

## Independently-Designed Major: Public Health Science

### Fostering Healthy Communities through Inclusive, Accessible, and Robust Health Education

In the United States, there is a widespread lack of health literacy among young children, adolescents, and even adults. The poor literacy and negative outcomes are exacerbated among marginalized populations, including non-white, LGBTQ+, and disabled individuals, whether due to cultural, linguistic, financial, and/or physical barriers. Health literacy is the degree in which individuals can access, comprehend, and employ basic health knowledge such as first aid, basic medical terminology, and make appropriate health decisions for themselves or others (Zheng, Tao, Wu, Tao, & Fang, 2016). Even among general youth populations (i.e. non-marginalized), 75% of middle school-aged children scored low-to-medium on tests of health literacy and emergency preparedness, which was correlated with increased risk of injury (Zheng et al., 2016). Additional studies find that millennials exhibit less health literacy than older populations, a troubling trend that suggests deteriorating health awareness not just among children, but among broader populations (Pancetti & Vinci, 2018).

Current school-based instruction on health literacy is limited to lecture on sexual health or disaster intervention, which yield poor memory retention given its ineffective format (Bandyopadhyay, Manjula, Paul, & Dasgupta, 2017; FEMA, 2013). Of these topics, content may not be holistic or unbiased. Of the 30 states that contain legislature regarding school-based sexual health education, nearly 70% explicitly promote or endorse abstinence. This leads to higher rates of teen pregnancy, unregulated abortions, and risky behavior that afflict one's quality of life. These negative outcomes carry greater impact among marginalized groups (Stanger-Hall & Hall, 2011). Despite recent changes in legislation to promote comprehensive sexual health education among select states including Colorado (Colorado Department of Education, 2020), the present instruction that children and adults of varying identities receive in traditional settings is solely limited to this sexual health and first aid, which is not encompassing of all factors that constitute the general well-being of communities (Bornstein, Leventhal, & Lerner, 2015).

### The Domain of Public Health Science

*“Health problems have plagued individuals and societies since the beginning of time, and they will continue to do so. You can change this as you explore the mind-body link in mental health and individual wellness... [which] will enable you to bring about change in public health in your community and to effect positive lifestyle changes among individuals and even populations”*

– University of Wisconsin Superior

Public health science encompass theories and applications from public health, community health education, and human biology, seeking to translate and communicate knowledge of the human body, disease pathology, mental health awareness, and health resources to diverse communities, ranging from children to elderly, from the socioeconomically-disadvantaged to individuals with developmental disabilities. These health topics extend beyond discussions of sexual health education, first aid, and disaster prevention, which are most commonly employed in traditional school settings. This domain seeks to redefine how to communicate integral topics of health to communities amid social, economic,

linguistic, and/or physical barriers (Bandyopadhyay et al., 2017; FEMA, 2013). In communities, factors that can perturb typical development and wellness include socioeconomic status, race/ethnicity, disability, family dynamics, access to food and water, and proper housing (Bornstein et al., 2015). Public health science considers a solid foundation in human anatomy, physiology, and a thorough understanding of intersectional barriers in education and communities to increase health literacy.

Current nationwide initiatives in this field over the past 20 years include promotion and motivation theory, STI prevention, safe sex practices, illicit drug use, alcohol dependency, social and emotional learning, exercise promotion, and healthcare access (Minnesota State University Mankato, 2019). As one can see, these thesis topics require a rich understanding of human anatomy and physiological processes, as well as an individualized knowledge of the communities that educators are trying to reach out to. I have delved into similar work both in the past and currently, as I wed principles from human anatomy/physiology and individualized education. For my high school thesis in biomedical science, I created an educational board game to teach the respiratory system to elementary-aged children which demonstrated efficacy in increasing students' knowledge of such system and processes. Another thesis project concerned individualizing instruction of science and literacy to better students' academic performance and self-attributive thoughts in the classroom. Apart from such academic projects, I am involved in several committees at the Colorado Department of Public Health and Environment whose work applies the knowledge that this independently-designed major would grant me. I am a member of the Comprehensive Sexual Health Education Oversight Entity, which seeks to put comprehensive sexual health education in rural and/or underserved school districts, with an intersectional lens, in accordance with the recent 2019 Colorado house bill 1032. During the next academic year, I will be interning with the Community Health Partnership to promote robust health literacy via making health education and policy more accessible to marginalized communities in Colorado Springs. This previous and current work requires holistic knowledge of human biology, individualized education practices, and intersectional studies, which this would provide.

