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## Investigation of Study Strategies in Undergraduate Preparation for the MCAT and Optimizing Preparation According to Current Medical Students

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**Investigation of Study Strategies in Undergraduate Preparation for the MCAT and  
Optimizing Preparation According to Current Medical Students**

University Honors Program Thesis

University of Nebraska at Omaha

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### **Abstract**

The Medical College Admission Test (MCAT) is a pivotal assessment for aspiring medical students, serving as a measure of undergraduate readiness in preparation for this huge advancement in their academic careers. Success on the MCAT requires content mastery, but to do that, strategic study approaches that are tailored to the individual, and comprehension of the test's unique format and demands are essential. It is a common misconception that there are limited ways to study for the MCAT, while also sacrificing a legitimate understanding of the content. This project investigates further into identifying effective study methods for MCAT preparation with promise to provide recommendations for optimizing study strategies. Previous literature review suggests a combination of content review, frequent practice testing, and effective time management are key components for success on the MCAT. Here we identified primary and secondary study preparation resources of online-based curriculum that are geared toward effective study prep according to undergraduate students at the University of Nebraska at Omaha. Furthermore, students in this study group explained the helpfulness of fellow peers and mentors that aided in the search for study resources that are geared most to their academic needs. We also collected evidence of effective practices from current medical students at the University of Nebraska Medical Center, to provide retrospective insight on their MCAT performance. Overall, this project aims to contribute insights into optimizing study approaches for MCAT success. Our findings seek to aid pre-med undergraduate students in their pursuit for higher education and study methods that extend into their medical school journey.

## **Investigation of Study Strategies in Undergraduate Preparation for the MCAT and Optimizing Preparation According to Current Medical Students**

Preparing for the Medical College Admission Test (MCAT) is a daunting task for many undergraduate students looking to pursue careers in medicine. A student's grade point average (GPA) and MCAT score are huge contributors when being considered for medical school admission. This highlights the perseverance and dedication that is necessary while completing undergraduate studies along with simultaneous measures to prepare for the MCAT in order to continue this academic journey. However, there is previous research that suggests that even students at the top of their class in undergrad, experience difficulties acclimating in medical school and fall behind (West & Sadoski, 2011).

The Medical College Admission Test (MCAT) is a critical hurdle for aspiring medical students, serving as a comprehensive assessment of their aptitude and preparedness for medical school. Achieving success on the MCAT demands a profound understanding of science and math-based topics, but also strategic and efficient study methods that are suitable for the individual to achieve success. However, with the seemingly abundant amount of study resources available, undergraduate students are often daunted by the task of finding which methods are most tailored to their needs and will optimize their study period. This project aims to provide valuable insight and guidance to future MCAT examinees seeking to maximize their performance and enhance their competitiveness toward medical school admission.

Choosing what resources to use for MCAT preparation is a critical decision when evaluating readiness for the exam. According to the Association of American Medical Colleges (AAMC), the majority of test-takers studied more than 10 hours per week, however, only 30% of that statistic of students studied more than 30 hours per week (Steed & Kadavakollu, 2019). This

is a broad range of study periods, and there is no straightforward answer as to how long applicants should study for. However, somewhere between 300 and 400 hrs accumulated is the accepted number (Steed & Kadavakollu, 2019). Coming in at 7 hours and 33 minutes, the MCAT tests endurance and stamina while test-taking, so it is crucial to practice studying for long periods of time to build endurance and prevent burnout (Steed & Kadavakollu, 2019). Students at the University of Nebraska-Omaha reported studying for 4-6 months in preparation, along with the minority of students utilizing 7-9 months. Establishing the appropriate preparatory period is the first step in beginning your MCAT journey. An important strategy to follow is planning devoted study time once choosing a starting date (Steed & Kadavakollu, 2019). Demonstrating discipline is arguably the most difficult challenge most students struggle with when faced with many months of complex study material. Finding ways to ease into rigorous study schedules and forming a routine that is unique to your learning style is the key to perseverance.

