USCPrice
Sol Price School of Public Policy

PPD 599 – ANALYTICS FOR HEALTHCARE MANAGEMENT
Spring 2020, 2 units

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Class Dates & Times
February 7th & 8th – Friday: 2pm -7pm, Saturday: 9am – 2pm
April 3rd & 4th - Friday: 2pm -7pm, Saturday: 9am – 2pm

COURSE DESCRIPTION

This purpose of this 2-unit course is to introduce data analytics that are relevant healthcare management. Analytical capabilities are in great demand in health administration residencies and entry-level positions. Course readings are composed of articles and cases studies that provide background to context of health management and administration tasks. These include readings and case studies that focus on reducing unnecessary hospital visits and increasing outpatient care, analyzing rates of comorbid disease in health system patients, measuring hospital readmission rates, and evaluating hospital spending and patient satisfaction. Using data published by the Centers of Medicare and Medicaid Services (CMS), students will gain insight into the issues mentioned above and will learn how to use Microsoft Excel in order to derive insights from the data. Students will be exposed to large data sets and learn techniques for: data cleaning, implementing functions, grouping sums, averages and other statistics using pivot tables, visualization and graphing, building dashboards. The course provides training in necessary for students entering residency and establishes an analytical foundation for student to build upon.

Students will also access video tutorials that enable them to learn data analytics at their own pace through a step by step process. The value for students will be the ability to play back videos to practice key elements of Microsoft Excel. Analytics assignments will integrate these video tutorials.

Class time is used to review and discuss the analytics component of the assignments. Guest speakers that are healthcare professionals who utilize data analytics will also be invited to present on the types of analytic problems they face in the workplace. Guest speakers will also introduce more advanced, as well as, emerging technologies relevant to health data analytics. These include: Microsoft SQL, Tableau, Data Modeling, and Predictive Analytics.

LEARNING OBJECTIVES

COURSE LEARNING OBJECTIVES	COGNITIVE / AFFECTIVE DOMAIN	LEVEL
1. Synthesize information using large data sets in Microsoft Excel	Cognitive	Syntheses
2. Describe how data is being utilized to identify and create efficiencies in healthcare	Cognitive	Syntheses
3. Conduct core Excel skills including: cleaning, formatting, modeling and mathematical functions	Cognitive	Application
4. Illustrate data in graphical formats for effective presentation	Cognitive	Syntheses
5. Apply Excel functions in order to synthesize data	Cognitive	Application

DATA SOURCES

This class will utilize publicly available data from Centers for Medicare and Medicaid Services at: Data.Medicare.Gov in order structure problem sets that are applicable to student learning. Five data sets in particular will be used in preparation for assignments. Note, each data set along with video tutorials will be made available via Camtasia and posted to Blackboard. These data sets will touch on the following areas:

1. Hospital Readmission Reductions Program
2. Hospital Complications and Deaths
3. Medicare Hospital Spending by Claim
4. Patient Survey: (PCH – HCAHPS) PPS Exempt Cancer Hospitals
5. Outpatient Procedures: Volume

INTERNET-BASED LEARNING
1. In addition to the data sources, we will have weekly internet-based interaction and readings that will provide context and background to the importance of the data sets. Students will be responsible for checking Blackboard throughout the course in order to access video tutorials and perspective on their analytics assignments.

COURSE COMPETENCY OUTLINE

Graduates of the USC Price MHA program will demonstrate 15 core competencies, organized by 6 domains. The main purpose of this competency-based curriculum is to help faculty and students focus on the key knowledge, skills and abilities that students need to develop overall and within each course while they are enrolled in the MHA program so they can succeed in the workforce once they graduate.

The following competency levels indicate what is expected of students to achieve for the competencies this course emphasizes.

