deerwalk Compware

Data Analytics in US Healthcare

"Program designed,prepared and supported by deerhold®"

INTRODUCTION

The United States has one of the most complex healthcare systems. The US Healthcare System is also considered to be one of the least efficient, and thereby, one of the most expensive systems among the developed countries in the world. At the same time, those who are insured get the best care and have a lot of choices. The US healthcare spending in 2020 was about $4 trillion which is close to 20% of the US GDP. In 2020, per capita healthcare spending was above $12K per year. By any measure, The US per capita healthcare spending is almost double than that in its other industrial peers.

One of the reasons for high healthcare costs is administrative waste. Providers face a huge array of usage and billing requirements from multiple payers, which makes it necessary to hire costly administrative help for billing and reimbursements. Americans pay almost four times as much for pharmaceutical drugs as citizens of other developed countries. Hospitals, doctors, and nurses all charge more in the U.S. than in other countries, with hospital costs increasing much faster than professional salaries.

The health care system, which is becoming increasingly data-reliant, data analytics can help derive insights on systemic wastes of resources, can track individual practitioner performance, track the health of populations and identify people at risk for chronic diseases.

The use of analytics therefore can potentially reduce the overall costs associated with the system.

COURSE OBJECTIVES

The objective of this course is to familiarize students with different components of the US healthcare system and enable them to perform different kinds of analytics for a given set of US healthcare data.

The course will enable to students to understand the

- The US Healthcare System
- Key components of US Healthcare System
- Various data sets generated by the key components
- Need for aggregation of data generated by each of the key components
- Value that can be generated from the aggregated data sets via analytics

Apart from the theoretical overview, the course also provides participants with extensive hands-on practical experience in handling the raw data, data transformation using different tools, performing analytics and reporting analytics.

COURSE OUTCOMES

By the end of this course, student will have a comprehensive knowledge and understanding of US Healthcare System. They will able to

Understand the basic functioning of US Healthcare System
Identify different data sets associated with the US Healthcare System
Apply various tools and techniques to transform the data
Analyze the data and generate knowledge out of the data and report them
Get employed in the US healthcare analytics firms

COURSE PREREQUISITES

Basics of relational and non-relational database management and design · Structured query language (SQL)

ELIGIBILITY

Must have either completed undergrad in computer science or senior or rising senior in an IT or computer science undergrad course

COURSE DURATION

The complete course will be of 12 weeks.
Each week there will be five classes, on Monday to Friday.
Each class will be 2 hours in duration.

EVALUATION

Course participants will be evaluated every two weeks by way of quizzes. · A two and half hour examination will be conducted during the final week of the course.

MODE OF INSTRUCTION

Online

INSTRUCTORS

Course will be taught by instructors who have extensive hands-on experience on working with US Healthcare data.

GUEST LECTURERS

Rudra Pandey, PhD
Chris Kryder, MD
Jeff Gasser, CPA
Jeff Rick
Binod Bhattarai
Ashay Thakur

COURSE OUTLINE

OVERVIEW OF US HEALTHCARE SYSTEM

Theory

- Introduction to Healthcare System
- Public Health Insurance
- Commercial Health Insurance
- Government Sponsored vs Private Health plans
- Self vs Fully Insured

DATA MANAGEMENT PROCESS & KEY INDUSTRY PLAYERS

Theory

- Types of Player (Organization level)
- Management Process
- Health Insurance Terminology
- Health Care Providers

US HEALTHCARE DATA

Theory

- Introduction to Healthcare Data
- Data warehouse and Data Lake in Healthcare
- US Healthcare Data Types
- Type of Data Files
- Data Types

Practical

- Setup own free AWS server.
- Setup Redshift using qwiklabs
- Create a Table
- Load sample data from S3
- Install workbench for Redshift

BIG DATA TECHNOLOGIES IN HEALTHCARE

Theory

- Define Big Data
- Evolution
- Big Data & Scalability
- Challenges in Big Data Tools
- Big Data Tools and Technologies
- Next Generation Big Data

Practical

- Install MongoDB
- MongoDB Import, Create Database, Insert Document and Query Document
- Usage of commands like Aggregate, Replication
- Create & restore Backup
- MongoDB Array and Various Array Operators in MongoDB