### **Primary Study Preparation**

It is important to choose study material that aligns with your learning style along with accounting for thorough content comprehension and opportunities for practice and review. Brainstorming available resources that meet costly requirements and fundamental content is the best first step (Steed & Kadavakollu, 2019). Many students recruited in this project opted for review books, such as those provided by Kaplan and The Princeton Review, both of which provide comprehensive practice review, practice questions, and full-length practice tests. Kaplan's 7-book review set was found to be the majority of surveyed students' primary study resource. Additionally, according to the Kaplan website, they claim that their material can raise a student's MCAT score up to 15 points to those that put in the work (*Kaplan's Prep Works*). However, these claims have since been discredited by many current medical students who state

that this approach is far too old-school for this generation of incoming students. While some students may argue that spending hours simply reading a huge book contributes to a comprehensive understanding of MCAT topics, most students are not as engaged in their studying with this simple learning style. This is a common mistake most undergraduate students make when studying due to the nature of the majority of college undergraduate classes that assign large textbooks that are painstakingly never used or as helpful as they appear to be. This ideology also follows the routine of many undergraduate classes that primarily introduce topics and cover a large sum of content with class examinations that solely rely on students' ability to recall information in a specific scenario (Steed & Kadavakollu, 2019). Continuing to practice the ability to simply recall information can become a bad habit when beginning MCAT preparation. The MCAT is known to assess a deeper understanding of concepts introduced in undergraduate courses that require further exploration (Steed & Kadavakollu, 2019). Regardless, Kaplan and The Princeton Review are still useful and very popular among students who have identified the book material as their optimal study resources. However, assuming that reading hardcover books as primary study material is the best bet for students who do not fit this study technique may be their downfall.

Other primary study preparation identified by undergraduate students included UWorld and Anki, both being online-based material. Online resources are promoted to cater to more active learning styles and allow for more efficient comprehension of MCAT topics. There is a plethora of online resources that meet current MCAT expectations and aim to provide an interactive learning experience to future test-takers. Online resources often provide free or low-budget study material that allows for quick content review with an emphasis on exploring a larger variety of advanced topics, unique to the needs of the individual. Most of these online

resources provide simultaneous feedback on practice questions and exams that are helpful towards active learning. Active learning techniques are important to utilize when using online resources, these are identified as: creating summary notes at the end of topic sections, building content vocabulary, practicing applying concepts to real-life scenarios, making flashcards, rewording large sentence structures into your own words to enhance understanding, practicing multiple choice question formatting, interpreting data along with presented figures, and using concept maps to tie together large sections of information (Steed & Kadavakollu, 2019).

Additionally, UWorld has been specifically acknowledged by current medical students as an excellent resource for MCAT prep, along with Anki for fast-paced review. Anki is a great resource to take advantage of because it is completely free to use and very customizable. This online software uses digital flashcards that are designed to help students learn vast amounts of complex knowledge by utilizing repetition that optimizes memory retention and recall (Puri, 2023). These sources place an emphasis on personalized and specific study plans that aid in identifying the test-takers strongest/weakest subject points (Steed & Kadavakollu, 2019).

Ultimately, the key is to select resources that resonate with your learning style and provide a thorough understanding of future exam content.

### **Secondary Study Preparation**

Within this project, we were also able to identify means of secondary study preparation materials utilized by surveyed students. Our survey reported the majority using Khan Academy and AAMC Content. Both resources are very budget-friendly and come as a great starting point for content introduction. Typically, more renowned preparatory courses are only as helpful as the amount of money the student is willing to invest in them (Steed & Kadavakollu, 2019).

However, Khan Academy's MCAT collection contains hundreds of video tutorials along with

thousands of practice questions that cover MCAT topics, and it is all free to use (Steed & Kadavakollu, 2019). When undergraduate students were asked why they had chosen these study materials a very underwhelming amount had said it was because it was affordable to use. As discussed prior, many students are under the impression that adequate MCAT preparation curriculum should cost a minimum of hundreds of dollars when that is not necessary. Both AAMC and Khan Academy are very well-developed online systems that provide students with an endless agenda of resources and content to prepare a future medical student.

