**Learning Objectives**

1. **Write a project proposal with clearly delineated sections**
   1. Include a brief **background**, outlining the needs or resource gap that your project will help to fill
   2. Articulate project **goals**
   3. Articulate project **objectives**
   4. Outline **methodologies** or processes
      1. Anticipate use-of-subjects approval process
   5. Outline **resources**
      1. minimal 3 literature sources
      2. other resources including personal expertise, collaborators with expertise, data sources etc.
   6. Describe expected **results**, outcomes and/or deliverables
   7. Anticipate potential **challenges** to meeting your project’s objectives

[Use this RUBRIC below](#Rubric) to understand and organize the content expected for a successful Project Proposal.

***Bold-italic*** headers on this worksheet correspond to content required in the Submission Form.

Email the contents of this worksheet to your Capstone Project Advisor for editing and review. After your advisor determines that your progress “meets expectations” as is defined by the RUBRIC included at the end of this worksheet, submit your work by copying from this worksheet and pasting into the online Submission Form. Access the submission form via the Capstone Course website; submit your **Project Advisor approved** proposal **no later than November 30th**.

*Of note:* If your advisor has not already completed the advisor information form located at <http://umassmed.edu/oume/capstone-course/csd-forms-and--reports/capstone-advisor-interest/>, please request that he/she do so at his/her earliest convenience.

***Last Name***

***First Name***

***Degree Program***

* MD student
* MD GHP student
* MD CTRP student

***House | LC Mentor***

***Capstone Team Affiliate***

* Colleen Burnham | Group Projects
* Bronwyn Cooper | Kelley (MS1 MS2)
* Rachel Gerstein | Blackstone
* Christina Hermos | Burncoat
* Carolina Ionete | Quinsigamond
* Sarah McAdoo | Brightwood
* Jill Zitzewitz | Tatnuck

**Project Information**

***Project title*** (working or actual):

***Group Project***: [yes/no]

***Group Members***:

**Your Project Proposal | SEE RUBRIC BELOW FOR INSTRUCTIONS AND EXAMPLES**

1. ***Background***
2. ***Project Goals***
3. ***Project Objectives***
4. ***Proposed Methods (Include Use of Subjects if appropriate, see below for details)***
5. ***Anticipated Results, Outcomes and/or Deliverables***
6. ***Potential Challenges***
7. ***References (minimum 3) and other Resources***

**Use of Subjects**

We cannot overly stress the importance of the required institutional review of the Capstone research project that uses human or animal subjects.

Identify if project review by one or more of the following UMMS committees is necessary. Describe here your timeline for requesting a review of this project proposal, including your rationale for *not* requesting a proposal review by the IRB, IACUC, or SAS.

***Institutional Review Board (IRB) Timeline***

If you plan to conduct research involving human subjects, the research study must be reviewed and approved by the UMass Institutional Review Board before the study begins. Please refer to the [UMMS Institutional Review Board (IRB)](http://www.umassmed.edu/ccts/irb/) for additional information.

UMMS Institutional Animal Care and Use Committee (IACUC) Timeline

If you plan to conduct research involving animal subjects, the research protocol must be reviewed and approved by the UMMS IACUC prior to receiving animals and/or conducting of any research on existing animals. Please refer to the [UMMS Institutional Animal Care and Use Committee](https://www.umassmed.edu/research/compliance/iacuc/) for guidance.

***Students as Study Subjects in Educational Research (SAS) Timeline***

All scholarly projects or surveys in medical education that will recruit SOM students as study subjects will be referred to the SAS Advisory Group for review. This review will occur in advance of IRB review for those projects that may require IRB review. Please refer to the [Lamar Soutter Library guide](http://libraryguides.umassmed.edu/SAS) for more information about the requirement.

**Capstone Project Advisor Determination Acknowledgement**

The submission form will ask you to ***confirm that your Advisor has determined your work is ready for submission*** with the following “question”:

Please confirm that this is the final version of the Capstone Project Proposal and that your Advisor has reviewed this report, provided comments and has determined that it meets expectations.