STANDARD CODES & GROUPERS

Theory

- ICD – 9,10
- CPT
- HCPCS
- Revenue Code
- DRG
- SNOMED
- LOINC
- NDC
- HIPPS
- Place of Service
- Modifier Codes
- Discharge Codes

Practical

- Calculate
  - Grouper distribution
- Coding convention

ETL (EXTRACTION, TRANSFORMATION, LOADING)

Theory

- Data Ingestion

Practical

- Copy Import

- Import
- Data Mapping
- Data standardization
- Tools and Technologies
- Electronic Medical Records and Data exchange
- X12 Data types – 834/837 overview

- Import Quality Report
- Data Import (Delimiter and Fixed Length)
- Data Transformation Scripting
  - Eligibility
  - Medical.
  - Pharmacy
  - Providers
  - Laboratory
  - Survey

DATA QUALITY

Theory

- Data Correctness
- Data Completeness
- Standardization
- Quality Control
- Outlier(s)

Practical

- Prepare Data Mapping Document
- Create scripts to support the data mapping document.
- Compute Standard Code checks

THE KEY DATA COMPONENTS

Theory

- Eligibility
- Claims
- Pharmacy
- Provider
- Lab
- Biometrics
- SDOH

Practical

- Compute
  - Member Match logic
  - Employee count
  - Member count
  - Avg Age count
  - Avg Family Size count
  - Gender Mix
  - Medical Claims Paid
  - Pharmacy Claims Paid
  - Member Month
  - Date Distribution
- Calculate
  - PMPM
  - Avg Generic Script Cost
  - Avg Brand Script Cost
  - Top 100 reports for standard codes
- SDOH
  - Social Determinants of Health

COMPUTING KEY METRICS

Theory

- Member Month (MM)
- Per Member Per Month (PMPM)
- Member Pay and Plan Pay
- Per 1000
- Diagnosis Groupers
- Procedure Groupers
- Drug Category
- Utilization Metrics
- Quality Metrics
- Episodes
- Pricing Concepts
- Healthcare Reports
- NPI

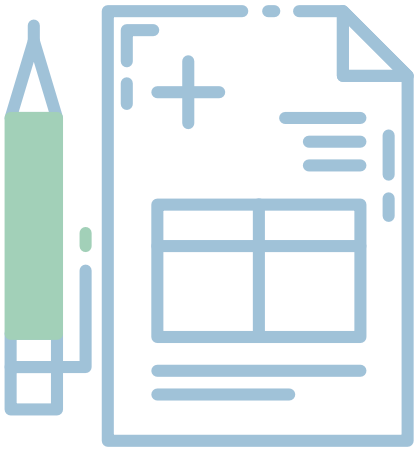
Practical

- Compute
  - ER Visits per 1000
  - Admission per 1000
  - Office Visits per 1000
  - Services per 1000
  - High-cost Procedure and Diagnosis
  - Members with chronic conditions
- Compute utilization metrics such as
  - Admit per 1000,
  - ER visits
  - Hospitalization days

STANDARD HEALTHCARE REPORTS

Theory

- Design and code standard population analytics reports
- Quality and Risk Measures



Practical

- Chronic Condition Report
- Compute Quality Metrics such as
  - Member with chronic diseases with no office visits in last 12 months
  - Member with chronic diseases with ER visits within last 30 days.
  - Member with chronic diseases with admission within last 30 days.
  - Member with Comorbidity.
  - Member with chronic diseases with certain types drugs.
  - Members with two doses of Covid-19 vaccine.
  - Members with more than 1 Physical Therapy in 1 year.
- Calculate BMI.
- Utilization Report
- INBR
- High Cost Member Report

MACHINE LEARNING IN HEALTHCARE

Theory

- Using Machine learning algorithms and detecting patterns associated with diseases and health

Practical

- Disease Identification and Diagnosis using ML algorithms

DATA SECURITY

Theory

- HIPAA
- Safe Harbor
- Expert Determination
- De-identification
- Secured Work Process
- Secured Coding
- Certifications

Practical

- De-identification of data set under Safe Harbor method.
- De-identification of data set under Expert Determination method.

EVALUATION WEEK

Final Assessment