

Single Long-term Research Project Integrates In-depth Knowledge and Skill Development
Leading to Scholarship Excellence

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Background Information

Undergraduate students must decide on a research experience that will give them the ability to develop key competencies which professional programs are looking for in their applicants. Many students assume that they must have research experiences in several different labs or clinical settings to develop all their needed competencies. The Difference Makers of the University of Florida Food Science and Human Nutrition Borum Lab questioned if one may attain all the needed competencies through one research experience. We call our members the “Difference Makers” because they collaborate and communicate closely with our pediatric and adult neurology physicians to create Precision Ketogenic Therapy (PKT) care plans that improve the lives of our many patients that have been told there is no answer to their diagnoses and symptoms. These Difference Makers of the Borum Lab are a vast array of undergraduate students with majors including computer science, biology, dietetics, nutritional science, and more. The lab members that interact with the physicians and patients compose the Borum Lab clinical team and are called “KetoBuddies.” KetoBuddies work alongside the aforementioned physicians as they deliver Precision Ketogenic Therapy, providing support to facilitate the treatment. As the KetoBuddies develop further knowledge in academics and more experience within the Borum Lab, they gain many competencies that strengthen their future potential for desirable educational and career positions. This project investigates the competencies gained by each member while in the Borum Lab and the efficiency by which the members have gained them while staying in one singular research project, maintaining the same research question and participants.

Hypothesis

The Difference Makers of the Borum Lab hypothesized that undergraduate researchers will gain a higher quality holistic research experience through a singular integrated research project with a consistent research question and participants that allows them to develop the key competencies to become a top applicant in their future professional endeavors.

Abstract

Healthcare undergraduates pursuing career and education goals face a highly competitive admission process to graduate and professional schools. Applicants are urged to develop and demonstrate a multitude of health professional competencies obtained from a variety of experiences and communicate them in an integrated manner. The Difference Makers in the University of Florida, Food Science and Human Nutrition Borum Lab surveyed lab members to identify key health professional competencies needed to be a top applicant for their future professions and graduate programs. The Difference Makers then supplemented the data with an internet search for current requirements/competencies for healthcare professions and graduate programs. A focus group made up of the Difference Makers deliberated over the survey results and narrowed the competencies to eight:

- Hands-on Patient/Client Interaction
- Soft Skills
- Collaboration Skills
- Critical Thinking and Problem Solving
- Professional Development
- Sustainability/Commitment
- Effective Oral/Written Communication Skills with Diverse Audiences
- Technical Skills for Data Collection, Management, and Analysis

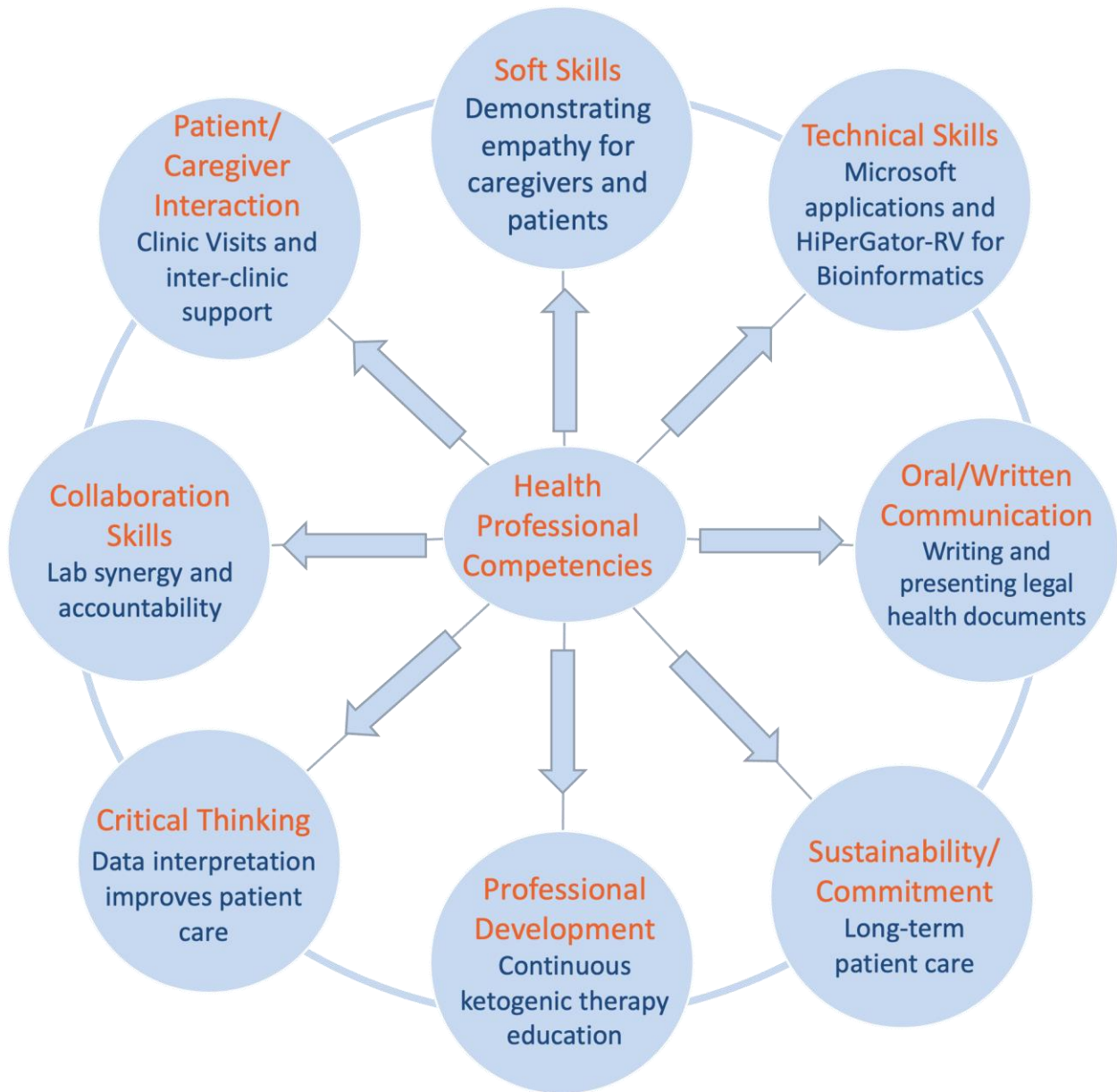
Completing a multitude of research activities as an undergraduate student to cover all the skills is time demanding, not conducive to in-depth learning, and makes it difficult to integrate the demonstration of competences during an interview. The Difference Makers identified examples of activities developing the eight health professional competencies while working in the Borum Lab.

This research highlights the feasibility of obtaining health profession and clinical translational research competencies by overlapping the experiences with skill development when excelling in an extended single extracurricular research program.

Methods

Members of the Clinical Team of the Borum Lab were surveyed about the key competencies of their professional school or career of interest. The results of this survey were then fortified with information gathered through internet research on the qualities that specific graduate programs indicated were desired in an applicant. A focus group comprised of members of the clinical team then deliberated over this data, categorized them into eight key categories of competencies and discussed ways in which these categories can be integrated into a single research experience.

