# Capstone for Impact Submission | GY2021

**Project Title:** Evaluating and Improving the Experience of Pregnancy Associated Hospitalizations

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**Advisor Names:** Dr. Deb Berman & Dr. Ashley Hesson

**If this project can be continued by another UMMS student, please include your contact information or any other details you would like to share here:**

Please reach out if you have interest and motivation in pushing this project forward! I plan to continue this work as a resident but am in need of a medical student with time and passion.
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**Summary:**

While most women have healthy uncomplicated pregnancies, many women will have either maternal or fetal complications necessitating hospitalization. These hospital admissions and stays, known as antepartum hospitalizations, are oftentimes unexpected, and can cause disruptions to these women and their home and work lives.  According to data published from managed care organizations, a significant portion (8-27%) of pregnant women will be hospitalized at least once during pregnancy for a condition other than delivery. These antepartum patients can experience a length of stay ranging from short term (hours to days) to long term (weeks to months) and are peppered with considerable uncertainty and risk. Outcomes from antepartum stays are high-stress and often have complex maternal and fetal complications including stillbirth, preterm birth, prolonged neonatal intensive care unit (NICU) stays, maternal bleeding, infections, and maternal intensive care unit stays. With my Capstone for Impact Project, I sought to understand the antepartum patient population at the University of Michigan and the unique needs of these women. I then worked with key stakeholders to thoughtfully work towards implementing a hospital-based program within Von Voigtlander Women's Hospital that will specifically target these needs, much similar to the way ChildLife or the Family Center at Mott Children's Hospital meets the needs of our pediatric patients and their families during prolonged hospitalizations.

I expanded upon the work already being done by Dr. Deborah Berman, Dr. Ashley Hesson, and their team regarding long term antepartum hospital stays. The team previously completed the largest ever survey-based, longitudinal cohort study of antepartum patients (n=740) with hospital stays of 96 or more consecutive hours at the Von Voigtlander Women's Hospital. Data included demographics, pregnancy outcomes, provider interactions, perceived needs, and satisfaction with their stay. Over 56% of women responded to the survey. However, 44% of women who were sent surveys did not respond.

These survey non-responders represent a significant proportion of the antepartum population. Existing data indicate that in general, survey non-responders are more likely to be racial/ethnic minorities, women, and younger individuals. Furthermore, antepartum patients are similarly more likely to be black, young, and without private insurance. Targeting initiatives to the survey responders alone may leave out the needs of a key demographic of the antepartum population, a demographic that has historically been overlooked in medical research and in healthcare.

Therefore, I sought to expand upon this survey-based work to first understand and analyze the survey non-responders to clarify the needs and goals of the antepartum population in its entirety. Then I sought to develop and implement specific initiatives to meet the needs of this antepartum population at Michigan Medicine with the collaboration of all associated stakeholders.

In summary, the project can broadly be divided into two aims:
1. Evaluate and characterize the survey non-responders to understand the collective antepartum population.
2. Design and implement a program to meet the needs of all hospitalized antepartum patients at Von Voigtlander Women's Hospital.


**Methodology:**

**Aim 1: Evaluate and characterize the survey non-responders.**

As mentioned above, Drs. Berman and Hesson and their team previously completed a survey-based, longitudinal cohort study of 740 antepartum patients with hospital stays of 96 or more consecutive hours. This work was the largest survey-based study completed on an antepartum population. It was undertaken with the goal of better understanding the composition of the modern antepartum population and predictors of satisfaction with hospitalization to inform strategies for care delivery and address potential disparities. Data included demographics, pregnancy outcomes, provider interactions, perceived needs, and satisfaction with their stay. Over 56% of women responded to the survey. However, 44% of women who were sent surveys did not respond representing a knowledge gap in understanding and improving the antepartum experience for all-comers.

To evaluate the survey non-responders, we obtained IRB approval to complete chart reviews of these non-responders and their neonates. Data collected included age, marital status, race, gravida/para (at time of admission to extended stay), length of stay, date of delivery, gestational age, outcome (term, preterm, NICU, demise, IUFD/Abortion), reason for admission (bleeding, hypertension, maternal comorbidities/other, nonreassuring fetal heart tones, PPROM, preterm labor), EPDS, and fetal number. Upon completion of chart review, we analyzed the data to identify patterns and differences between responders and non-responders as well as to the Michigan Medicine obstetric population as a whole. We plan to write up our findings and submit for publication. We currently have two abstracts nearing submission for the February 12, 2021 submission deadline for The Society for Reproductive Investigation (SRI) annual meeting.

**Aim 2: Design and implement a program for hospitalized antepartum patients at Von Voigtlander Women's Hospital**

I sought to design a program tailored to the needs of antepartum patients with the goal of programmatic sustainability and longevity in mind. I began by examining the data gathered from Dr. Berman and Dr. Hesson's existing research to find themes for what key elements are important to include in an antepartum program. I then met with key stakeholders on Labor and Delivery, OB/GYN leadership, nursing, Child and Family Life program directors, and Music Therapy to ensure I had captured an accurate perception of both the current state and goals of the future state. This will allow for a better understanding of what the need is and how the need has previously been met in our institution. Through these conversations, I have created an Antepartum Wellness Program Proposal (attached) and we originally planned to meet with senior leadership and our donor family in Fall of 2020.

