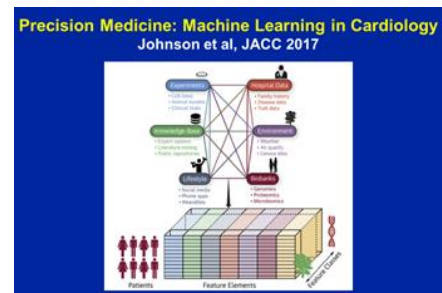
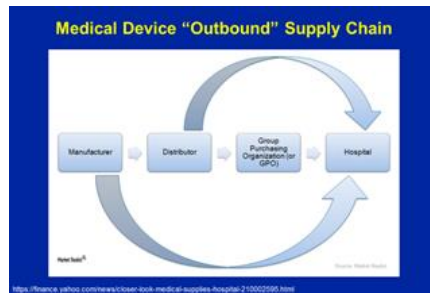
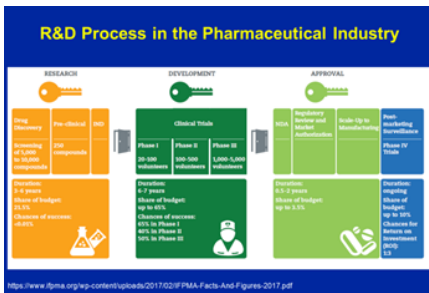


CHE 49700-H/59700: ANALYTICAL METHODS IN HEALTHCARE DELIVERY



Course Description: This course provides a “real world” overview of healthcare delivery in the United States (US). The topics covered include the major medical product segments, regulatory framework, and financial considerations, including costs, health insurance, and reimbursement. Following a focused review of relevant physiology and pathophysiology, a series of critical medical conditions having the highest impact on the US healthcare system are discussed. An important aspect of the course is a team project, occurring over the last half of the semester and consisting of two presentations and a final report (in lieu of examinations). Finally, a number of emerging healthcare developments, including precision medicine, artificial intelligence, population health, and value-based care, are addressed.

Course Objectives: The overall objective of this course is to provide students a detailed overview of the US healthcare system, with emphasis on the important role of engineers. The course is structured in three parts:

- **Overview of the US healthcare system:** characterize the major segments of medical products (pharmaceuticals/biologic compounds and medical devices/diagnostics) along with the regulatory framework applying to each of these segments (especially in relation to approval pathways for new products); delineate the major components of both pharmaceutical and medical device companies, in particular those functions for which engineers play an important role (research and development, manufacturing, regulatory affairs, sustaining engineering, and intellectual property); understand US health economics by identifying the major cost drivers for the system; develop a basic comprehension of health insurance coverage and reimbursement policies in the US
- **Highest impact clinical conditions:** After a focused physiology/pathophysiology review, understand the impact of the following conditions, from both a clinical and resource utilization/cost perspective: coronary artery disease, heart failure, diabetes, cancer, obesity, Alzheimer’s disease, chronic kidney disease, stroke, arthritis, sepsis, and acute kidney injury; characterize the clinical characteristics along with the causes, demographics, and current treatment of each of these disorders
- **Addressing unmet clinical needs:** For one of the above high-impact conditions, develop an understanding of an unmet clinical need and propose a solution addressing that need

Team projects: Student groups should plan to meet with Professor Clark before beginning work on the project to set expectations. The clinical characteristics of the chosen high-impact disorder along with its causes, demographics, and current treatment will be presented in Presentation 1. With Professor Clark or another engineering faculty member serving as a mentor, an unmet clinical need for the disorder will be identified along with an engineering-based solution for the problem – these considerations will be the focus of Presentation 2.

Course Information: Instructor: William R. Clark, M.D.
Course Hours: TTh 1:30 – 2:45 PM

Course Requirements: This is a CHE-Honors course but is open to all undergraduate and graduate students. BIOL 23000 or equivalent course is recommended but not mandatory.

For more information: Please contact Professor Clark directly at clarkw@purdue.edu