Chapter XX), if desired, to identify cause.
[Advanced Search]
Search Text : Reflux
Please check the properties that you'd like to include in the search
[Check All] [Uncheck All]
Title
Definition
Inclusion
Exclusion
Note
Coding Hint
Index
Search