Food Allergy Tool: Eosinophilic Esophagitis Elimination Diet

Food allergies and sensitivities are common in the general population with an estimated 3-4% of people suffering from a true allergy to a specific food group and another 5-10% with a reported sensitivity. Though many reactions could be prevented by avoiding allergens, an estimated 30,000 emergency department visits per year occur because of inadvertent exposures. The most frequent food groups implicated include wheat, soy, eggs, shellfish/seafood, nuts, and dairy products. These are the same food groups implicated and often eliminated in a number of other diseases including eosinophilic esophagitis (EoE). Food elimination diets are therefore becoming critical for decreasing morbidity and mortality in both patients with EoE as well as other conditions worldwide. We envision this resource as a food diary application that would alert patients to exposures thereby providing real time feedback, aid in meal preparation by providing sample menus, and improve communication between patient and provider by allowing users to download their food diaries.

User Setting: Patients with Eosinophilic Esophagitis

UPHS Manager: Dr. Kristle Lynch, Assistant Professor, Gastroenterology
Dr. Carolyn Newberry, Fellow, Gastroenterology
Hospital of the University of Pennsylvania

Students (CIS 557): Yan Gao, Zixing Li, Boyi He,
Talia Statsky-Frank (Project Manager)
School of Engineering and Applied Sciences

Penn Memo Update: Nursing Communication Platform

Announcements to clinical nurses at the Hospital of the University of Pennsylvania (HUP) come in the form of 20-50 emails daily, which are not organized, customized, or prioritized in a way to ensure that nurses can easily find information relevant to patient care. In addition, there is no feedback to the sender of the email that important announcements are read and understood. The goal of this project is to create a platform to publish announcements to staff that provides consistency, coordination, and custom tailoring. In addition, user behavior can be tracked to close the feedback loop. As a returning mHealth labs project, a number of updates were made to this web application including the ability to add priority messages, message previews, and the ability to embed videos.

User Setting: Nurses at UPHS

UPHS Manager: Suzanna Ho, RN, MSN, Coordinator of Patient Safety and Quality Nursing
Angela Piech, MSN, RN, CCRN, Assistant Nurse Manager, Medical Intensive Care Unit
Hospital of the University of Pennsylvania

Students: Christopher Cahill, Nolan Hill, Allison Schwartz, Michael Sosnick
Talia Statsky-Frank (Project Manager)
School of Engineering and Applied Sciences
**Anesthesia Checklist** and Dashboard  

Currently, attending and resident anesthesiologists at The University of Pennsylvania Health System (UPHS) do not have a standardized method to set up an operating room prior to a surgical operation. Often, it may require 30-40 steps for an anesthesiologist to set up an operating room. This web application will provide a digital checklist to ensure that crucial steps of the setup process are completed in order and will also prompt the anesthesiologist to request special materials ahead of time and reduce time spent waiting in the operating room. This application will also provide a dashboard showing which operating rooms have been set up in order to better facilitate emergency surgical operations.

**User Setting:** Physicians and nurses in the department of Anesthesiology

| UPHS Team: | Dr. Scott Falk, Associate Professor of Anesthesiology and Critical Care, Director of Performance Improvement, Quality, and Safety  
| Dr. Elizabeth A. Valentine, Patient Safety Officer and Assistant Professor, Department of Anesthesia and Critical Care  
| Hospital of the University of Pennsylvania |
| Students: | Allen He, Andrew Wang, Tsun Yeung, Robin Zhang  
| Sahil Ahuja (Project Manager)  
| School of Engineering and Applied Science  
| Monica Poeke  
| University of Pennsylvania School of Nursing |

**My Transplant Navigator**

Patients who are evaluated for transplantation and added to the transplant list are given a packet of complex and often overwhelming information. This patient facing web application will provide patients with educational materials about their transplantation. Additionally, recent research has shown that outcomes are improved when patients attempt to optimize their health prior to surgery, a concept known as “pre-habilitation.” In conjunction with a physical therapy team, this app will also provide exercises and nutritional advice for patients waiting to undergo transplantation. The patients will be able to download a copy of their exercise adherence and show their providers during follow up appointments. Further, social support is integral for many of these patients and this app will have functionality that allows invited friends and family to encourage patients once exercises are completed.

**User Setting:** Patients undergoing organ transplantation

| UPHS Team: | Dr. Susanna Nazarian, Assistant Professor, Surgery  
| Derek Zaleski, PT DTP  
| Good Shepherd Physical Therapy |
| Students: | Jerry Chang, Chloe Le, Crystal Lee  
| Jane Lee (Project Manager)  
| School of Engineering and Applied Sciences  
| Michele Chang  
| University of Pennsylvania School of Nursing |
**Medical Education Content** Aggregator

For medical students and residents, there are seemingly infinite resources available to better understand disease processes and management. However, there is currently no website that curates and aggregates this content. This web application will focus on providing medical students and residents content selected by a team of physicians in order to better understand disease management as well as procedural skills. Users will be able to search for a disease or skill (e.g. central line placement) and these are also categorized by rotation within a certain field of medicine. Users will also be able to register for an account and save videos and other content to their “dashboard” for further review.