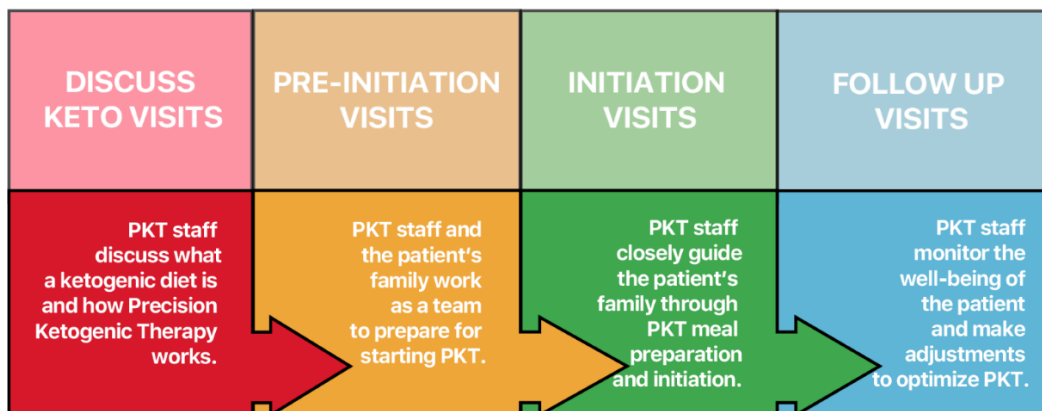
Results



Hands-On Patient/Client Interaction

At the Borum Lab, having productive interactions with patients and their caregivers is a top priority. This entails asking appropriate questions and taking comprehensive notes in telehealth and in-person clinical visits to identify the needs and wants of patients and address their concerns. It also means Difference Makers connect with patients on an individual level to allow for optimal correspondence in between clinic visits, tying back to the important theme of personalized care. This builds valuable healthcare professional skills such as the ability to work with and learn from a diverse set of patients – including gaining exposure to a wide range of patient problems and diagnoses – as well as counseling and treatment management.

THE PKT PROCESS



From start to finish, the PKT Process involves continuous interaction with patients and their caregivers as we work as a team with the physicians to ensure patients are receiving the best care possible. This clear communication allows us to account for their changing needs and preferences so the physicians can adjust their treatment accordingly and in a timely manner.

Reminder Email Draft

Subject: PKT Telehealth Visit

I hope you and are doing well. I am reaching out to remind you of our telehealth visit on Monday the 3rd at 10AM in zoom room . Please let us know if you are still able to attend. As always, we are interested in any data you have. We especially need updated information on ketones, specific gravity, weight, and vitamins and minerals she is taking so we can make sure she is receiving the best treatment possible.

Thank you and we look forward to seeing the both of you,


The PKT Team

Difference Makers draft reminder emails to send to caregivers ahead of their clinic visits as well as other types of emails we may send requesting information, addressing concerns they reached out to us about, or explaining any changes we are making to the patient's treatment, to name a few.

Soft Skills

The Borum Lab's Difference Makers contribute to a variety of areas in the lab that promote the development of a critical set of soft skills. It requires empathy and open-mindedness to hold meaningful conversations with patients, families, and healthcare professionals alike. Difference Makers learn that a treatment plan is only effective if the patient and their family are closely involved in the decision-making process.

Precision Ketogenic Therapy, as its name implies, requires close attention to and measurement of dietary intake that is often unfamiliar to families. Such an adjustment is not always easy and may come with a set of obstacles. It is important that KetoBuddies work towards understanding the initial difficulty that a change in diet often entails, and work towards making the process of initiation as seamless as possible for a patient and their family. This may mean developing a PKT version of a family-favorite recipe. An example of a keto-version of a pizza recipe is shown to the right. These details may seem unremarkable at first glance but make an unprecedented difference in the morale of the family and the sustainability of the treatment.

		129 Cheese Pizza on Cauliflower Crust Meal	3/6/22
		2.5 3/6/22	
		Ingredients	
		127.5 grams	Eat Smart Cauliflower Rice, Serves Four
		22.9 grams	Hunt's Tomato Sauce (canned)
		24.4 grams	Sargento Off the Block, Natural, Traditional Cut, Whole Milk Mozzarella
		22.1 grams	Egg Beaters Original
		0.2 grams	Spices, oregano, dried
		44.2 grams	Crisco Canola Oil with Omega-3 DHA
		Directions	
Prescription		1. Separately weigh the cauliflower, cheese, Egg Beaters, oregano, tomato sauce, and canola oil.	
Ratio	2.5	2. Microwave the weighed cauliflower for about 5 minutes to soften it. Drain out as much water as possible.	
Calories	1800	3. Mix the drained cauliflower with the weighed Egg Beaters until combined.	
Protein	37.2	4. Press the dough onto a parchment lined baking sheet in a circular shape. Preheat the oven to 400F.	
Meals	3	5. Bake the crust for about 25 minutes, or until golden brown and crispy.	
Snacks	1	6. Mix the weighed tomato sauce with the oregano and canola oil. Remove the crust from oven and top with the sauce mixture and weighed cheese.	
Cal/Meal	533.3	7. Put the pizza back into the oven until the cheese is fully melted (approximately 10 minutes). Allow the pizza to cool. Enjoy!	
Cal/Snack	200.0		

During clinic visits with physicians, KetoBuddies must learn to conduct themselves compassionately and professionally. A large part of this is understanding when to ask certain questions and how to phrase these questions in an appropriate manner. This requires being attentive to the climate of the conversation and adjusting one's statements accordingly. Hearing from patients' families is an incredibly rewarding experience, and families have shared many inspiring remarks about the improvements they have seen in the quality of life of their loved ones or about the other impacts personalized treatments have had.

"...never doubt the intelligence of a patient, even if they are not always able to verbalize... We truly appreciate all the support we have received from the Precision Ketogenic Team"

- PKT patient family, <https://borum.ifas.ufl.edu/pkt-for-families/b5a-pkt-patient-experience/>

The process of patient care in the Borum Lab is sustained by a variety of team members and professionals, and hence requires well-developed interpersonal skills. Constructive criticism is expected throughout the process; in their time in the Borum Lab, team members learn that the ability to learn from and provide such criticism is pivotal to their personal and professional development. The documents that KetoBuddies work to prepare before and after clinic visits, called (Pre-Clinic) Comprehensive Epilepsy Forms, serve to inform providers of the patient's PKT status. Such documents are presented to and reviewed by other members of the Borum Lab, including fellow KetoBuddies, prior to being sent to the provider. In these meetings, constructive criticism and questions are encouraged and are a major contributor to quality control of the documents.

Diet Prescription

Current Diet Prescription

- **Date Diet Prescription Implemented:** 01/22/2021
- **PKT Ratio:** 3.5:1
- **Calories:** 1800 kcal/day (64 kcal/kg/day)
- **Protein:** 37 g/day (1.3 g/kg/day)
- **Number of Meals per Day:** 3
- **Number of Snacks per Day:** 1

Proposed Diet Prescription

- **Date Diet Prescription Proposed:** 03/26/2022
- **PKT Ratio:** 3.5:1
- **Calories:** 1800 kcal/day (64 kcal/kg/day)
- **Protein:** 37 g/day (1.3 g/kg/day)
- **Number of Meals per Day:** 3
- **Number of Snacks per Day:** 2

Reason for Diet Prescription Proposal: Increase in number of snacks to account for patient's preferences.

PKT Plan

- Patient has been doing well at the current ratio of 3.5:1, and the family is happy with his height and weight.
- We added another snack into the patient's diet prescription because the family notices the patient sometimes asking for a snack after dinner to accompany his siblings.
- We will continue to monitor the patient's height and weight and make further adjustments to the diet prescription if necessary.

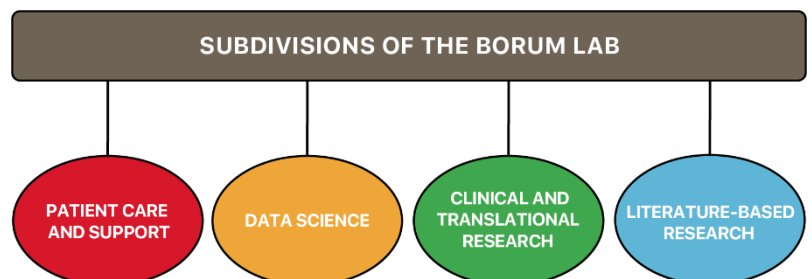
The development of soft skills (empathy, compassion, and consideration of constructive criticism) is essential to the administration of high-quality patient care as well as to the development of professional competency. It is often discussed in the Borum Lab that with increasing personal efforts to develop these skills, the value of an individual's research experience increases. As members of the lab, we are presented with the incredible opportunity to assist in the improvement of a patient's quality of life. By using this invaluable opportunity to fine tune their soft skills, lab members will become better equipped for professional schools and any future endeavors.

