

# MS IN HEALTHCARE POLICY AND RESEARCH

## SAMPLE CAPSTONE PROJECTS

### NEWYORK QUALITY CARE

#### Addressing Social Determinants of Health: Actionable Insights for an Accountable Care Organization

"Social Determinants of Health (SDoH) refer to the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life." These conditions are complex, interconnected, and they can adversely impact a patient's long-term health outcomes. In this project, students used mixed-methods research to provide actionable insights for New York Quality Care (NYQC)—the accountable care organization (ACO) of Weill Cornell Medicine, Columbia and New York-Presbyterian—on how to improve its efforts to address the SDoH needs of its patients. Students conducted an empirical analysis of NYQC's Medicare claims data to examine spending and utilization at the ACO. In addition, students conducted semi-structured interviews with the ACO's care management and clinical documentation team leads. Based on the findings, students provided NYQC with a list of 7 recommendations to help the ACO adequately address the SDoH needs of its patient population with the goal of reducing unnecessary health care spending and improving patient outcomes.

### WEILL CORNELL GRADUATE SCHOOL OF MEDICAL SCIENCES, DEPARTMENT OF POPULATION HEALTH SCIENCES

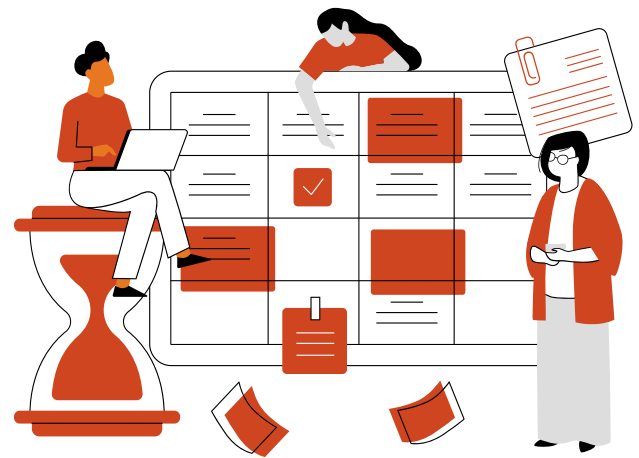
#### Cost Effectiveness of Annual Prostate MRI Guided Biopsy for Treatment of Prostate Cancer

MRI and MRI-guided biopsy enable enhanced identification of clinically significant Prostate Cancer (PCa). Through targeted biopsies, they reduce invasiveness. Yet, there is a lack of evidence for their cost-effectiveness as screening tools. Students examined the cost-effectiveness of integrating MRI and MRI-guided biopsy to predict outcomes of men being screened for PCa. A decision-analytic Markov model was constructed from a federal payer perspective with a 10-year time horizon and a 65-year-old male assigned for the base case. The model was simulated separately for four different prostate-specific antigen (PSA) levels using Monte Carlo microsimulation with 100,000 trials. The input values of probabilities, costs, and quality-adjusted life years (QALY) for the model were derived from the literature and expert consultation from medical professionals. Cost-effectiveness was calculated through incremental cost-effectiveness ratios (ICER). One-way sensitivity analyses were performed using key parameters for the two strategies. The parameters included the sensitivity and specificity of the tests.

### HEALTH RECOVERY SOLUTIONS

#### Risk Prediction for Congestive Heart Failure Patients with Natural Language Processing

Health Recovery Solutions (HRS) offers a telehealth software platform for home health care (HHC) agencies that allows better connection between patients, clinical professionals, and healthcare personnel. For this project, students conducted a retrospective observational study on patients enrolled in HHC after getting discharged from acute care. The data used in the study was de-identified data, per HIPPA rules, from the HRS platform to explore the health status of patients and predict the risk of re-hospitalization. The data contained structured information including biometrics (like blood pressure, age, etc.) and preexisting conditions assigned by clinicians, as well as



unstructured data including notes from clinicians for patients, and health survey data. Feature engineering was performed on longitudinal data to develop a feature matrix for each patient in the data set. One set of classification models targeted the structure data and, among those, SVM classifier produced the best recall rate for both outcomes. Another set of NLP models was built to predict rehospitalization using the clinical notes data. Cross-validation was performed to choose the best performing models and the test results from those that were assembled using a weighted average to obtain a classifier with higher recall and accuracy than any individual model. These predictions are intended to improve health outcomes of HHC by prompting the clinician for an intervention and preventing unplanned hospitalizations or irreversible damage to patients' health.

### HEALTH AND HOPE MYANMAR

#### mHealth in Myanmar: Community-Based Participatory Design of a Population Health Surveillance Data Collection Application Organization

Myanmar's Chin people face multiple cultural, structural, and institutional barriers to accessing adequate healthcare. Health and Hope Myanmar (HHM) and Health and Hope UK (HHUK), community partners in this work, are the only providers of healthcare services to the ethnic minority regions of the Chin. A barrier to understanding health needs and implementing new programs involves a lack of actionable population-level health surveillance data. Weill Cornell Medicine students worked collaboratively with HHM to create mobile technology-based surveillance forms to improve data collection methods and increase accuracy. More accurate surveillance data will help HHM understand the state's greatest health concerns, then implement and evaluate programs to address related issues. Students conducted a workflow analysis of existing paper-based data collection forms by interviewing the key stakeholders from HHUK and HHM, including the midwives, traditional birth attendants (TBAs), and community health workers (CHWs). Students used CommCare, an open-source platform designed by Dimagi, specifically for data collection in low-resource settings, to facilitate design of the mobile phone-based application. They also iteratively created prototype designs of the data collection tools. Students employed a user-centered, participatory design approach that actively elicited feedback from the stakeholders in the design process to help ensure the design met their requirements and was usable in the specific context. The students' final product involved a mobile health-based application for population health surveillance data collection.