My advisor has reviewed and approved this report as “meets expectations” [yes/no]

| Category | Expected | Description & Example |
| --- | --- | --- |
| Goals & Objectives | The student explicitly states the basic purposes for the work, and defines realistic, achievable objectives | **Goals**: State the overarching goal of the project, in broad terms. This should be 1-2 sentences.  **EXAMPLE** *The goal of this project is to educate middle school students in one Worcester public school on healthier eating habits in order to potentially reduce the incidence of future health problems.*  **Objectives**: Specific, measurable, and attainable measures that you will take to achieve your goal  **EXAMPLE** *1) To develop evidence based educational materials for the target audience. 2) To coordinate a sustainable meeting schedule with school administrators 3) To schedule and conduct 6-8 one-hour sessions with students. 4) To measure knowledge gained from the curriculum through pre and post surveys of participating students* |
| Background | The student 1) outlines the current status of this specific topic and describes what knowledge or resource gap exists. 2) describes the rationale for the project, (communicating to the reader why and how the project will improve the current gap). 3) cites relevant literature and other resources. | **Background:** 2-4 paragraphs. Provide a description of the current state of the problem or gap. Outline prior work related to this problem (include citations). Make an argument for how the problem arises from the background information. Include definitions for the reader to understand the context of the project (eg medical or specialized terminology, organizational partnerships where work will take place).  **EXAMPLE 1** *Lesbian, gay, bisexual, transgender, and queer/questioning (LGBTQ) patients have been shown to receive inferior care compared to their heterosexual counterparts due to barriers such as fear of stigmatization, provider bias and discrimination.1 Individuals in this group face increased rates of bullying, physical and sexual abuse, depression, and suicide. The Association of American Medical Colleges and the Society of Teachers of Family Medicine have both called for better education of tomorrow’s physicians regarding health care towards this medically disadvantaged group, calling for a formal LGBTQ curriculum to be incorporated into standard medical school curriculum, which currently is not a requirement.2*  *There is a lack of standardized education for Medical students on LGBTQ health.3 At UMass Medical School, the LGBTQ health elective is optional. Preliminary data regarding students who have taken the LGBTQ elective in the past, showing that 60% of students enrolled in the elective identified as LGBTQ. This data suggests that LGBTQ health education to be delivered to a broader population of medical students at UMass Med.*  **EXAMPLE 2** *Meningiomas, vascular tumors arising from arachnoidal cap cells of the meninges, comprise 20-30% of all primary brain tumors (1). According to the World Health Organization (WHO) grading system, WHO grade I, non-malignant meningiomas, make up about 80-90% of all meningiomas, WHO grade II, atypical meningiomas with increased mitotic activity and cellularity with pattern-less, sheet-like growth along necrotic foci, 5-15%, and WHO grade III, malignant meningiomas with aggressive local invasion, recurrence, and metastasis, approximately 2% (2–4). Presenting symptoms and signs are mostly related to the tumor location and size, and at a macroscopic level, these tumors are typically firm, well capsulated with broad-based dural attachments. Histopathologically, the most common tumor types are meningothelial, fibroblastic, and transitional (4). Brain invasion may be seen in any type of meningioma and is a sign for increased recurrence risk and decreased feasibility of gross total surgical excision (4).*    *Recent studies have detected pro-angiogenic vascular endothelial growth factor (VEGF) in meningioma tumor cells and found correlations between VEGF and tumor recurrence (5,6). New molecular treatments are being developed targeting angiogenesis, however, surgical excision remains the mainstay, making prognosis greatly affected by anatomical accessibility, tumor size, and recurrence (1,7,8). Fatty acid binding protein 4 (FABP4), is one of nine intracellular, small molecular weight (approximately 15 kDa), highly conserved fatty acid binding proteins (FABP) that serve as receptors and chaperones for a variety of hydrophobic ligands (9–11). Although the functions of FABPs have yet to be uncovered in their entirety, they are known to be involved in many vital cellular processes including regulation of gene expression, cell differentiation, and proliferation. Previously thought to be macrophage- and adipocyte-specific, FABP4 plays a role in inflammation and the regulation of glucose homeostasis and free fatty acid (FFA) metabolism (12,13). In adipocyte-tumor cells of ovarian cancer, FABP4 has been implicated to play a pathogenic role by significantly increasing tumor weight and metastatic potential (14).