Another small minority of undergraduate students had reported using independent study methods as their secondary study material. This can mean a lot of different things in terms of finding study techniques that work best for the individual. However, one specific area of preparation a lot of students forget about is the Critical Analysis and Reasoning Skills (CARS) section on the MCAT. Practicing reading comprehension can be overlooked when there is already a large burden of other MCAT content to go through, but this does not mean an excessive amount of time needs to be dedicated to this area. The CARS section tests a student's ability to comprehend and analyze reading material presented through various ethics, philosophy, social sciences, and humanities studies (Steed & Kadavakollu, 2019). In 2018, AAMC found that scores on CARS were frequently lower than all other areas of the exam (Steed & Kadavakollu, 2019). Identifying students where English is their second language was a frequent accretor to this statistic (Steed & Kadavakollu, 2019). The best way to combat the struggle surrounding the MCAT's CARS section, it is recommended to strengthen reading skills by simply reading as much as possible. Reading a variety of literature whether it is fiction, nonfiction, news articles, or scientific journals, can strengthen reading comprehension and help create habits of breaking down complex topics and learning new vocabulary along the way (Steed & Kadavakollu, 2019).



This method can even be used on downtime where reading a book you are interested in can promote thinking about question and answer-based prompts on reading material. It is encouraged that while interpreting literature, readers should immerse themselves in the content to get an understanding of the material the author is presenting. This has been shown to be helpful when testing on CARS where the answers are solely contained in the passage if reading comprehension is well-developed (Steed & Kadavakollu, 2019). This is unique from other sections of the MCAT where the test-taker is forced to use background knowledge and recall of study material, whereas CARS tests the ability to pull knowledge from the reading passage to answer questions (Steed & Kadavakollu, 2019). Students should focus on reading away from distractions to fully decipher literature and build reading skills. There are a variety of ways to become more aware of reading material and enhance comprehension at a quicker speed. Online resources such as Read Me or Spreeder have been proven to help individuals become more efficient and faster readers (Steed & Kadavakollu, 2019). Studying for CARS does not need to occupy a large area of study time if reading skills are already well-developed. Current medical students and recently accepted students have shared statements of regret around obsessing over CARS studying. When, in reality, simply familiarizing yourself with a strong comprehension of reading material, no matter the genre, can be very helpful. This just goes as a reminder that studying does not always have to be extremely hardcore and there are ways to make it fun and easy. Students experience burnout more frequently when they feel there is no way around these daunting responsibilities. Studying material does not need to be expensive and sufficient learning tools are more accessible than they appear to be. Implementing these resources and dedicating focused practice time towards these areas can greatly contribute to overall MCAT performance.

### **Study Techniques**

Preparing for the MCAT requires a combination of effective study techniques that are tailored to the exam's unique formatting and demands. Techniques that involved active learning, repetition, practice questions, content review, practice tests, and concept mapping have been identified as efficient study methods (Steed & Kadavakollu, 2019). A combination of study techniques can help maximize your preparation and optimize performance on the MCAT. Practicing time management and self-testing are the strongest variables to consider when accounting for effective studying (West & Sadoski, 2011). Developing a study routine and establishing self-discipline is a huge contributor to successful preparation. However, it is important to find the line drawn between procrastination and using time for self-care and hobbies. Making it a priority to avoid procrastination will help to stay on top of your learning and leave plenty of time for other commitments (West & Sadoski, 2011). Techniques of effective time management includes repeated exposure to content, previewing information, reviewing shortly after information is presented, prioritizing difficult subjects, and scheduling study periods (West & Sadoski, 2011). Practicing these approaches can help towards developing healthy studying habits that will also carry into medical school success. Some research has even found that MCAT success correlates to acclimation in medical school and performance on the US Medical Licensing Examination (USMLE) (West & Sadoski, 2011).

Ultimately, everyone has their own style of learning that will either use these ideas or disregard these recommendations. However, across all individuals, utilizing practice tests is a necessity when preparing for the duration of the MCAT. Taking at least three full-length exams while closely replicating the testing environment each time is recommended to help develop a pacing strategy and build confidence on exam day (Steed & Kadavakollu, 2019). Along with this approach, students are given scores on each section that can be used to develop more specific

