HMP 599: Decision-Making for Health Systems

Adam VanDeusen, ajvandeu@umich.edu
Teaching Assistant(s) Name, Contact Information

Student Office Hours
Professor Office Hours Dates, Times, Locations
TA Office Hours Dates, Times, Locations

Textbooks
- *Decision Modeling* (Version 2.1.0) by David M. Tulett. The textbook PDF can be accessed free of charge at: https://linney.mun.ca/pages/view.php?ref=36808
- *Cost-Effectiveness Analysis in Health* (2nd edition or newer) by Peter Muenning, ISBN: 0787995568. Available online free of charge through the University of Michigan Library.
- Additional readings will be provided via Canvas.

Prerequisite Courses and Competencies
Students are required to take an introductory course in biostatistics (BIOSTAT 501 or BIOSTAT 521). Students are also expected to have experience in Microsoft Excel and basic computer programming (any language).

Course Description
Critical decisions are made in health systems every day, ranging from clinical (*how does a clinician design an effective treatment plan for a diabetic patient?*) to administrative (*when should more surgical gowns be reordered for the surgery department so supply is minimal, but never empty?*) to strategic (*is it economically advantageous to merge with another practice?*). As a health system leader, you can use several tools to ensure the decisions you make are holistic and evidence-based. This course will introduce you to several of these tools and encourage you to apply them to real-world scenarios and datasets. Some methods we will explore include decision trees, value of information, sensitivity analysis, risk preferences, and Monte Carlo simulation. Beyond these quantitative methods, we will also explore qualitative evaluation tools. Finally, we will practice communicating alternatives and decisions to stakeholders via oral presentations and written reports.

We will discuss decision-making related to current events in healthcare, and you are encouraged to share examples from their own professional, academic, and personal experiences. In addition to the content learned in this course, you may also discover new connections for project collaboration, data sharing, and/or professional development.

Learning Objectives
Upon completion of this course, students should be able to:
1. Evaluate complex scenarios within health systems, including how to allocate limited resources and how to balance competing objectives.
2. Establish and appropriately quantify potential alternatives for addressing scenarios.

3. Develop quantitative assessments to understand how different alternatives impact a scenario, as well as a larger system.
4. Select and apply the appropriate decision-making tool(s) for a given scenario from a suite of methods.
5. Effectively and objectively communicate decision-making methods and results to a range of stakeholders.

Course Policies

This course is intended for all students at the University of Michigan and all students deserve full access to learning (and demonstrating that learning) in this course. The instructional team is committing to meeting the needs of all students. The team has worked to make this course inclusive and accessible and we are open to how we can continue to improve the course in these domains. If at any point in the term, you find yourself not able to fully access the space, content, and experience of this course, you are welcome to contact the instructor(s) at class sessions, during student office hours, via email, or through this anonymous form: (https://forms.gle/tGZCS72My8jCFuXy6). Any discussions are private and confidential.

Students who think they could benefit from course accommodations are also encouraged to contact the Services for Students with Disabilities (SSD) office at https://ssd.umich.edu. SSD can help you document your needs and create an accommodation plan.

Homework assignments, examinations, and projects will be submitted to Canvas. Assignment structure varies based on the nature of the content, but will largely be computer-based, either using Microsoft Excel or R (both available at no cost to students). Students may submit one homework assignment late up to 3 days (72 hours) from the deadline without penalty. All other late assignments will receive 10% off the original maximum grade for each day beyond the deadline. Late exams will not be accepted without prior instructor approval.

Academic Integrity

As health system leaders, we have an ethical, and often legal, responsibility to act with integrity. Students in this class are expected to model that integrity through their participation and work submitted. This includes not committing plagiarism and not collaborating with others on assessments in which that is not allowed. More information about academic conduct can be found at https://sph.umich.edu/admissions/policies-procedures/mph-mhsa.html.

Team Project

Students will complete one team project during this course. Each team will select their own project related to an operational or policy decision of their choice. Teams will have 3-4 team members and will be assigned by the instructors and designed to include students from a range of experiences based on intake surveys. The report will be graded on content but writing quality will affect the final grade. In addition, each team member will be asked to complete a peer evaluation form that may impact individual grades. More information about the project can be found in the prompt on Canvas.

Final Course Grade Breakdown

Class Participation	5%
Homework	20%
Midterm Exam*	25%
Final Exam*	25%
Team Project	25%

*Like the work you conduct in the real world, exams are open-book, open-notes, open-Internet. Exams will take place ***outside*** of class time and are completed ***independently***.

Final Course Letter Grade

98-100%	A+
94-97%	A
90-93%	A-
87-89%	B+
83-86%	B
80-82%	B-
77-79%	C+
73-76%	C
70-72%	C-
<70%	F

Course Schedule (subject to change if needed)

Date	Course Week	Module	Session Details	Assignments Due	Reading
Aug. 31	1	Decision-Making Basics	Course Intro, Intro to Decision-Making in Healthcare	Assignment: Intake Survey	Tullett, Ch. 1
Sept. 7	2	Decision-Making Basics	Identifying and Quantifying Alternatives	Team Project: Agreements + Project Ideas	Tullett, Ch. 2
Sept. 14	3	Mapping Decisions	Decision Trees	Assignment: Decision Tree	Tullett, Ch. 8, 9.1-9.2
Sept. 21	4	Mapping Decisions	Cost-Effectiveness Analyses	Assignment: CEA	Muenning, Ch. 1-2
Sept. 28	5	Mapping Decisions	Conditional Probabilities	Team Project: Project Brief + Data Acquisition Plan	Tullett Ch. 9.3-9.4 Muenning, Ch. 5
Oct. 5	6	Mapping Decisions	Value of Information	Assignment: VOI of diagnostic test	Tuffaha et al. (2014); Colbourn et al. (2007)
Oct. 12	7	Modeling Decisions Under Uncertainty	Simulation, Part I	(TBD or none)	Tullett, Ch. 8
Oct. 19	8	Modeling Decisions Under	Simulation, Part II	Assignment: Simulation	Abe et al. 2016; Nunes-

		Uncertainty		Design Outline	Vas et al. 2019
Oct. 26	9	Modeling Decisions Under Uncertainty	Simulation, Part III	Team Project: Evaluation outline	Marshall et al. 2015
Nov. 2	10	Modeling Decisions Under Uncertainty	Sensitivity Analyses	Assignment: Waiting Room Simulation	Tullett, Ch. 4, Muenning, Ch. 9
Nov. 9	11	Modeling Decisions Under Uncertainty	Data Visualization	Midterm Exam (take-home)	Groeger (2013); Viégas & Wattenberg (2015)
Nov. 16	12	Communicating Decisions	Attuning Messages	Assignment: Data Visualization Critique	Clark 2018; Lucas 2019
No Class Week of Nov. 23					
Nov. 30	13	Communicating Decisions	Team Project Pitch Sessions	(None)	Bier 2000; Naik et al. 2012
Dec. 7	14	Qualitative Analyses	Probability Elicitation, Failure Modes & Effects Analysis	Assignment: Risk Analysis	Gerosa et al. 2006; Bukowski video
Dec. 14	15	Qualitative Analyses	Final Exam	Team Project Due	*None*