- **Beginning (B)** - Recall facts and basic concepts and be able to explain their meaning.
- **Intermediate (I)** - Integrate ideas and draw connections between them. Use information in new situations.
- **Advanced (A)** - Justify a decision or position and produce new or original work

MHA Competency	Level (B/I/A)	Course Objective(s)	Assessment Methods
Domain 1: Knowledge of Health Care Environment			
1.1 Demonstrate knowledge of established and evolving issues in health care, and the ability to apply this knowledge to diverse health organizations	I	Determine how data is being utilized to identify and create efficiencies in healthcare	Discussion Post
Domain 2: Critical Thinking and Analysis			
2.1 Demonstrate the ability to understand a situation, issue or problem by breaking it into smaller pieces and tracing its implications in a step-by-step manner.	I	Determine how data is being utilized to identify and create efficiencies in healthcare	Final Paper
Domain 3: Business and Management Knowledge			
3.2 Understand and use administrative and clinical decision support tools in process and performance improvement.	I	Ability to conduct core Excel skills including: cleaning, formatting, modeling and mathematical functions	Analytics Assignments
Domain 5: Communication			
5.1 Demonstrate the ability to facilitate a group, and to prepare and present cogent business presentations.	I	Illustrate data in graphical formats for effective presentation	Analytics Assignments, Final Paper

COURSE REQUIREMENTS AND FINAL GRADE DETERMINATION

Assignment	Deadlines	Percent of Grade
Analytics Assignments (5 in total)	Bi-Weekly	50%
Participation in Weekly Readings and online tutorials	Weekly	20%
Final Paper	April 20	30%
		100%

ANALYTICS ASSIGNMENTS:

There are 5 required Excel assignments in which students create analytical outputs after watching the video tutorials. The aim of these assignments will be two-fold:

1. To introduce students to real life data analytic problems in healthcare pertaining to quality, costs, patient satisfaction and care volume.
2. To explain how to derive and gather insights from large data sets in order to answer questions pertaining to variation and physician performance

SUMMARY: Below are the descriptions of the five required analytics assignment submissions. Use the links below in order to export your data set into Excel. Most importantly, utilize the video tutorials as sources of reference in order to guide you through Excel.

Assignment #1:
Evaluate Outpatient Procedure Volume by Category of Procedure
This assignment will teach the following functions:
Lookup & Reference Formulas, Pivot Tables and Creating Graphs to Summarize Data
Data Set for Assignment: https://data.medicare.gov/Hospital-Compare/Outpatient-Procedures-Volume/xbz4-gvaz

Assignment #2
Determining Measures of Complications and Death Among Hospitals Across the Nation
This assignment will teach the following functions:
How to Create a Dashboard: Slicers, Pivot Tables, Formatting
Data Set for Assignment: https://data.medicare.gov/Hospital-Compare/Complications-and-Deaths-Hospital/ynj2-r877

Assignment #3:
Medicare Spending by Claim: Evaluating Variation in Claims by Type by State
This assignment will teach the following functions: Excel's logical functions such as the IF, AND, OR and NOT function.
Data Set for Assignment: https://data.medicare.gov/Hospital-Compare/Medicare-Hospital-Spending-by-Claim/nrth-mfg3

Assignment #4:
Evaluating HCAHPS Question & Answers at PPS Exempt Cancer Hospitals
This assignment will teach the following functions: Text Functions, Pivot Tables, and Creating Graphs to Summarize Data
Data Set for Assignment: https://data.medicare.gov/Hospital-Compare/Patient-Survey-PCH-HCAHPS-PPS-exempt-Cancer-Hospit/iy27-wz37

Assignment #5: **Utilizing CMS Data to Evaluate Hospital Readmission Rates**
This assignment will teach the following functions: Count & Sum, Lookup & Reference, Creating Dynamic Graphs
Data Set for Assignment: https://data.medicare.gov/Hospital-Compare/Hospital-Readmissions-Reduction-Program/9n3s-kdb3

Note: Modifications to assignments and datasets may occur throughout the course.

REQUIRED READINGS
Required reading associated with the discussion posts will be included in each discussion post assignment on blackboard.