study plans towards problem areas and help gauge readiness (Steed & Kadavakollu, 2019). Even using self-testing styles on other days where less time is committed to preparation can help increase knowledge retention (West & Sadoski, 2011). Learning material in terms of predicting possible test questions and being able to answer in your own words can improve performance in the context in which students are asked to find solutions to question prompts, rather than select an answer from a list of options (West & Sadoski, 2011). Additionally using study groups to implement self-testing strategies would be in your best self-interest to have the ability to quiz each other and provide feedback in a straightforward manner. Creating study groups with peers to discuss different concepts and share ideas can also reinforce self-knowledge and provide new perspectives. Current medical students explain that surrounding yourself with others that are facing the same challenges, provides you with a feeling of much-needed support as well as an aspect of accountability towards learning various material. Utilizing a study group to keep you on track through the many months of preparation has tremendous benefits. Often, students who do not plan out their studying efficiently will run out of time before exam day before they run out of necessary study material (West & Sadoski, 2011). Engaging in study groups not only fosters collaboration and peer support but ensures sufficient progress throughout the process. Enabling these strategies and leveraging support from fellow test-takers allows for greater navigation through the preparatory period with greater confidence.

### **Financial Limitations and SES**

In this project, we discussed primary and secondary study preparation materials that are used by undergraduate students; however, it is also necessary to address cost-efficiency towards preparing for the MCAT. When discussing how the MCAT accommodates students from lower socioeconomic backgrounds, it is important to acknowledge resources that are also available to

support all students who may face these struggles. In previous years, there had been raised concerns about inequitable access to exam preparation resources with noticeable differences in performance for students from higher to lower socioeconomic (SES) backgrounds (Hanson et al., 2022). Students from lower SES backgrounds may struggle with affording the necessary study material for adequate MCAT preparation, as well as being able to dedicate the time aside from other potential commitments surrounding heightened work or family obligations (Girotti et al., 2020). Accounting for these hurdles, in 2015, the MCAT was redesigned to mitigate for group differences in MCAT scoring for examinees from a lower SES and those also underrepresented in medicine (Girotti et al., 2020). Careful attention was paid to the extent of opportunities received by test-takers and their overall access to free or low-cost preparation resources (Girotti et al., 2020). The AAMC also recognizes that students may not be aware of available test preparation resources available through AAMC at little to no cost. Through the official website, students can access textbooks surrounding a variety of MCAT subjects (Steed & Kadavakollu, 2019). They also provide well-informed and low-cost “Official MCAT Prep” bundles as well as free study plan worksheets and full-length exams that are very convenient to utilize since the AAMC ultimately decides what content will appear on the MCAT (Steed & Kadavakollu, 2019). There is frequent unawareness of budget-friendly resources surrounding students who are unsure if they can even afford the materials they need to study for the MCAT and are psyched out to pursue a career in medicine. It is also important to recognize students who may not have the seemingly accommodating family background to support them. First-generation students whose parents or other family members who never received any college degree or who have no background in medicine often have a lack of guidance and get lost in this process (Girotti et al., 2020). These factors can play a role in mental intimidation that makes an applicant feel unsure

about their passion. In these ways, it is important to become aware of faculty and pre-health advisors that are available to tackle these obstacles (Steed & Kadavakollu, 2019). When asking medical students during an interview process where they received guidance through their pre-med journey they had mainly accredited to advisors and peers. It may seem intimidating to admit struggle when preparing for an exam that sets the aptitude for the remainder of your academic career, but everyone starts somewhere, and needing guidance is inevitable in some aspect of the journey. The main takeaway is not to be afraid of confronting these obstacles and letting it get the best of you before you even begin studying.

With growing advances in healthcare and science, there is a need for progression in future physicians' knowledge to meet complex problems in clinical care (Girrotti et al., 2020). By 2030, there is estimated to be a shortage of more than a hundred thousand physicians in the United States (Steed & Kadavakollu, 2019) not yet accounting for professionals who are unable to catch up to an increasingly diverse patient population (Girrotti et al., 2020). This also implies that incoming medical students should be aware of needing a broader academic foundation in order to be prepared for these advancements in medical school curriculum (Girrotti et al., 2020). These factors go beyond whatever consequences or obstacles a student may face and encourage a new willingness to explore new topics in medicine that can make you a more competitive applicant. With this predicted shortage, it is important to address challenges faced by low SES students, as well as those underrepresented, and encourage access to low-cost resources to effectively prepare everyone for medical school admissions. Furthermore, the AAMC is continuously evaluating policies to address the needs of all test-takers to promote diversity and inclusivity in medical professions that can set all students up for much-earned success.

