UMB RAMP: UMB Research And Mentoring Program to develop skills and promote interest in STEM fields through hands-on exposure to academic research among West Baltimore Youth

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Background

- UMB CURE Connections (C2) is an integral component of this minority STEM education pipeline in which West Baltimore HS students gain STEM enrichment including hands-on STEM activities, exposure to an academic environment and community outreach through a network of minority-focused college programs at UMB and its partner institutions.
- In this project, we propose to expand upon our current C2 curriculum by developing, implementing, and evaluating a basic, clinical and translational research nanocourse that promotes skill development with the goal of preparing students for an applied research experience.
- This poster describes the development of a curriculum that provides an introduction to basic, clinical and translational research that incorporates hands on training components for HS students

Methods

- Curriculum targets rising 11th- and 12th-graders in Baltimore City
- Mentors were recruited from undergraduate and graduate programs in the Baltimore area.
- We will implement the nanocourse curriculum in a 5-week summer program coinciding with YouthWorks.
- Lessons and activities will be led by various UMB faculty members, mentors, and university staff. Scholars will receive 5 hours of daily instruction.
- Scholars will complete a pre- and post-survey to assess their interest and self-efficacy in research.

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Clinical and Translational Research Curriculum Overview

Schedule Overview

Week 1: Orientation

- **Tours of the professional schools and labs** on the UMB campus
- **Stop the Bleed** and **Basic Life Support training**

Week 2: Laboratory Science

- **Basic Lab Safety training** from Environmental Health Services
- Training from mentors in **laboratory skills**, such as: taking accurate and precise scientific measurements; maintaining a lab notebook; and using balances and pipettes
- Learn **research skills** from mentors**,** such as: developing a research question; forming a hypothesis; designing an experiment; and analyzing data
- Training from UMB School of Medicine librarians in **conducting background research** using online databases
- **Field trip** to the **Towson University Science Complex**.

Week 3: Clinical and Translational Research

- Tour of the **General Clinical Research Center** and School of Nursing **Clinical Simulation Labs**
- **Hands on clinical skill training:** conducting a health history assessment; anthropometry; measuring vital signs; and physical activity and dietary intake assessment and methodology

Week 4: Research Ethics and Independent Experiments

- Presentation from UMB IRB manager about the **role, history, and importance of IRBs**
- Participate in a discussion on whistleblowing, a debate on research ethics, and conduct a mock IRB
- **Study infamous cases of ethical misconduct** in research
- **Design and conduct their independent experiments** with guidance from mentors

Week 5: Independent Experiment Presentation and College/Career Preparation

- **Report and analyze data** from their independent experiments.
- **Make posters and present** their independent experiments.
- Participate in **workshops on college and career readiness** led by UMB staff from Human Resources and the Writing Center, such as resumes, interviews, personal statements, networking, and elevator pitches

Program-wide Learning

Lab tours

Throughout the summer program, scholars will tour 10+ labs across three UMB professional schools in many different areas of biomedical research. The goal of the lab tours is three-fold:

- to show students the breadth of what biomedical research can be and to broaden student perception of it
- to help students find an area of research that piques their personal interest
- to provide networking opportunities for lab internships in the future

Incorporation of Social Emotional Learning

Each day will start with an overview of the day ahead and a social-emotional learning (SEL) or team-building activity to foster a sense of community and belonging in the scholars. The aim of SEL activities is to build students' sense of belonging to a community of fellow researchers to strengthen students' overall Researcher Identity.

Skills for Reading Academic Literature

The skills and methods for reading academic literature are generally not taught in US public HS curricula, and the methods used for reading literary writing don't translate well into academic literature. Because of this, scholars will be explicitly taught methods for reading abstracts and articles. Scholars will continue to build their skills in reading academic literature with weekly journal clubs and will engage in Q&As with graduate student guest speakers who will be presenting their research to RAMP scholars. Becoming comfortable with reading the literature will aide scholars in the future when writing articles themselves.

Program Successes and Challenges To Date

Successes

- High interest during mentor recruitment and hiring process
- Ease of interdepartmental communication and interest in volunteering time and knowledge in a normally siloed campus

Challenges

- Shortened turnaround time for recruitment due to later-than-expected hiring for research staff and IRB approval resulted in a lower number of participants than desired