Collaboration Skills

The Borum Lab Difference Makers define collaboration as teamwork both within certain areas of the lab, as well as between these areas, all while maintaining self-accountability. This requires respectful communication, listening to colleagues, and coming to a collective decision. Some examples that fall under the category of collaboration skills in most labs include:

- Work effectively in a team and independently
- Organizing other members to work on a common project
- Learning how to delegate tasks
- Engaging with scientific community
- Collaboration with healthcare professionals
- Conflict resolution
- Work well with people of all backgrounds
- Train new members

The Borum Lab has four subdivisions as illustrated in the diagram to the right: patient care and support, data science, clinical and translational research, and literature-based research.

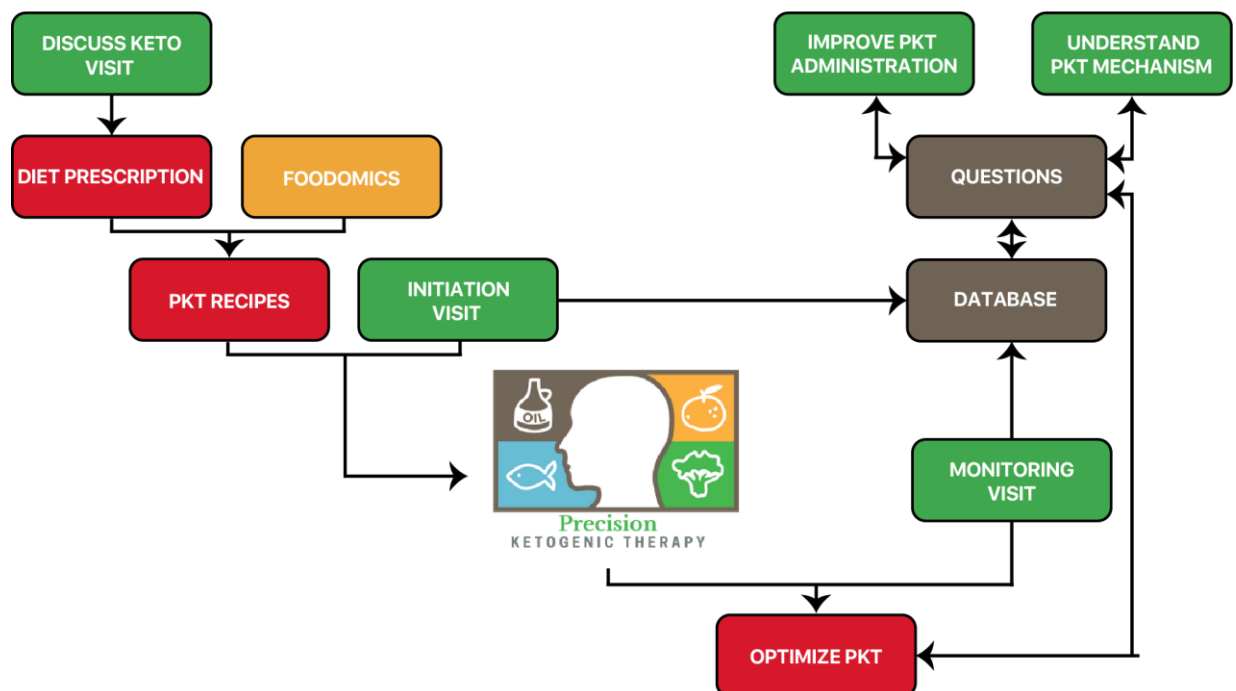


While each team member may not work directly in all four areas, they are expected to be literate in each area of the lab to an extent which they can explain it to a brand-new member and train them thoroughly in each of the four subdivisions. Frequent collaboration is necessary throughout these four areas to not only train new members, but to provide the patients with the optimal care

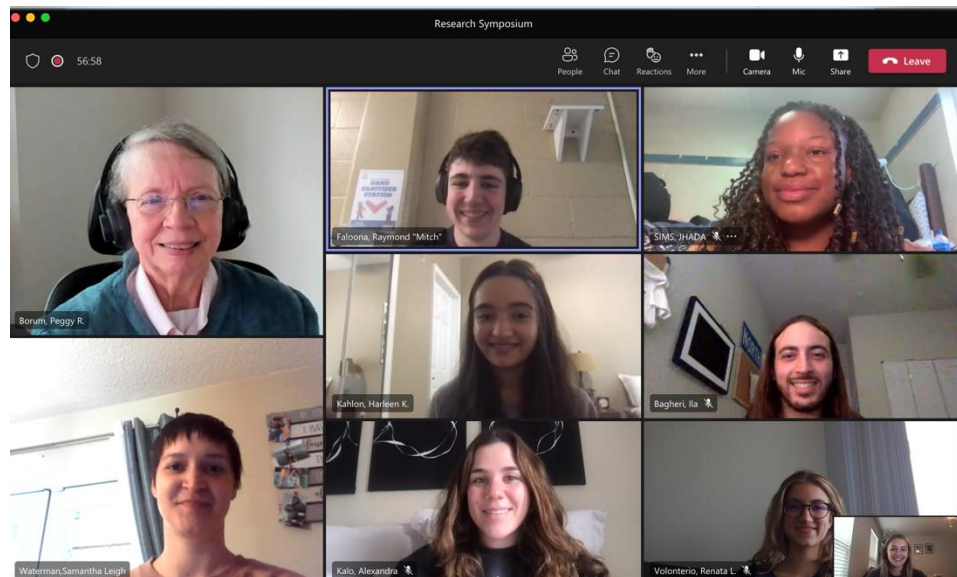
possible. Some examples specific to the Borum Lab that allow our members to further develop their ability to collaborate include:

- Leading team meetings with a variety of lab members from both clinical and data science teams
- Discussing ideas with team members and Dr. Borum and being able to thoroughly present these ideas to a multitude of education levels, experience in the lab, and backgrounds
- Training new lab members and assisting them as needed
- Interdisciplinary work between Foodomics, recipe-making, diet prescriptions, and data entry and analysis
- Interacting and providing information to Dr. Winesett, our pediatric patient provider, and Dr. Bruzzone, our adult patient provider

The above examples allow us to optimize PKT and are further connected by the diagram below.



We can connect and interact with each other at any given time with the use of Microsoft Teams, our primary application for communication and patient information in the Borum Lab. Below you can see a few members of our team that have collaborated to create our presentation for the Center for Undergraduate Research symposium! Even without being in a physical lab together, we fluently communicate and work together on projects of all sizes and intensities to further optimize the care of our patients.



Collaboration with Borum Lab team members, healthcare providers, and professionals within the lab creates a flow of valuable information that directly benefits each patient. Practice collaborating with healthcare professionals improves each member of the Borum Lab and the application of our collaboration is a lifelong skill each Difference Maker can take with them in their future educational and career path.

Critical Thinking and Problem Solving



Critical thinking is a key competency that builds upon other skills needed by health professionals.

The importance and usefulness of critical thinking can be displayed through numerous examples within the Borum Lab. Simply put, each stage of Precision Ketogenic Therapy (PKT) involves some form of critical thinking to accurately interpret results and to improve treatment as a whole.

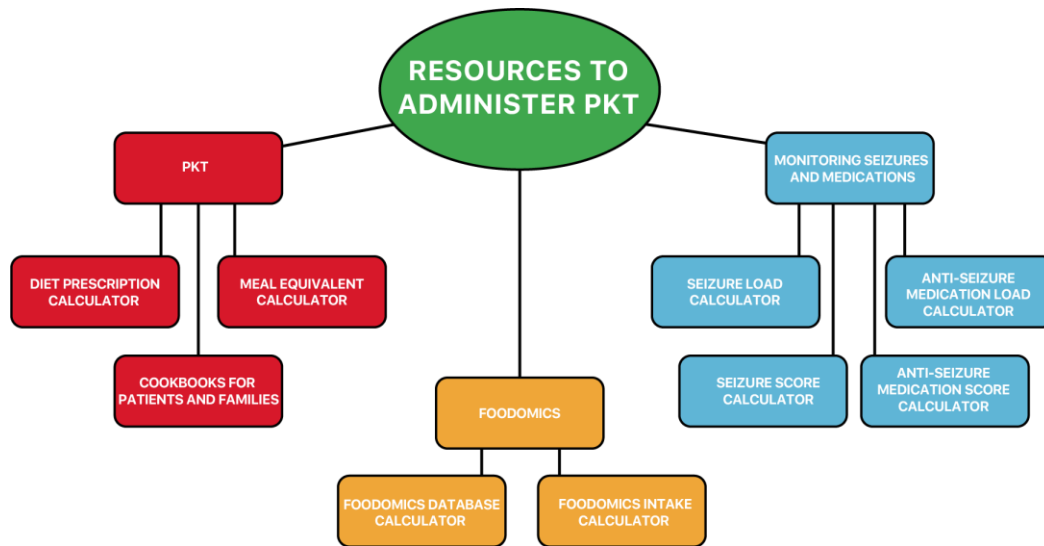
This starts with the Foodomics Database, the foundation of the treatment. When inputted into our Excel document, nutritional data collected from local stores are used in calculations, which are then passed on to other parts of the lab. Critical thinking is used in the Foodomics Database when deciding on foods that will match the preferences of patients while still being affordable; however, it is also used to consider potential areas of improvement (i.e.- including values for specific fatty acids and amino acids).