*  *We discovered that FABP4 is also expressed by a subset of human endothelial cells (EC) (15,16). Endothelial cell FABP4 (EC-FABP4) is strongly induced by pro-angiogenic mediators, VEGF and basic fibroblast growth factor (bFGF), supporting FFA metabolism as a key process in angiogenesis (12,16). In the brain, FABP4 has been identified along with three other FABPs: FABP3 (Heart-type FABP), FABP5 (Epidermal-FABP), and FABP7 (Brain-FABP) (17). However, FABP4 is not expressed in normal brain tissue and has only been detected in brain abnormalities such as glial tumors, arteriovenous malformations (AVM), and cavernous malformations (CM) (18,19). Glioblastoma (GBM), characterized by angiogenesis and vasculogenesis and considered the most aggressive form of glial tumors, expresses FABP4 more commonly than its lower-grade counterparts (18,20,21). In a previous study, we reported that 90% of GBMs are FABP4-positive (18). In AVMs and CMs, two of the most commonly encountered cerebral vascular malformations (CVM), FABP4 may be involved in endothelial cell pathogenesis leading to vascular remodeling (19,22–24). In one study, 100% of AVMs and 78% of CMs are FABP-positive (19).*  *The pattern of FABP4 expression in vascular brain abnormalities and the involvement of FABP4 in modulation of angiogenesis suggest that it may also play a role in the vascular pathogenesis of benign and malignant meningiomas. We hypothesize that in contrast to normal brain and meningeal tissue, FABP4 may be expressed at greater levels in meningioma tumors.* |
| Proposed Method(s) | The student clearly describes the steps he/she will take to meet each project objective. The student defines the components of the methodology or processes and explains why these were chosen. | **Identify Methods and or Processes:** Describe the project approach and how will these methods accomplish the goals and objectives of the project  **Define the components of the methodology** or processes and explain why these were chosen. (ie, more details of the methods and state why they suit the objectives of the project)  **EXAMPLE** *Based on my review of the literature, I will create a list of healthy meal choices for home and school, healthy snacks, and helpful hints on avoiding unhealthy foods, which are the pieces of information that I want to provide to students. Based on review of best practices and the health education literature, I will develop 6-8 interactive classroom sessions with language geared toward middle school students, and a corresponding PowerPoint slide deck. I will access resources in web design to create a web platform for student participants that will include Power-point slides. I will work with my advisor, the school health educator and a biostatistician from Qualitative Health Sciences to develop and interpret a simple pre-post knowledge and attitude test. I will review the need for IRB approval with an IRB representative.* |
| Anticipated Results, Outcomes, and or Deliverables | The student outlines the expected results or outcomes, which are clearly linked to goals and objectives | **Anticipated results or outcomes** with clear links to goals and objectives.  **EXAMPLE** *1. Information from a literature review and review of best practices will be consolidated and incorporated into a new curriculum aimed at middle school students. 2. A relationship with the stakeholders (health educators at Worcester Public Middle School) will be established. 3. 6, 1 hour after-school sessions will be held in the 2019-2020 academic year reaching 20-30 students. 4. Students will be able to demonstrate in post-surveys a significant gain in knowledge towards healthier eating habits and be able to describe common sequelae of unhealthy eating.*  **Deliverables**  **EXAMPLE** *1. A course book with outlines for 6 1-hour sessions that can be used by future medical students at Worcester Public Middle School or other sites. 2. Power point slide decks corresponding to the published course material. 3. A Website managed by UMass Medical Students for middles school course participants.*  **EXAMPLE** *1. An abstract that will be submitted to the Annual Meeting for Pediatric Obesity Prevention. 2. A poster that will be presented at the meeting if accepted.* |
| Potential Challenges | The student will anticipate challenges to the project. | **Address potential challenges (1-3)** and plans to respond to them, including modifications as necessary.  **EXAMPLE** *1) I may not be allowed into the schools and will need to develop relationships with the support of my advisor who currently works with this school’s health educators. 2) I have experience working with younger students and will need to develop new skills for teaching this age group. Collaborating with their teachers will help me develop these skills. 3) Dietary choices are heavily influenced by cultural norms and given the diversity in the Worcester Public schools, there is a chance of alienating some ethnic groups. I will need to educate myself on culture and food choices and incorporate these practices into the curriculum in a respectful manner.* |
| References (citations) | Include citations from your Background | **List References and Resources:** List references from relevant scholarly literature and resources in the suggested format.  **Citation style (APA, JAMA, Chicago or MLA Style)**  ***See your House Librarian for assistance in using an online reference manager (e.g., EndNote of RefWorks) to assist with citation collection, storage and output.***  **EXAMPLE**  American Psychological Association. (2010). *Publication manual of the american psychological association* (Sixth ed.). Washington, DC: American Psychological Association.  Iverson, C., & American Medical Association. (2009). *Ama manual of style : A guide for authors and editors* (10th ed. / ed.) [10th ed. /]. Oxford: Oxford University Press. (2009).  **EXAMPLE** (videos):  Palmer, A. (2013, February). *Amanda Palmer: The art of asking* [Video file]. Retrieved from <https://www.ted.com/talks/amanda_palmer_the_art_of_asking>  TED. (2013, March 1). *Amanda Palmer: The art of asking* [Video file]. Retrieved from <https://www.youtube.com/watch?v=xMj_P_6H69g> |