**User setting:** Medical students and Resident Physicians

| UPHS Team: | Dr. Isaac Matthias, MICU attending  
|           | *Penn Presbyterian Hospital* |
| Students: | Adam Christenson, Addison Shelley, Danielle Lozano, Dillon Lynch, Xavier Islam  
|           | Michael Sosnick (Project Manager)  
|           | *School of Engineering and Applied Sciences* |

**Resident Performance** Visualization Tool

In the emergency department, the resident physicians are provided feedback and metrics on their performance every few months, usually in numerical format on an excel sheet. However, residents currently have no way to assess their performance and efficiency in real time. Especially during training, it may be beneficial for residents to be able to adjust their workflow in order to improve efficiency and patient outcomes. This tool provides physicians with robust visualizations that show their performance including patients seen per hour, patient satisfaction scores, time to discharge, and the proportion of patients leaving against medical advice. Residents will have the ability to view their performance over various time periods.

**User setting:** Physicians in the department of Emergency Medicine

| UPHS Team: | Dr. Alexander Sackeim, Resident Physician, Department of Emergency Medicine  
|           | *Hospital of the University of Pennsylvania* |
| Students: | Xuan Ru Ng, Tony Xiao, Caroline Cai, Andrew Wang  
|           | Allison Schwartz (Project Manager)  
|           | *School of Engineering and Applied Sciences* |
Food Insecurity Screening and Resource Tool

Food insecurity is defined as having limited consistent access to adequate food due to lack of money and other resources. In 2015, 42.2 million Americans lived in food insecure households, including 29.1 million adults and 13.1 million children. Within the CHOP pediatric network, many children may live in food insecure households but there is currently not an electronic way to screen patients for food insecurity. This web based application will allow parents in the waiting room of a pediatric office to take a two question food insecurity screening survey. If they are found to be food insecure, parents will have the option to add their zip code and download resources that shows local resources to help combat food insecurity. Physicians will also receive a message that their patient screened positive for food insecurity so they may intervene as well.

User setting: Patients in pediatric practices within the CHOP primary care network

UPHS Team: Dr. Deepak Palakshappa, Instructor of General Pediatrics at the Center for Pediatric Clinical Effectiveness,
Children’s Hospital of Philadelphia

Students: Patrick Andrade, Cameron Deering, Caitlin Rubin, Anita Tenjarla
Sahil Ahuja (Project Manager)
School of Engineering and Applied Science

Doula Request and Communication Tool

Recent research has shown that having a doula present during births can improve outcomes including shortened duration of labor and decreased rates of cesarean section. One of the key aspects of the involvement of doulas is that they provide emotional and other support by maintaining a “constant presence” throughout labor, providing specific labor support techniques and strategies, encouraging laboring women and their families, and facilitating communication between mothers and medical caregivers. However, there is currently not an automated system that allows nurses within the UPHS system to request a doula for a patient who has expressed interest. In order to improve this process, this communication tool will allow a provider to request a doula from a network of certified volunteers, who can respond and assign themselves to be a doula for that patient. This app aims to improve access to volunteer doula services and increase the proportion of births that have a doula present.

User setting: Patients, nurses, and doulas

UPHS Team: Dawn Durain, CNM, MPH, FACNM, Advanced Senior Lecturer
Mamie Guidera, MSN, CNM, FACNM, Advanced Senior Lecturer
University of Pennsylvania School of Nursing

Students: Hannah Sherry, Nicole Chaney, Megan Poore
University of Pennsylvania School of Nursing, Nurse-Midwifery Program
Talia Statsky-Frank
School of Engineering and Applied Sciences
Research Quest

There are over 15,000 academic publications every year with a much larger number of ongoing research projects awaiting publication. Recruitment for research projects at academic institutions is often delayed by word-of-mouth and email communications, which can be taxing to both research investigators and volunteer researchers. Further, the current process typically involves an informal candidate evaluation, often misappropriating candidate qualifications to project obligations. Research Quest will facilitate researcher recruitment and appropriate collaborations via an online web-based platform that allows research investigators in all disciplines (medicine, political science, computer science) to post their project and recruit future volunteer researchers from their same academic institution.

User setting: Physicians, Nurses, Researchers

UPHS Team: Daniel Mangels, MD
Internal Medicine Resident, Hospital of the University of Pennsylvania

Students: TBD, School of Engineering and Applied Sciences

Radiation Oncology Decision Tool

Currently patients that are diagnosed with bladder cancer have two decisions for their treatment: surgery in the form of a radical cystectomy or radiation therapy. This is often a difficult decision for patients and there is currently not a decision aid tool that patients can utilize. We are going to use novel data from a retrospective analysis of patients with bladder cancer and offer a digital decision aid tool that will help patients make an informed choice about their treatment.

User setting: Physicians, Patients, Nurses, Researchers

UPHS Team: John Christodouleas, MD
Brian Baumann, MD
Department of Radiation Oncology, Hospital of the University of Pennsylvania

Students: TBD, School of Engineering and Applied Sciences
Lifestyle Modification Tool for Patients Undergoing Surgery

Patients who are not connected to the healthcare system or do not regularly see a primary care physician may undergo a surgical operation, which is a unique time to intervene and connect the patient with the health care system and promote lifestyle modifications to improve health. Currently there is an opportunity to reach patients in the preoperative waiting area prior to surgery and provide information on the importance of lifestyle modifications and having a physician they see regularly. The department of anesthesia may be well positioned to provide this information, especially in the form of a digital tool that patients can review while they are waiting for their operation.

User setting: Physicians, Patients, Nurses, Researchers

UPHS Team: Andrew Wong, MD  
Department of Anesthesia, Hospital of the University of Pennsylvania

Students: TBD, School of Engineering and Applied Sciences