Summer Student Research Program
Project Description

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E-MAIL: aziz.merchant@rutgers.edu

PROJECT TITLE (200 Characters max): Surgical Outcomes Analysis Using Large Administrative Datasets: The National Inpatient Sample and National Surgical Quality Improvement Program

HYPOTHESIS:
Large datasets can allow analysis of surgical disease outcomes while recognizing important contributing factors such as healthcare cost health disparities, socioeconomic factors, other environmental factors, and medical co-morbidities.

PROJECT DESCRIPTION (Include design, methodology, data collection, techniques, data analysis to be employed and evaluation and interpretation methodology)

Study Objectives:

1. Utilize large, publicly available datasets to describe the factors that affect the epidemiology and outcomes of surgery.
   a. Describe the prevalence and incidence of certain surgical disease processes in the United States, such as gallbladder, hernia, appendicitis, diverticulitis, and other surgical emergencies.
   b. Study trends over time, from rates of surgery to complications and socioeconomic factors.
   c. Analyze important patient and environmental factors in surgical disease outcomes.
      i. Complications, health services utilization, late effects, and mortality.
2. Develop independent ideas for research with real clinical implications.
3. Topics of research include, but are not limited to:
   a. Emergency general surgery
   b. Health Disparities (Race, economic status, insurance) and surgical outcomes
      i. Socio-economic, demographic, geographical and clinical factors associated with access to quality surgical care
   c. Minimally Invasive surgery and outcomes
   d. Robotic surgery outcomes
   e. Surgery and Frailty in the elderly
   f. Surgical quality improvement

Methods

1. We use large datasets and metadata from:
   A. Nationwide Inpatient Sample
   B. National Surgical Quality Improvement program
   C. Other Datasets depending upon availability
      I. Surveillance, Epidemiology, And End Results Program (SEER)
      II. CDC databases
      III. EPIC-Electronic Medical Records
      IV. Vizient and University Hospitals Consortium

2. We will analyze patient and disease characteristics including prevalence, age, sex, race, household income, and geographic location to determine correlations with disease prevalence.

3. Focus will be on the relationship of outcomes of care and prevalence to healthcare disparities in race, gender, and socioeconomic status, as well as emergency general surgery, laparoscopy/robotics, frailty/elderly outcomes in surgery.
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Pre-requisites:

Medical Students interested in these projects must have a working fluent knowledge of biostatistical techniques such as logistic/linear regression, cleaning of data from databases, propensity matching, etc. In addition, they must be able to use SAS or SPSS (or comparable statistics package). There is no biostatistician that we work with, so the students must be comfortable in the above basic analytical techniques.

Students participating in the above research will be expected to complete the research project to manuscript publication. This will involve study initiation, IRB protocol submission, data analysis, manuscript writing and revision, manuscript submission, and addressing reviewer’s comments from journals. Students will learn and be mentored through all parts of the process of manuscript preparation and submission.

Projects general take up to six months to one year from start to finish, sometimes more or less. Students are welcomed to stay on for as many projects as they want, but they must complete the first project. The projects will extend beyond the summer and the expectation is that students will continue beyond this time period to complete the project.

This project(s) will be of interest to medical students looking to establish a track record of publishing manuscripts and research in surgical outcomes and disparities.