Next, critical thinking is also used when making recipes for a patient because of the multitude of factors that go into creating these meals. Specifically, the recipe needs to match the diet prescription of the patient (exact amounts of protein, carbohydrate, and fat), all while still being appetizing. An example is shown here, which demonstrates the many criteria that a recipe must meet.

Finally, interpretation of data is crucial when dealing with patient data. For example, the efficacy of the treatment is measured through a variety of metrics, including seizures, urinary ketones, and beta-hydroxybutyrate. By looking at these values

373 Cheesy Taco Eggs with Spinach and Mandarin Oranges Meal 1/21/2022		1/21/22
		
	Ingredients	
	21.3 grams	Kraft Mild Cheddar Cheese (block)
	85.6 grams	Organic Valley Heavy Whipping Cream (Ultra Pasteurized)
	25.6 grams	Egg Beaters Original
	10 grams	Crisco Canola Oil with Omega-3 DHA
	12.9 grams	MCT Oil
	35.1 grams	Del Monte Mandarin Oranges, in water, artificially sweetened, no sugar added (canned)
	47.9 grams	Spinach, raw
	0.5 grams	McCormick Original Taco Seasoning Mix
Prescription	Directions	
	Ratio	4
	Calories	1900
	Protein	27
	Meals	3
	Snacks	0
	Cal/Meal	633.3
	Cal/Snack	0
	1. Weigh the eggs, cream, canola oil, MCT oil, spinach, cheese, and taco seasoning separately. Combine eggs and some cream to increase the volume.	
	2. Add the canola oil to a small pan over medium heat. Add the raw spinach to the pan and allow it to wilt.	
	3. The spinach can be left in the pan to be mixed with the eggs or can be served on the side instead.	
	4. Directly add the egg mixture and taco seasoning to the pan of spinach. You can scramble the eggs or form an omelet by folding in half.	
	5. Grate the weighed cheese and add to the pan to melt over the eggs.	
	6. Drain and then weigh the mandarin oranges to be served on the side.	
	7. Serve the remaining cream and MCT oil on the side as a drink or whipped together.	
	Enjoy!	

over time, we can find trends in the seizure activity of patients, and better deduce possible causes if an issue arises. Overall, critical thinking is clearly used in several areas within the Borum Lab, but also through the collaboration and connections between these areas.

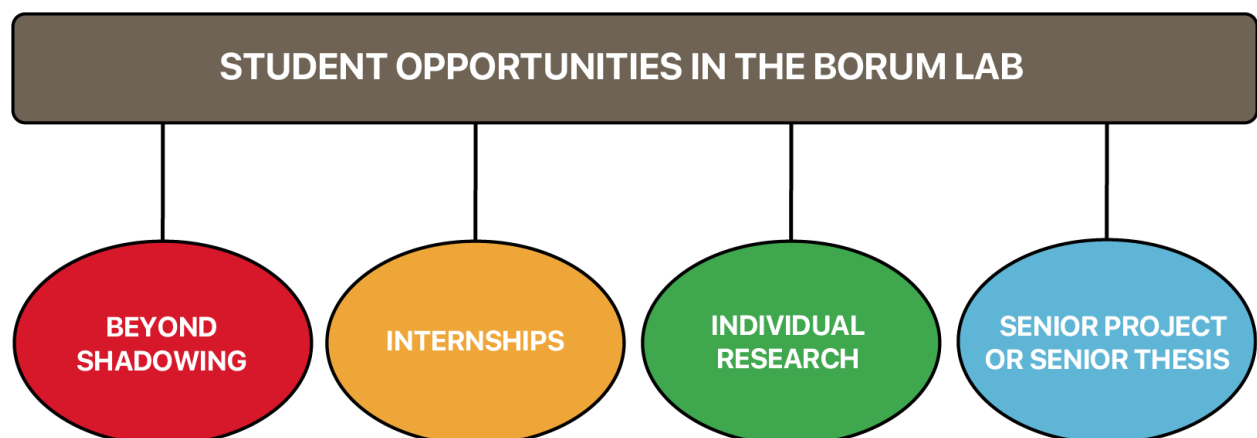


Professional Development

Critical thinking, collaboration skills, soft skills, commitment, and technical skills are competencies that can be acquired in various ways through daily interactions and ongoing relationships through club or jobs, but professional development is not as easily acquired. Professional development is something that can only be acquired through experiences working in the field. The Borum Lab enables students to gain insight to what it means to be professional and how to interact with others and conduct oneself appropriately in a professional setting.

They learn how to accurately converse with peers and professionals to ensure patients receive quality care in an efficient time. They are also afforded the opportunity to lead by example through continuous communication and leading team meetings to progress toward lab goals. Members of the lab continuously educate themselves on the latest advances in ketogenic therapy and scientific literature in order to optimize care for the patient. Through piecing together the components for this research symposium members have learned how to convey the inner workings of the lab in a professional manner. The graphic below depicts a few of the opportunities the lab affords students for them to acquire professional development skills.

Specific examples of professionalism in the lab can be observed in the following examples:

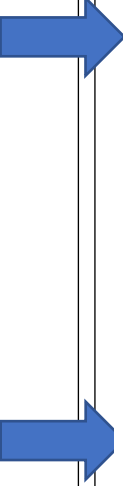


- Leading team meetings
- Having conversations with healthcare professionals during clinic visits, leadership experience through team meetings, developing proficiency in excel/HiPerGator data entry.
- Learning how to address doctors, keeping legal progress notes
- Properly following protocol and SOPs
- Communicating with providers and Dr. Borum about specific patient needs

Sustainability and Commitment

Borum Lab members are committed to patients even on “days off”; they are responsible for answering any urgent concerns which can include a recipe request, sending over an updated medical foods list, or any other crucial patients’ need. Lab members work with the same patient long term and respond to their constantly evolving wants and needs. Each patient has a different diagnosis, so the care and treatment is unique for each patient. Lab members keep track of patient’s specific needs and issues on the Ketogenic Therapy Issues document, pictured below. Lab members are responsible for keeping this document up to date.

Ketogenic Therapy Issues	
Name:	Medical Record #:
Discuss PKT Labs, Scale, Multistix, records, stool samples, in-person visit, IFC,	
Questions to Ask: <u>Caregiver:</u> <u>Email:</u> <u>Preferred contact:</u>	
<u>Seizures:</u> How many seizures does he have a day? How long do they last? What type of seizures does he have?	
<u>Medications:</u> What medications is he currently taking and what dose?	
<u>Supplements:</u> What supplements does he take? Can he send pics of the bottles?	
<u>Laxative:</u> Has he taken MiraLAX or other laxatives?	
<u>Overall Health:</u> What is his diagnosis? What type of physical activity does he participate in and how often? Is he experiencing any sicknesses that would postpone PKT? How are his current bowel movement and voids?	
<u>Date Recorded:</u>	
<u>Height:</u>	
<u>Weight:</u>	
<u>Diet:</u> What is his route of feeding?	