1. The Opportunities and Challenges of Data Analytics in Health Care
   Paul B. Ginsburg, Andrés de Loera-Brust, Caitlin Brandt, and Abigail Durak
   https://www.brookings.edu/research/the-opportunities-and-challenges-of-data-analytics-in-health-care/

2. Growth in Outpatient Care: The Role of Quality and Value Incentives
   Ken Abrams, Andreea Balan-Cohen, Priyanshi Durbha
   https://www2.deloitte.com/us/en/insights/industry/health-care/outpatient-hospital-services-medicare-incentives-value-quality.html?id=us:2el:3dp:mdrnhlth:awa:lshc:091518

3. Measuring the Quality of Healthcare in the U.S.
   Gary Claxton, Cynthia Cox, Selena Gonzales, Rabah Kamal, Larry Levitt
   https://www.healthsystemtracker.org/brief/measuring-the-quality-of-healthcare-in-the-u-s/

4. The Facts on Medicare Spending and Financing
   Juliette Cubanski, Tricia Neuman Follow, Meredith Freed
   https://www.kff.org/medicare/issue-brief/the-facts-on-medicare-spending-and-financing/

5a. HCAHPS: Patients' Perspectives of Care Survey
    Centers for Medicare & Medicaid Services
    https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/HospitalHCAHPS.html

5b. The Top Five Recommendations for Improving the Patient Experience
    Anne Marie Bickmore, Kathleen Merkley

https://www.healthcatalyst.com/insights/patient-satisfaction-and-outcomes-five-recommendations

6. Top 4 Big Data Analytics Strategies to Reduce Hospital Readmissions
   Jessica Kent
   https://healthitanalytics.com/news/top-4-big-data-analytics-strategies-to-reduce-hospital-readmissions

7a. Dissecting racial bias in an algorithm used to manage the health of populations
    Ziad Obermeyer, Brian Powers, Christine Vogeli, Sendhil Mullainathan
    https://science.sciencemag.org/content/366/6464/447

7b. Benefits, Pitfalls, and Potential Bias in Health Care AI
    Douglas C. Hague
    http://www.ncmedicaljournal.com/content/80/4/219.full

FINAL PAPER:

Your final paper can use any topic we have covered through the analytics assignments or in class. It should be no more than three pages and also leverage the learnings from the class and guest speakers. The prompt of the paper to guide student is the following:

Discuss an area of healthcare where data analytics is being used in order to identify and create efficiencies in order to improve the status quo. Based on your experience throughout this class what is your understanding of how analytics is used by healthcare professional and how do you envision this changing?

Your paper will be graded on the following criteria:

CRITERIA	EXCELLENT	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	NEEDS IMPROVEMENT
Thesis/Focus	Thesis and purpose are clear, closely match the writing task, and provide fresh insight.	Thesis and purpose are fairly clear and match the writing task. Thesis and purpose are somewhat original.	Thesis and purpose are somewhat vague and/or only loosely related to the writing task, and/or unimaginative	Reader cannot determine thesis & purpose and/or thesis has no relation to the writing task.

CRITERIA	EXCELLENT	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	NEEDS IMPROVEMENT
Organization	Fully supports thesis & purpose. Sequence of ideas is effective. Transitions are smooth and effective	Organization supports thesis and purpose. Transitions are generally appropriate. However, sequence of ideas could be improved	Some signs of logical organization in support of the thesis. Transitions are abrupt, illogical, and/or ineffective.	Unclear organization and/or organizational plan is inappropriate to thesis and/or no transitions.
Support	Substantial logical development of ideas. Assumptions are made explicit. Details are germane, original, and convincingly interpreted	Offers solid but less original reasoning. Assumptions are not always recognized or made explicit. Contains some appropriate details or examples	Offers some support that may that may be dubious, too broad or obvious. Details are too general, not interpreted, irrelevant to thesis, or inappropriately repetitive	Offers simplistic, undeveloped, or cryptic support for ideas; inappropriate or off-topic generalizations; faulty assumptions; and/or errors of fact.
Sources	Uses **at least three sources** to support, extend, and inform, but not substitute for writer's own development of ideas. Skillfully combines material from a variety of sources. Always conforms to style manual.	Uses sources to support, extend, and inform the writer's own development of ideas. Appropriately uses quotes, but may not always conform to required style manual.	Uses relevant sources but substitutes them for the writer's own ideas. Quotations and paraphrases may be too long and/or inconsistently referenced.	Fails to use sources and/or overuses quotations or paraphrasing and/or uses source material without acknowledgement.