## **Conclusion**

The goal of this project was to provide valuable insight into effective study methods for MCAT preparation as identified by undergraduate students as well as current medical students who have successfully navigated the exam. Through a comprehensive analysis of a simple survey and an interview process, several key themes have emerged that emphasize the importance of a multifaceted approach that integrates comprehensive study review, practice testing, personalized study plans, and collaborative learning experiences. By utilizing these techniques, aspiring medical students can enhance their readiness, optimize performance, and increase their competitive profile in the eyes of medical school admissions. Additionally, it is important to note that obsessing over a score does not positively contribute to academic readiness and a pace set forth by the individual is what will create the right path. Always remember to prioritize consistency, resilience, and self-care throughout the journey in order to keep a balanced lifestyle. Learning to identify areas of struggle and developing a unique plan of action will help establish life-long success in any medical field. Ultimately, the insight from this project was intentional in empowering future medical students to pursue academic excellence and success in their future endeavors.

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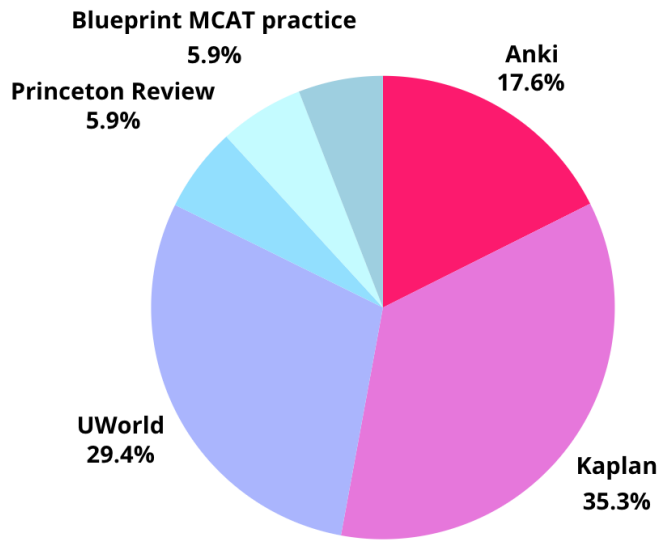
<https://www.ama-assn.org/medical-students/usmle-step-1-2/what-anki#:~:text=Anki%20flashcards%20are%20a%20digital,optimizes%20memory%20retention%20and%20recall.>

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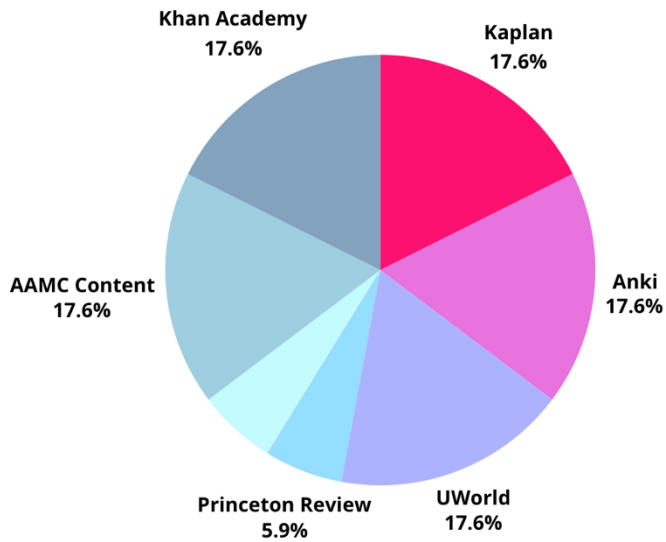
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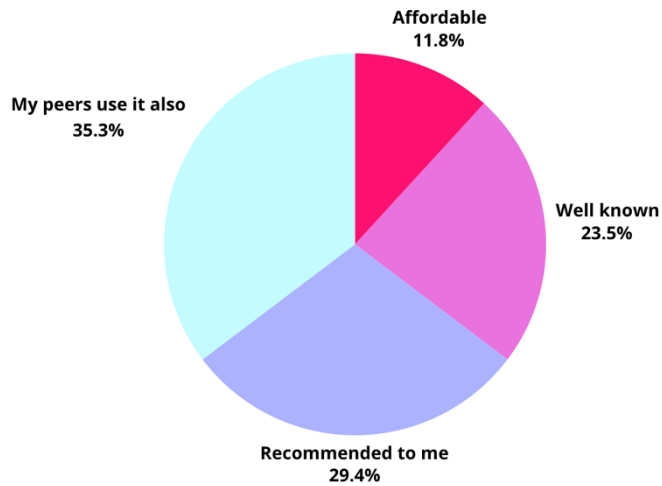
**Figure 1:** Results of undergraduate student response to primary study material.