Due to the COVID-19 pandemic, this meeting was delayed. However, the pandemic did have some positive effects on the project. Given the significant cut back on in-person services offered due to practicing social distancing, an even greater need for antepartum patient support, education, and community emerged. Our team began brainstorming novel solutions and decided to pursue a phone app directed at admitted antepartum patients. The ultimate end goal will be to create an app for our antepartum patients that provides education, community, support, creative outlets, and communication in real time with providers. I have created a preliminary evidence-based wireframe mockup of the application (see Figure 1) that we intend to build out and present to senior departmental leadership in the common months.

Additionally, through my work in meeting with stakeholders from multiple disciplines, I met and partnered with a Music Therapist with specific interest in antepartum wellness. We have worked together to push forward a Graduate Student Practicum program for implementing a dedicated Music Therapy program for antepartum patients. This work is currently underway with plans for the student to start in April 2021.
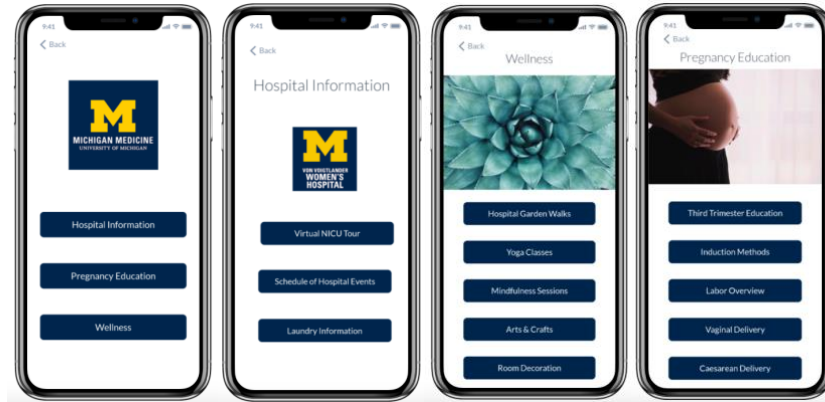
Figure 1: Wireframe mockup of the Antepartum Wellness phone-based application.

**Results:**

Many of our tangible results are largely pending still as a result of the COVID-19 pandemic. However, the groundwork for the following elements are underway or in final stages of planning and implementation:

1. Non-responder Analysis
   a. Between the years 2011 and 2020 there were 68,010 deliveries. Of these, 504 (0.74%) were born to antepartum patients (defined as an admission to the antepartum service for greater than 96 hours). The antepartum group delivered earlier (excluding stillbirths, 269 days of gestation vs 272, P<0.01), was younger (29.5 vs 30.5, P<0.01), and had more prior deliveries (P<0.01) than the general obstetric population. Notably, the distribution of patient race between the antepartum group and the general group is similar (P=0.18). The stillbirth rate is also similar between the antepartum group and the general group (P=0.95). Within the antepartum group, survey responders (N = 297, 58.9%) and non-responders (N = 207, 41.1%) were similar in terms of maternal age (P = 0.82), race (P = 0.17), gestational age (P = 0.88), length of stay (P = 0.14), parity (P = 0.06), and fetal number (P = 0.19). The responders are more likely to be married (P<0.01). Regarding reason for admission, responders are more likely to be admitted for maternal comorbidity or hypertension while non-responders are more likely to be admitted for preterm labor or non-reassuring fetal heart tones (P<0.01). Regarding pregnancy outcomes, responders are more likely to have a baby in the NICU or born preterm not needing NICU care while non-responders are more likely to have a neonatal demise (P<0.01).
   b. Draft abstracts attached. Plan to submit to the Society of Reproductive Investigation (SRI) call for abstracts in February 2021.
2. Current State Analysis of Antepartum Offerings
   a. See attached Antepartum Wellness Proposal
3. App Development
   a. Preliminary wireframe mockup created (see Figure 1).
4. Music Therapy Graduate Practicum Program
   a. Western Michigan Graduate student planning to start April 2021
5. Dedicated Antepartum Wellness Program (under the direction of a dedicated music therapist)

    a.   See attached Antepartum Wellness Proposal

## Conclusion:

Significant work has been completed analyzing the survey responses from antepartum patients showing the shared prioritization of effective provider communication and social support of the antepartum population despite the significant diversity of the group. However, non-responders to this longitudinal cohort, survey-based study remain an underrepresented group. From our initial data analysis, antepartum patients are more likely to be multiparous and younger. The subset of antepartum non-responders are more likely to be single, experience a neonatal demise, deliver prematurely, and have a baby that requires care in the neonatal intensive care unit (NICU). Programs, such as ours, seeking to optimize the antepartum experience should attempt to elucidate and then target the specific needs of the antepartum population as a whole.

We seek to create an evidence-based antepartum wellness program that will serve the needs of all patients from all demographics. Work is still actively underway to create an antepartum wellness program, supported by an evidence-based app, that will meet the needs of all antepartum patients and serve to reduce the burden of hospitalization during pregnancy.

## Reflection/Impact Statement:

Through this project, I have learned the value of perseverance and patience. I hope the global pandemic is a once-in-a-lifetime phenomenon, but the concept of a major project setback is not unique to my project. I learned that you can leverage the setback to brainstorm even more creative solutions to meet the needs of your target population. I learned the value of networking and asking the right questions to the right people, and to keep asking questions when you feel you've hit a "dead end". There are so many good people working in any given field, but who are often siloed from each other. By asking the questions, you can be the connector that brings the right people to the table, and as a medical student with more time and energy, this is an extremely meaningful way you can contribute to research and our medical community. Foster your curiosity and persevere through setbacks and it is amazing what you can achieve.

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