CRITERIA	EXCELLENT	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	NEEDS IMPROVEMENT
Style	Sentences are varied, complex, and employed for effect. Diction is precise, appropriate, using advanced vocabulary. Tone is mature, consistent, suitable for topic and audience. Adheres to required length.	Sentences show some variety & complexity. Uneven control. Diction is accurate, generally appropriate, less advanced. Tone is appropriate. Adheres to required length.	Sentences show little variety, simplistic. Diction is somewhat immature; relies on clichés. Tone may have some inconsistencies in tense and person	Superficial and stereotypical language. Oral rather than written language patterns predominate
Conventions	Essentially error free. Evidence of superior control of diction	Grammar and syntax are correct with very few errors in spelling or punctuation	Repeated weaknesses in mechanics and usage. Pattern of flaws.	Mechanical and usage errors so severe that writer's ideas are difficult to understand

USC GRADING POLICY

GRADE	CRITERIA
A	Work of excellent quality
B	Work of good quality
C	Minimum passing for graduate credit
C- or below	Failing grade for graduate credit

ADDITIONAL POLICIES

Incomplete (IN) is assigned when work is not completed because of documented illness or other "emergency" occurring after the twelfth week of the semester (or the twelfth week equivalent for any course that is scheduled for less than 15 weeks). **Registrar's Note:** Recommended definition of emergency: "A situation or event which could not be foreseen and which is beyond the student's control, and which prevents the student from taking the final examination or completing other work due during the final examination period. Also note that as defined above, a student may not request an IN before the end of the twelfth week (or twelfth week equivalent for any course scheduled for less than 15 weeks); the rationale is that the student still has the

option to drop the course until the end of the twelfth week (or twelfth week equivalent). The grade of IN exists so there is a remedy for illness or emergency which occurs after the drop deadline.

Marks of IN must be completed within one year from the date of the assignment of the IN. If it is not completed within the specified time limit, marks of IN will automatically become a marks of IX (expired incomplete) with the exception of thesis, dissertation, and non-letter-graded courses, and are computed in the GPA as a grade of F (zero grade points). A student may petition the Committee on Academic Policies and Procedures (CAPP) for an extension of time to complete an Incomplete.

COURSE OUTLINE

DATE	TOPIC
Week 1: January 12	**Course Kickoff:** • Online Introduction/Introduction to Video Tutorials for Class Assignments • **Required Reading & Discussion Post**: The Opportunities and Challenges of Data Analytics in Health Care. https://www.brookings.edu/research/the-opportunities-and-challenges-of-data-analytics-in-health-care/ • Due Date: January 19th 11:59 PM
Week 2: January 19	• **Required Reading & Discussion Post**: Growth in Outpatient Care: The Role of Quality and Value Incentives. https://www2.deloitte.com/us/en/insights/industry/health-care/outpatient-hospital-services-medicare-incentives-value-quality.html?id=us:2el:3dp:mdrnhlth:awa:lshc:091518 • Due Date: January 26th 11:59 PM • **Video Tutorial 1**: Lookup & Reference Formulas, Pivot Tables and Creating Graphs to Summarize Data Analysis
Week 3: January 26	**Analytics Assignment #1 Due: February 2nd 11:59 PM**

Week 4: **February 2**	**First Class Session** **(February 7-8)** • Course Overview & Introductions • Assignment Review & Discussion • Excel Tips and Shortcuts • Guest Speaker: Utilizing Data, Analytics & Excel in Consulting • Guest Speaker: Introduction to Other Methods of Data Analytics (SQL, Python, Tableau) • Guest Speaker: Utilizing Data to Identify Interventions for High Risk Populations • Career Roundtable
Week 5: **February 9**	• **Required Reading & Discussion Post**: Measuring the Quality of Healthcare in the U.S. https://www.healthsystemtracker.org/brief/measuring-the-quality-of-healthcare-in-the-u-s/ • Due Date: February 16th 11:59 PM • **Video Tutorial 2**: How to Create a Dashboard
Week 6: **February 16**	**Analytics Assignment #2 Due: February 23rd 11:59 PM**
Week 7: **February 23**	• **Required Reading & Discussion Post**: The Facts on Medicare Spending and Financing https://www.kff.org/medicare/issue-brief/the-facts-on-medicare-spending-and-financing/ • Due Date: March 1st 11:59 PM • **Video Tutorial 3**: Logical Functions, Pivot Tables & Graphs
Week 8: **March 1**	**Analytics Assignment #3 Due: March 8th 11:59 PM**
Week 9: **March 8**	• **Required Readings & Discussion Post**: HCAHPS & Top 5 Recommendations for Improving the Patient Experience o https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/HospitalHCAHPS.html