<u>Date Recorded:</u>	
<u>Height:</u> 130 cm	01/18/2022
<u>Weight:</u> 34.1 kg	01/18/2022
<u>Seizures:</u> How many seizures does he have a day? - 2 hard seizures every 1-2 days, 8 seizures per week How long do they last? - Short, about 30 seconds What type of seizures does he have? - Short, spastic, sometimes eye will deviate to the left	
<u>Grocery Stores:</u> What grocery stores does he shop at? - Winn Dixie, Publix Does he use Amazon? - Yes	
<u>Recipe Request:</u> Food dislikes? - Green beans and peas Favorite foods? - Apples, carrots	
<u>Diet:</u> - Have the new recipes at the 2.5 ratio been working out? - Implement Monday - Route of feeding: G-tube	
<u>Issues:</u> - His blood pressure is still high, taking 12.5mg hydrochlorothiazide when blood pressure is about 120 - Dr. Borum suggested an extra flush of water to try and lower his specific gravity - He has been going through periods of hyperactivity. Mom noticed his hyperactivity is less severe as it used to be, although it seems like it is lasting longer than before - Need updated height and weight - Hospitalized in December with COVID	

This document helps lab members become familiar with the patient and allows them to generate specific questions to ask at clinic visits. Lab members oversee the creation of recipes using their precise ketogenic ratio that include the patient's favorite foods, documenting their current issues, and ensuring their patients are completing labs when needed.

The lab members have implemented a planner system to accurately track the tasks they need to complete for each patient. Each patient has their own bucket within the planner card system that includes planner cards lab members will add for tasks that need to be completed. For example, lab members will create a card in their patient's bucket for pre-clinic and post-clinic forms to be sent to the provider, clinic reminder emails to be sent to the families, or for Dr. Borum to propose a new diet prescription for the patient. Before and after a clinic visit, lab members will add the respective planner card, pictured below, to confirm all required tasks for the visit are completed.



PRE-CLINIC PLANNER CARD

Checklist 0 / 12
☒ Show on card

- ☐ Keto Buddy: if you cannot attend visit, reach out to Bianca to find a sub
- ☐ Keto Buddy: create and fill out PCCEF
- ☐ Keto Buddy: update patient summary, make sure all information is up-to-date...
- ☐ Keto Buddy: create folders for upcoming visit, organize patient folder
- ☐ Keto Buddy: make list of missing provider notes/labs, make planner card for ...
- ☐ Keto Buddy: generate questions to ask at clinic visit in Issues document
- ☐ Keto Buddy & Dr. Borum: In weekly meeting, go over pre-clinic items at least ...
- ☒ Keto Buddy: finalize PCCEF  
- ☐ Dr. Borum: send PCCEF to provider
- ☐ Keto Buddy: draft reminder email for patient and add to patient folder...  
- ☐ Dr. Borum: send patient reminder email
- ☐ Keto Buddy: < <personalize the card, add ANY OTHER ITEMS THAT MUST GET...
- ☐ Add an item

POST-CLINIC PLANNER CARD

Checklist 0 / 19
☒ Show on card

- ☐ Keto Buddy: attend clinic visit and take notes
- ☐ Keto Buddy: update patient progress notes
- ☐ Keto Buddy: update patient summary list (including new diet Rx if applicable)
- ☐ Keto Buddy: create patient folders for this visit
- ☐ Keto Buddy: create a new diet Rx with updated values in patient folder
- ☐ Dr. Borum: propose new diet Rx < <insert more details if necessary>>
- ☐ Keto Buddy: fill out CEF for this visit
- ☐ KetoBuddy: Update Issues doc from last visit and for next visit in mind
- ☐ Keto Buddy: Make sure you have provider notes from visit before finishing CEF
- ☐ Keto Buddy & Dr. Borum: meet during weekly meeting to go over CEF
- ☐ Dr. Borum: send CEF to provider
- ☐ Dr. Borum: add provider notes to patient folder from EPIC
- ☐ Dr. Borum: expect < < lab results, records, photos, height, weight, etc., if appli...
- ☐ Keto Buddy: organize patient folder, add relevant notes/updates to Progress ...
- ☐ Keto Buddy: make recipe making planner card, make patient recipes < < delet...
- ☒ Keto Buddy: create and send updated medical foods list to provider ...  
- ☐ Keto Buddy: enter anthropometrics into HyperGator-RV
- ☐ Keto Buddy: enter clinical lab values into HyperGator-RV
- ☐ Keto Buddy: < <personalize the card, add ANY OTHER ITEMS THAT MUST BE ...
- ☐ Add an item

Effective Oral/Written Communication Skills with Diverse Audiences

Well-developed oral and written communication skills are essential for being able to effectively communicate lab concepts and significance between varying audiences. Difference Makers are challenged to clearly communicate with prospecting clients and patients, peers and mentors within the lab, and other researchers. These skills are practiced through common lab procedures such as patient interaction, clinical notes and documentation, and research symposiums, adjusting the correspondence to match who they are addressing and context. Being able to appropriately communicate with prospective patients establishes a well-developed understanding from both perspectives. This ensures researchers know what the patient requires, and prospective patients know what to expect from the lab and the treatment.

ID: AdSOPT.04

Title: Create and Revise a Standard Operating Procedure (SOP)-
Template

Version: 000

Approved by and Date:

I. Purpose

The purpose defines the intent of the document. It should be no longer than one or two sentences.

II. Scope

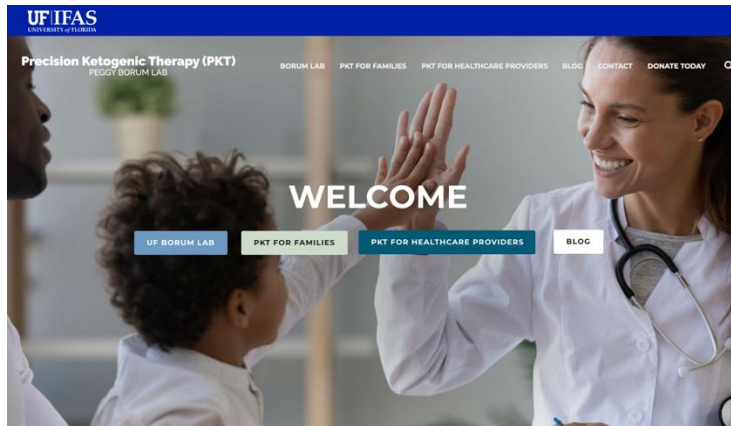
The scope defines why the SOP is need, when it will be used, who will be using it and the benefits of using the SOP.

III. Definitions

A. The definitions section clearly describes any terms that may not be familiar to users. Acronyms or abbreviations should be spelled out.

Being able to communicate objectives and methods clearly to newer members allows for the establishment of organized lab values and procedures. The development of standard operating procedures of lab practices serves as a case for written communication skills. Lab members

must be able to break down procedures in a manner that is comprehensible to incoming lab members.



The Borum Lab website addresses a wide audience from potential patients and questioning parents to inquiring researchers and possible lab members. Given the board range of experiences and interestes each of these groups

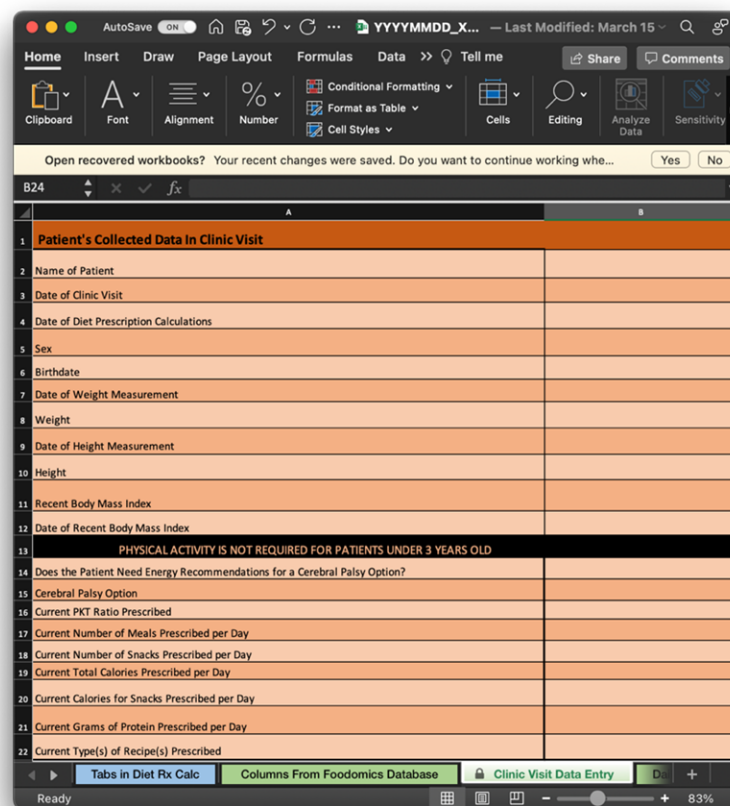
have, Difference Makers must tailor the website entries to meet the appropriate tone. Pages for prospective patients must clearly and coherently explain the therapy process to an audience who may have never heard of ketogenic diet before. Pages targeting other researchers and healthcare professionals may take more of a technical tone, assuming some shared knowledge.