**SPONSOR’S MOST RECENT PUBLICATIONS RELEVANT TO THIS RESEARCH**

**PUBLICATIONS:**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
<th>Publication</th>
<th>Year</th>
</tr>
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<tbody>
<tr>
<td>Elsamna, Samer; Elkattawy, Omar; Merchant, Aziz M;</td>
<td>Association of metabolic syndrome with morbidity and mortality in emergency general surgery</td>
<td>The American Journal of Surgery</td>
<td>2020</td>
</tr>
<tr>
<td>Gantz, Owen; Mulles, Shanen; Zagadailov, Pavel; Merchant, Aziz M;</td>
<td>Incidence and Cost of Deep Vein Thrombosis in Emergency General Surgery Over 15 Years</td>
<td>Journal of Surgical Research</td>
<td>2020</td>
</tr>
<tr>
<td>Gupta, A; Cadwell, JB; Merchant, AM;</td>
<td>Social determinants of health and outcomes of ventral hernia repair in a safety-net hospital setting</td>
<td>Hernia</td>
<td>2020</td>
</tr>
<tr>
<td>Patel, Richa; Patel, Krishan S; Alvarez-Downing, Melissa M; Merchant, Aziz M;</td>
<td>Laparoscopy improves failure to rescue compared to open surgery for emergent colectomy</td>
<td>Updates in Surgery</td>
<td>2020</td>
</tr>
<tr>
<td>Elsamna, Samer T; Hasan, Saif; Shapiro, Michael E; Merchant, Aziz M;</td>
<td>Factors contributing to extended hospital length of stay in emergency general surgery</td>
<td>Journal of Investigative Surgery</td>
<td>2020</td>
</tr>
<tr>
<td>Fiorentino, Michele; Mulles, Shanen; Cue, Lauren; Merchant, Aziz M; Tufariello, Ann; Cummings, Dustin; Onwubalili, Kenechi; Glass, Nina E;</td>
<td>High Acuity of Postoperative Consults to Emergency General Surgery at an Urban Safety Net Hospital</td>
<td>Journal of Surgical Research</td>
<td>2021</td>
</tr>
<tr>
<td>Nair, Prachi; Trivedi, Radhika; Hu, Patrick; Zhang, Yingting; Merchant, Aziz M;</td>
<td>Low-molecular weight vs. unfractionated heparin for prevention of venous thromboembolism in general surgery: a meta-analysis</td>
<td>Updates in Surgery</td>
<td>2020</td>
</tr>
<tr>
<td>Gao, Jeff; Zagadailov, Pavel; Merchant, Aziz M;</td>
<td>The Use of Artificial Neural Network to Predict Surgical Outcomes After Inguinal Hernia Repair</td>
<td>Journal of Surgical Research</td>
<td>2020</td>
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<td>Congiusta, Dominick V; Oettinger, Jason Paul; Merchant, Aziz M; Vosbikian, Michael M; Ahmed, Irfan H;</td>
<td>Epidemiology of orthopaedic fractures due to firearms</td>
<td>Journal of Clinical Orthopaedics and Trauma</td>
<td>2020</td>
</tr>
<tr>
<td>Congiusta, Dominick V; Amer, Kamil M; Otero, Katie; Metrione, Michael; Merchant, Aziz M; Vosbikian, Michael; Ahmed, Ifran;</td>
<td>Differences in the Predictive value of Elixhauser Comorbidity Index and the Charlson Comorbidity indices in patients with hand infections</td>
<td>Journal of Clinical Orthopaedics and Trauma</td>
<td>2021</td>
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### ABSTRACTS/POSTERS:

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2. Summer Student Research Program Symposium, Rutgers-New Jersey Medical School, 2016, Newark NJ. The Impact Of Frailty On Morbidity And Mortality Following Open Emergent Colectomies.


5. Integrative Health Symposium, Rutgers Biomedical and Health Sciences, Newark NJ May 2015. The Association of Insurance Status with Complicated Inguinal Hernia Presentation.

6. Detroit Surgical Association, March 2013, Detroit, MI. Single incision robotic cholecystectomy vs Multiport robotic cholecystectomy: systematic review and pooled analysis.

7. Detroit Surgical Association, January 2013, Detroit, MI. Analysis Of Outcomes Of Diabetic And Nondiabetic General And Vascular Surgery Patients Oral Presentation


IS THIS PROJECT SUPPORTED BY EXTRAMURAL FUNDS?
Yes ☐ or No ☒
(IF YES, PLEASE SUPPLY THE GRANTING AGENCY’S NAME)
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THIS PROJECT IS:  ☑ Clinical  □ Laboratory  □ Behavioral  □ Other

THIS PROJECT IS CANCER-RELATED □
Please explain Cancer relevance

THIS PROJECT IS HEART, LUNG & BLOOD-RELATED □
Please explain Heart, Lung, Blood relevance

THIS PROJECT EMPLOYS RADIOISOTOPES □

THIS PROJECT INVOLVES THE USE OF ANIMALS □
Pending □  Approved □  IACUC Protocol #

THIS PROJECT INVOLVES THE USE OF HUMAN SUBJECTS □
Pending □  Approved □  IRB Protocol # M

THIS PROJECT IS SUITABLE FOR: MEDICAL STUDENTS
Undergraduate Students □  Entering Freshman  ☑
Sophomores □  All Students  ☑

THIS PROJECT IS/CAN BE WORK-STUDY:  Yes ☑  or  No □

THIS PROJECT WILL BE POSTED DURING ACADEMIC YEAR FOR INTERESTED VOLUNTEERS:  Yes ☑  or  No □

WHAT WILL THE STUDENT LEARN FROM THIS EXPERIENCE?

The overall goals of the Research Program are to:

1. Allow motivated medical students of any level to participate in mentored research projects for a minimum of 8-10 weeks or even longer as desired by the student during Medical School.
2. Introduce/enhance medical students understanding of clinical research principles as it applies to clinical data, health, disparities, and surgical outcomes.
3. Provide a strong foundation in the ethical conduct of research and understanding of the Institutional Review Board (IRB) process.
4. Strengthen skills in critical evaluation of data and reinforce the concept of evidence-based medicine.
5. Broaden medical students knowledge of the role and relevance of research to clinical medicine.
6. Develop basic skills of oral and written presentation, poster presentation, and Manuscript preparation and submission.