	○ https://www.healthcatalyst.com/insights/patient-satisfaction-and-outcomes-five-recommendations • Due Date: March 15th 11:59 PM • **Video Tutorial 4**: Text Functions, Pivot Tables & Graphs
March 15	**Spring Recess**
Week 10: March 22	**Analytics Assignment #4 Due: March 29th 11:59 PM**
Week 11: March 29	**Second Class Session** **(April 3-4)** • Assignment Review & Discussion • Excel Functions, Tips, and Shortcuts • Guest Speaker: Financial Modelling: Evaluating Mergers and Acquisitions in Healthcare • Guest Speaker: Utilizing Data to Evaluate and Implement Alternative Payment Models • Career Roundtable
Week 12: April 5	• **Required Reading and Discussion Post**: Top 4 Big Data Analytics Strategies to Reduce Hospital Readmissions. https://healthitanalytics.com/news/top-4-big-data-analytics-strategies-to-reduce-hospital-readmissions • Due Date: April 12th 11:59 PM • **Video Tutorial 5**: Count & Sum, Lookup & Reference, Creating Dynamic Graphs
Week 13: April 12	**Analytics Assignment #5 Due: April 19th 11:59 PM**
Week 14: April 19	○ **Required Readings and Discussion Post**: Dissecting Racial Bias in an Algorithm Used to Manage the Health of Populations & Benefits, Pitfalls, and Potential Bias in Health Care AI

	○ https://science.sciencemag.org/content/366/6464/447 ○ http://www.ncmedicaljournal.com/content/80/4/219.full ○ Due Date: April 26th 11:59 PM
Week 15: **April 26**	**Final Paper Due: May 3 11:59 PM**

USC Student Affairs

APPENDIX A: ACADEMIC DISHONESTY SANCTION GUIDELINES

Violation	Recommended Sanction for Undergraduates*
Copying answers from other students on any course work. **	F for course.
One person allowing another to cheat from his/her exam or assignment.	F for course.
Possessing or using material exam (crib sheets, notes, books, etc.) which is not expressly permitted by the instructor.	F for course.
Continuing to write after exam has ended.	F for course.
Taking exam from room and later claiming that the instructor lost it.	F for course and recommendation for further disciplinary action (possible suspension).
Changing answers after exam has been returned.	F for course and recommendation for further disciplinary action (possible suspension).
Fraudulent possession of exam prior to administration	F for course and recommendation for suspension.
Obtaining a copy of an exam or answer key prior to administration	Suspension or expulsion from the university; F for course
Having someone else complete course work for oneself.	Suspension or expulsion from the university for both students; F for course.
Plagiarism – Submitting other's work as one's own or giving an improper citation.	F for course.

Submission of purchased term papers or papers done by others.	F for the course and recommendation for further disciplinary action (possible suspension).
Submission of the same assignment to more than one instructor, where no previous approval has been given.	F for course.
Unauthorized collaboration on an assignment.	F for the course for both students.
Falsification of information in admission applications (including supporting documentation).	Revocation of university admission without opportunity to reapply.
Documentary falsification (e.g., petitions and supporting materials; medical documentation).	Suspension or expulsion from the university; F for course when related to a specific course
Plagiarism in a graduate thesis or dissertation.	Expulsion from the university when discovered prior to graduation; revocation of degree when discovered subsequent to graduation. ***

* Assuming first offense
** Exam, quiz, tests, assignments or other course work.
*** Applies to graduate students

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
studenthealth.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention and Services (RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call
studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED)- (213) 740-5086 | Title IX – (213) 821-8298
equity.usc.edu, titleix.usc.edu
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following *protected characteristics*: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical

disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations. The university also prohibits sexual assault, non-consensual sexual contact, sexual misconduct, intimate partner violence, stalking, malicious dissuasion, retaliation, and violation of interim measures.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
usc-advocate.symplicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776
dsp.usc.edu
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710
uscsa.usc.edu
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101
diversity.usc.edu
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
dps.usc.edu, emergency.usc.edu
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu
Non-emergency assistance or information.