Technical Skills for Data Collection, Management, and Analysis

Clinical members at the Borum lab can develop technical skills in Microsoft Excel, Microsoft Teams and HiPerGator-RV with detailed data entry, analysis, and visualization, as well as utilizing bioinformatics to process patient information in collaboration with data science developers.

Microsoft Excel:

- Creating Diet Prescriptions for patients, where clinical data, such as height and weight are entered, and calculations are done in order to determine the optimal PKT diet for the patient based on their current anthropometrics.



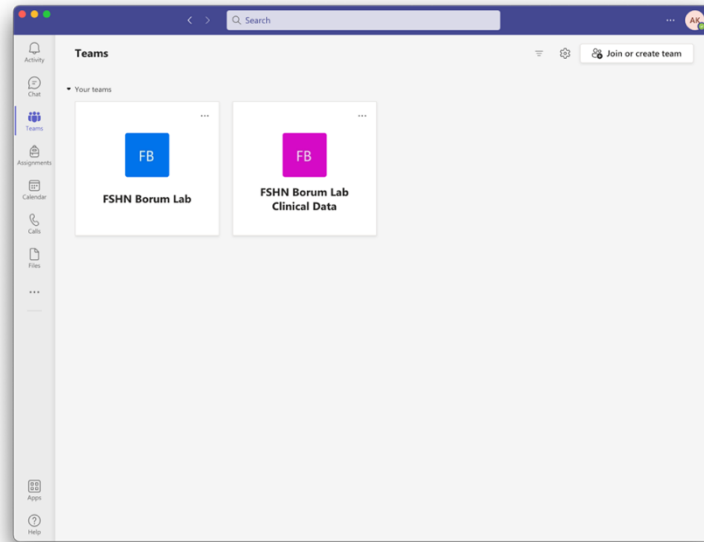
- Using “Meal Equivalents” to calculate meals that meet a patient’s nutritional and PKT requirements. Recipe-makers enter the diet prescription of the patient, the ingredients of the recipes, and balance out the amount of carbohydrates, protein, and fat to meet the desired ratio.

The screenshot shows a spreadsheet application with the title 'YYYY_ME_Meal_Equivalents_HFB_Calculator'. The spreadsheet has columns for patient information, meal details, and nutritional data. A blue arrow points from the spreadsheet to a detailed recipe card for 'Lime Yogurt' dated 3/25/22.

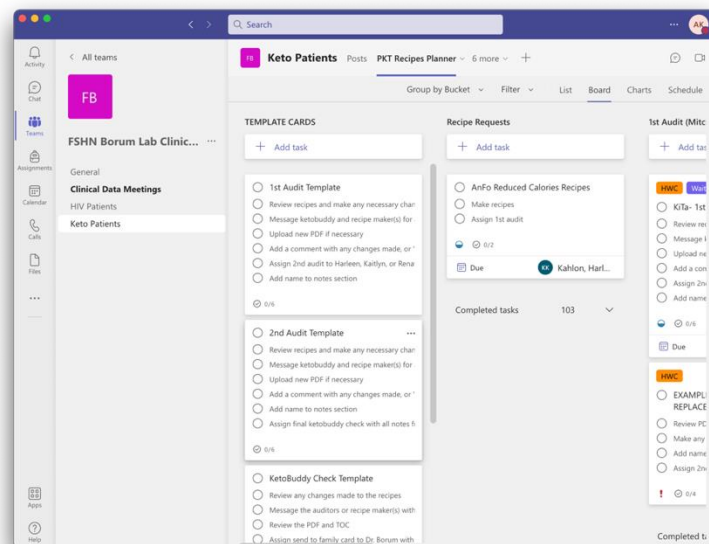
Prescription		Ingredients	
Ratio	2.5	13.3 grams	Crisco Canola Oil with Omega-3 DHA
Calories	1100	3.5 grams	MCT Oil
Protein	33	11.4 grams	Organic Valley Heavy Whipping Cream (Ultra Pasteurized)
Meals	4	32.7 grams	Dannon Light & Fit Greek Nonfat Yogurt - Key Lime
Snacks	0	67.3 grams	Ross Carbohydrate Free
Cal/Meal	275.0	3.5 grams	Beneprotein Instant Protein Powder
Cal/Snack	0		
		Directions	
		1. Weigh canola oil, MCT oil, heavy whipping cream, Ross Carbohydrate Free, Beneprotein, and yogurt separately. 2. Whip the heavy whipping cream in the bottom of a small container using a fork or a mini-hand blender until stiff peaks form. Fold cream into yogurt and serve orally. 3. Combine remaining ingredients with water to make 10 oz. of formula. Administer via g-tube and follow with 25-30 cc flush. 4. Any unfinished yogurt and cream can be diluted with water and administered via g-tube.	

Microsoft Teams:

- Members of the lab use Teams to communicate, plan, meet, work, and organize files and important documents.