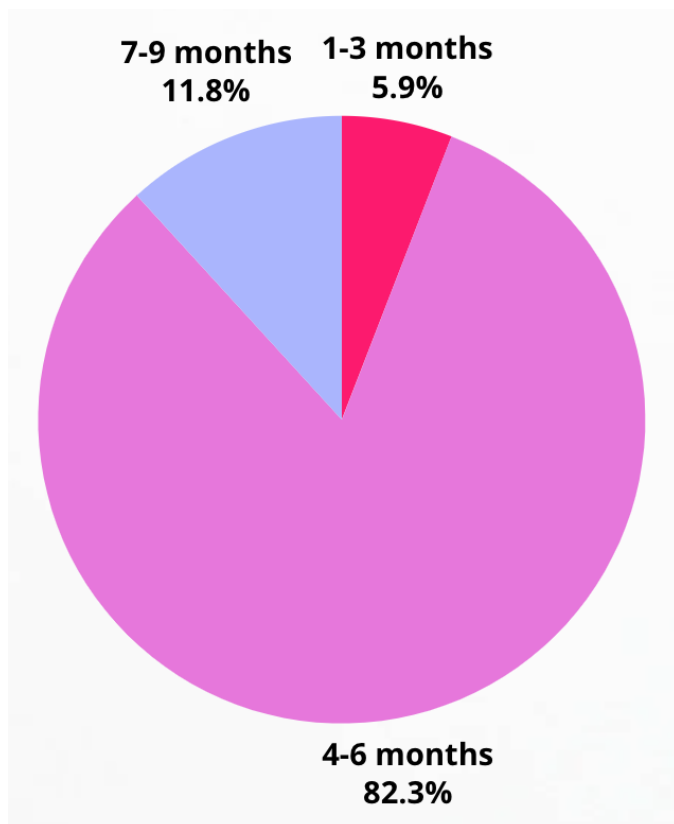
**Figure 2:** Results of undergraduate student response to secondary study material.



**Figure 3:** Results of undergraduate student response to why they chose that study resource.



**Figure 4:** Results of undergraduate student response to how long they were planning on studying for the MCAT.



## Appendix A

This form contains multiple choice questions designed for students on the pre-med track at UNO, who are planning on attending medical school and are studying to take the MCAT.

1. What year of undergrad are you currently in?
  - a. First/second year
  - b. Third year
  - c. Fourth year
  - d. Fifth year
2. What is your major (free response)
3. Are you a member of UNO's Pre-Med Committee?
  - a. Yes
  - b. No
  - c. No, but I plan on applying.
4. Select an allotted amount of time you are planning on studying for the MCAT.
  - a. 1-3 months
  - b. 4-6 months
  - c. 7-9 months
  - d. 10-12 months
  - e. Over a year
5. Have you taken a baseline test?
  - a. Yes
  - b. No
6. What primary study resource are you using/planning to use? (free response)
7. What secondary study resource are you using/planning to use? (free response)
8. What was the reason why you chose those study resources?
  - a. It is the most affordable.
  - b. It is well known.
  - c. I found it online.
  - d. Lots of my peers use it also.
  - e. It was specifically recommended to me.
9. Do you feel there are optimal resources on campus that provide helpful feedback towards preparing for the MCAT?
  - a. Yes
  - b. No
  - c. (explain here why):

## Appendix B

The following questions were asked to current medical students attending the University of Nebraska Medical Center.

1. What study strategies and materials did you use for MCAT preparation?
2. Who helped you in your undergraduate years to prepare for the MCAT and eventually apply to medical school?
3. Would you do anything differently, looking back now, during your MCAT prep?
4. Do you think the MCAT is the most important step towards applying to medical school? Or what is?
5. Do you think the MCAT is reliable towards further success in medical school? Does a successful MCAT score lead to success in medical school?