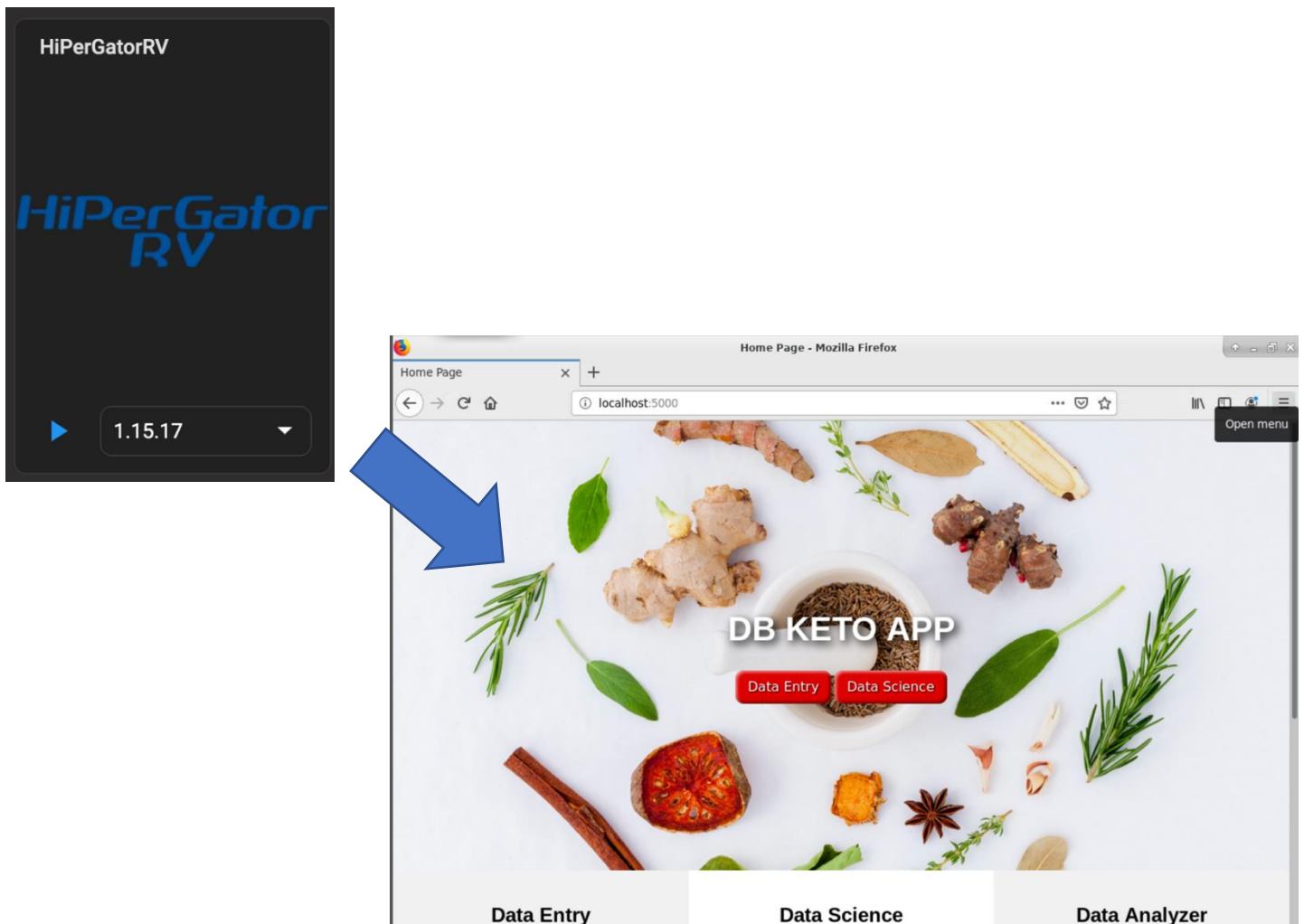


- Members use planner systems to keep tasks organized and to delegate responsibilities with teammates. This helps to keep track of completed tasks and it sets a timely goal for work completion.



HiPerGator-RV:

- HiPerGator-RV, in collaboration with data science developers, has allowed lab members to enter patient data, such as anthropometrics and clinical labs into a HIPAA compliant database, where it will allow the organization and visualization of trends of a patient's medical history. Families of the patients have continuously provided detailed records of clinical data throughout the years, and this program allows families to observe the progress of the patients during their PKT journey.



Conclusion and Future Implications

The Difference Makers of the Borum Lab concluded that learning these competencies in a singular research experience with the same central question and participants is an efficient method to gain and master the top eight competencies. They discovered this through the collection and analysis of the key competencies undergraduate students must gain from research to be the ideal applicants for their future education and career paths. Not only do undergraduate researchers gain the necessary competencies, hands-on patient/client interaction, soft skills, collaboration skills, critical thinking and problem solving, professional development, sustainability/commitment, effective oral/written communication skills with diverse audiences, technical skills for data collection, management, and analysis, but they learn to interconnect these skills on a subsurface level by focusing on a singular research experience. Student researchers should consider pursuing a solitary experience that integrates as many of these skills as possible in order to procure the knowledge and application desired by many educational and career paths.

Appendix A: Foodomics

Lab Member Enters Stage	NDID	Product Name	Source	USDA Food Group	Sub Food Group	
Needs Nutrient Run	ND01140	SPAM Oven Roasted Turkey (can)	Brandname Products	Sausages_and_Luncheon_Meats	Luncheon_Meats	Other
Needs Nutrient Run	ND01129	Armour Pepperoni	Brandname Products	Sausages_and_Luncheon_Meats	Luncheon_Meats	Pepper
Needs Nutrient Run	ND01127	Bridgford Pepperoni	Brandname Products	Sausages_and_Luncheon_Meats	Luncheon_Meats	Pepper
Needs Auditing	ND01128	Bridgford Thick Sliced Pepperoni	Brandname Products	Sausages_and_Luncheon_Meats	Luncheon_Meats	Pepper
Needs Nutrient Run	ND01135	Oscar Mayer Cotto Salami	Brandname Products	Sausages_and_Luncheon_Meats	Luncheon_Meats	Salami
Needs Nutrient Run	ND01137	Oscar Mayer Hard Salami	Brandname Products	Sausages_and_Luncheon_Meats	Luncheon_Meats	Salami
Needs Auditing	ND01165	Land O' Frost Premium Honey Smoked Turkey Br	Brandname Products	Sausages_and_Luncheon_Meats	Luncheon_Meats	Turkey
Needs Auditing	ND01164	Land O' Frost Premium Oven Roasted Turkey Bre	Brandname Products	Sausages_and_Luncheon_Meats	Luncheon_Meats	Turkey
Needs Auditing	ND01156	Oscar Mayer Carving Board Oven Roasted Turke	Brandname Products	Sausages_and_Luncheon_Meats	Luncheon_Meats	Turkey
Needs Auditing	ND01552	Knox Original Gelatine (unflavored)	Brandname Products	Sweets	Gelatin	Null
Needs Auditing	ND01554	Breyer's No Sugar Added, Butter Pecan Ice Crea	Brandname Products	Sweets	Ice_Cream	Null
Needs Auditing	ND01564	Smuckers Preserves- Strawberry, with Splenda, S	Brandname Products	Sweets	Jellies_Jams_Preserves	Null
Needs Nutrient Run	ND11216	Jell-O Cook and Serve Pudding- Lemon	Brandname Products	Sweets	Puddings	Null
Needs Nutrient Run	ND01566	Jell-O Sugar Free, Fat Free Instant Pudding - Ban	Brandname Products	Sweets	Puddings	Null
Needs Nutrient Run	ND01124	Jack Link's Original Turkey Jerky	Brandname Products	Snacks	Null	Null
Needs Nutrient Run	ND00965	McCormick Bac'n Pieces Bacon Flavored Bits	Brandname Products	Snacks	Null	Null
Needs Nutrient Run	ND01604	Mrs. Butterworth's Sugar Free Syrup	Brandname Products	Sweets	Syrups_and_Toppings	Null
Needs Nutrient Run	ND01605	Nestle Nesquik Chocolate Syrup	Brandname Products	Sweets	Syrups_and_Toppings	Null
Needs Nutrient Run	ND11254	Smucker's Magic Shell Caramel	Brandname Products	Sweets	Syrups_and_Toppings	Null
Needs Nutrient Run	ND11253	Smucker's Magic Shell Chocolate	Brandname Products	Sweets	Syrups_and_Toppings	Null
Needs Nutrient Run	ND11252	Smucker's Magic Shell Chocolate Fudge	Brandname Products	Sweets	Syrups_and_Toppings	Null
Needs Nutrient Run	ND01616	Vigo Imported Artichoke Hearts Quartered (can)	Brandname Products	Vegetables_and_Vegetable_Product	Green	Artiche
Needs Nutrient Run	ND01985	Birds Eye Steamfresh Asparagus Spears (frozen)	Brandname Products	Vegetables_and_Vegetable_Product	Green	Aspara
Needs Nutrient Run	ND01625	Green Giant Cut Asparagus Spears (canned)	Brandname Products	Vegetables_and_Vegetable_Product	Green	Aspara
Needs Nutrient Run	ND01622	Green Giant Cut Asparagus Spears 50% Less Sod	Brandname Products	Vegetables_and_Vegetable_Product	Green	Aspara
Needs Nutrient Run	ND01617	Green Giant Extra Long Asparagus Spears (cann	Brandname Products	Vegetables_and_Vegetable_Product	Green	Aspara
Needs Nutrient Run	ND01621	Le Sueur Tender Green Asparagus Spears (cann	Brandname Products	Vegetables_and_Vegetable_Product	Green	Aspara
Needs Nutrient Run	ND01631	Bird's Eye Deluxe Baby Vegetables Baby Broccoli	Brandname Products	Vegetables_and_Vegetable_Product	Green	Brocco

Food Run Template Card

+ Add task

☐ Sample Food Run Card (READ DESCRIPTION)
☐ Insert NDIDs here

! 0/1

Mitch's Group (Kaitlyn, Luna, Rutva)

+ Add task

Needs Entering
☐ Rutva's Draft Transfer
☐ ND00522
☐ ND00541
☐ ND00542
☐ ND00545
☐ ND00569

! 3/8
04/01 PR Patel, Rutva

Needs Entering
☐ Luna's Draft Transfer
☐ ND00430

! 10/11
04/01 P Perricone,Luna

Needs Entering
☐ Kaitlyn's Draft Transfer
☐ ND00331

Ila's Group (Harleen, Ha, Emma)

+ Add task

Needs Entering
☐ Harleen's Draft Transfer

! 11/11
04/01 KK Kahlon, Harl...

Needs Entering
☐ Draft EMERGENCY (60)

! 12/12
03/27 BI Bagheri, Ila

Needs Entering
☐ Draft EMERGENCY (50)
☐ ND00218
☐ ND01366
☐ ND01118
☐ ND01205
☐ ND01381
☐ ND00109
☐ ND01687

Appendix B: Recipe-Making and Diet Prescription

R	S	T	U	V	W	X	Y
Adjust Protein in Food	Adjust Fat in Food	Adjust CHO in food	Gram Protein left in meal	Grams fat left in meal	Grams CHO left in meal	Amount of Food or Medication/Supplement in Recipe	Unit
		16.2	0	0	0		160.2 g
	163		0	0	0		407.5 g
18.2			0	0	0		167.4 g
		17.12	0	27.27	0		161.8 g
	136.22		0	27.27	0		340.5 g
14.52			0	27.27	0		133.6 g

A	B
Patient's Collected Data In Clinic Visit	
1 Name of Patient	
2 Date of Clinic Visit	3/8/2022
3 Date of Diet Prescription Calculations	3/10/2022
4 Sex	Female
5 Birthdate	10/2/2015
6 Date of Weight Measurement	3/8/2022
7 Weight	17.2
8 Date of Height Measurement	3/1/2022
9 Height	111.6
10 Recent Body Mass Index	13.8
11 Date of Recent Body Mass Index	3/10/2022
12 Physical Activity	Sedentary
13 Does the Patient Need Energy Recommendations for a Cerebral Palsy Option?	Yes
14 Cerebral Palsy Option	Non Ambulatory
15 Current PKT Ratio Prescribed	4
16 Current Number of Meals Prescribed per Day	1
17 Current Number of Snacks Prescribed per Day	0
18 Current Total Calories Prescribed per Day	1750
19 Current Calories for Snacks Prescribed per Day	0
20 Current Grams of Protein Prescribed per Day	23
21 Current Type(s) of Recipe(s) Prescribed	Regular

A	B
Summary of Patient's Diet Prescription Calculations	
1 Date of Diet Prescription Calculations	3/10/2022
2 Age	6.4
3 Height	111.6
4 Weight	17.2
5 Body Mass Index	13.8
Patient's Ideal Anthropometrics	
6 Ideal Body Weight for Age	21.3
7 Ideal Body Weight for Height	19.0
8 Ideal Height for Age	117.6
9 Ideal Body Mass Index for Age	15.3
Patient's Recommendations for Calories per Day	
10 Recommended Calories per Day Using Patient's Height and Weight	1171
11 Recommended Calories per Day Using Ideal Body Weight for Age and Ideal Height for Age	1268
12 Recommended Calories per Day Using Patient's Cerebral Palsy Option	1238.76
13 Recommended Calories per Day Using Ideal Body Weight for Height and Patient's Height	1190
14 Recommended Calories per Day Using Ideal Body Weight for Age and Patient's Height	1212
Patient's Recommendations for Grams of Protein per Day	
15 Recommended Grams of Protein per Day Using Patient's Weight	16.34
16 Recommended Grams of Protein per Day Using Ideal Body Weight for Age	20.2
17 Recommended Grams of Protein per Day Using Ideal Body Weight for Height	18.1

E	G	H
Components of Diet Prescription		
1 PKT Ratio	4	4
2 Total Calories per Day	1850	1750
3 Calories for Snacks per Day	0	0
4 Grams of Protein per Day	24	23
5 Number of Meals per Day	1	1
6 Number of Snacks per Day	0	0
7 Type(s) of Recipe(s)	Regular	Regular
Summary of Diet Prescription		
8 Calories per Total Meals per Day	1850.0	1750.0
9 Calories per Meal per Day	1850.0	1750.0
10 Grams of Protein Per Meal per Day	24.0	23.0
11 Grams of Fat per Meal per Day	185.0	175.0
12 Grams of Carbohydrate per Meal per Day	22.3	20.8

	B	C	D	E	F	G	H	I	J	K	L
2	Date	Time	Day_Type	Source	Fasting	Tg_Blood	HDL_Blood	LDL_Blood	TC_Blood	Ns_Blood	K_Blood
1	02/10/1997 0:00:00	NA		3	2	1	59	52	70	134	136
2	03/17/1997 0:00:00	NA		3	2	1	65	73	95	181	141
3	12/12/2002 0:00:00	NA		3	2	1					133
4	05/19/2003 0:00:00	NA		3	2	1					
5	05/20/2003 0:00:00	NA		1	2	1					138
6	06/19/2003 0:00:00	NA		2	2	1	69	54	36	104	141
7	09/03/2003 0:00:00	NA		2	2	1	65	53	41	99	143
8	11/13/2003 0:00:00	NA		2	2	1	153	53	27	111	140
9	02/19/2004 0:00:00	NA		2	2	1	297	61	26	146	139
10	06/02/2004 0:00:00	NA		2	2	1	69	54	61	121	141
11	01/31/2005 0:00:00	NA		2	2	1	70	61	53	118	141
12	08/08/2005 0:00:00	NA		2	2	1	67	58	61	122	139
13	02/20/2006 0:00:00	NA		2	2	1	65	50	45	108	142
14	09/08/2006 0:00:00	NA		2	2	1	127	38	50	106	143
15	10/12/2006 0:00:00	NA		2	2	1	91	37	112	167	143
16	02/13/2007 0:00:00	NA		2	1	1	40	36	44	88	144
17	08/14/2007 0:00:00	NA		2	1	1	51	39	41	90	141
18	12/18/2007 0:00:00	NA		2	1	1	50	37	36	83	139
19	04/22/2008 0:00:00	NA		2	1	1	52	44	43	97	139
20	09/09/2008 0:00:00	NA		2	1	1	57	49	41	101	138
21	01/13/2009 0:00:00	NA		2	1	1	39	45	46	99	142
22	05/19/2009 0:00:00	NA		2	1	1	44	49	42	100	140
23	10/01/2009 0:00:00	NA		2	1	1	50	48	41	99	143
24	02/23/2010 0:00:00	NA		2	1	1	53	48	42	101	147.0
25	06/29/2010 0:00:00	NA		2	1	1	53	57	60	128	139
26	10/19/2010 0:00:00	NA		2	1	1	74	71	51	137	138
27	02/17/2011 0:00:00	NA		2	1	1	50	62	54	126	140
28	06/28/2011 0:00:00	NA		2	1	1	52	61	49	120	139
29	11/29/2011 0:00:00	NA		2	1	1	47	67	53	129	139
30	03/01/2012 0:00:00	NA		2	1	1	44	68	66	143	140
31	07/05/2012 0:00:00	NA		2	1	1	44	63	66	138	138
32	11/27/2012 0:00:00	NA		2	1	1	28	59	51	116	136
33	08/22/2013 0:00:00	NA		2	1	1	70	66	47	127	139
34	12/19/2013 0:00:00	NA		2	1	1	52	67	54	131	136
35	06/05/2014 0:00:00	NA		2	1	1	47	74	52	135	137
36	11/20/2014 0:00:00	NA		2	1	1	61	77	55	144	137

Group by Bucket

Filter

List

Board

Charts

Template Cards

+ Add task

Audit Template C

List each year to en

Move to 2nd Audit

0/2

current patient

non

anthropometrics

dietary intake

Patient Name, Ty

0/1

Data Collection Planner

Patient Name_Type of Data_Year

Last changed 02/12/2022 by you

Assign

current patient

noncurrent patient

anthropometrics

clinical labs

dietary intake

Bucket

Progress

Priority

Template Cards

Not started

Medium

Start date

Due date

Start anytime

Due anytime

Notes

Show on card

Derived from: insert source file name here. You may have to retrieve data from provider notes and lab documents that are outside of the excel source files, and that information with the associated dates need to be listed here.
***This information should be in comments section on HiPerGator and/or notes section of planner card!

***Year (in the title of the card) is the first year that there is data for on the specific excel sheet you are using.