#### Potential Public Health Science Thesis

The validity of this field will be demonstrated by applying its principles to a potential thesis idea. Despite the plethora of aforementioned theses (Minnesota State University Mankato, 2019), a novel idea suggests growth and relevance of this field. Differentiated instruction incorporates student abilities, learning styles, and personal characteristics to tailor education to best meet one's needs (Watts-Taffe, Laster, Broach, Marinak, McDonald-Connor, & Walker-Dalhouse, 2012). Emerging studies suggest efficacy of board games and related nontraditional formats on improving health literacy in young adults (Sardone & Devlin-Scherer, 2016). These ideas, in conjunction with improving sex ed standards in Colorado (Colorado Department of Education, 2020) can be applied to an interactive computer software that teaches basic anatomy and comprehensive sexual health, specifically accommodated for marginalized LGBTQ+ individuals via relatable scenarios, personalized instruction (e.g. including names and pronouns, and links to other helpful LGBTQ+ services). The efficacy of this idea could be measured via quantitative and qualitative analyses of knowledge retention and engagement/interest among consenting participants at the InsideOUT Youth Services in Colorado Springs. Evidently, this thesis requires knowledge of human biology, individualized education practices, and intersectional studies,

which this major would provide.

### Public Health Science at The Colorado College

Public health science is a valid and prevalent field of study across many U.S. universities, evidenced by a plethora of related thesis topics (Minnesota State University Mankato, 2019), a plausible thesis topic discussed above, and over 150 colleges across the United States offering degrees parallel or identical to this independently-designed major, all accredited by the Council on Education for Public Health (CEPH, 2020). This cohesive field of study goes beyond the current majors at Colorado College in many ways. Psychology can teach theories of motivation and learning, but emphasizes psychological research instead of human health. OBE can teach human anatomy, physiology, and cellular processes, but emphasizes a wide breadth of species and biological lab research, which does not align with the community education focus. Sociology is viable given its emphasis of intersectionality and power structures in human interactions, but does not emphasize human health. Lastly, education holistically teaches inequities, applications, and curricula design in a pedagogical context, but does not emphasize human health.

This independently-designed major is primarily modeled off of parallel majors (italicized) at the following colleges: Alma College (*integrative physiology*), Drexel University (*public health*), Minnesota State University Mankato (*community health education*), Ohio State University (*health and wellness innovation in healthcare*), San Francisco State University (*health education*), Taylor University (*human physiology and preventative medicine*), University of Colorado Boulder (*integrative physiology*), University of Colorado Denver (*public health*), University of Iowa (*health and human physiology*), University of Georgia (*health promotion*), University of Maryland (*public health science*), University of Wisconsin Superior (*community health promotion*), and Ursinus College (*health and exercise physiology*).

At Colorado College, this field of study will have roots primarily in human biology and education, though complementary subfields include chemistry, molecular biology, psychology, and sociology. I hope to take core HBK coursework to gain a comprehensive understanding of physiological processes, anatomy, and pathology that affect humans. Given this thorough instruction, this knowledge can be translated into digestible formats for a myriad of audiences and communities. However, this core content will be informed by educational and sociological principles; coursework in these domains will equip me with an intersectional lens that is crucial for executing health education and promotion among diverse communities.

## Courses for Public Health Science

A minimum of 14 courses over 15 blocks to complete the major requirements. Underneath each listed item is an adjusted description of the course from Banner, depicting its relevance to the Public Health Science IDM in achieving holistic human anatomy and physiology informed by educational and intersectional principles.

\*Indicates already completed or to be completed 2019-2020. | Indicates prerequisite courses Natural Science Competency: These foundational intro courses teach principles of biological, physical, and chemical processes that underlie human anatomy and physiological processes.

- **\*CH108: General Chemistry II** | CH107 (AP Chem)
  - *This course emphasizes chemical kinetics, thermodynamics, and acid-base equilibria, which is relevant to understand drug interactions and pH sequelae.*
- **HK125: Introduction to Human Nutrition** | None
  - *This course investigates the interplay between chemical structure, digestion, storage, and bioenergetics of macronutrients, micronutrients, and implications.*
- **\*HK151: Biophysics: Physics and Living Things** | None
  - *This course discusses the physics behind bodily processes, including muscle and nerve action, blood circulation, cellular physiology and anatomy, and exercise. Human Biology Competency: These courses teach broad and specific principles critical to understanding human anatomy, physiology, and disease pathology that affect humans.*
- **HK204: Introduction to Human Anatomy** | Intro Biology Course (AP Bio)
  - *This course is a cadaver-based lab to learn the structure and function of skeletomuscular, nervous, circulatory, respiratory, and digestive systems.*
- **PY296: Functional Neuroscience** | PY100 (AP Psychology)
  - *This course explores the neural structures and functions responsible for memory, muscle control, endocrine control, sensation and perception, learning, and others.*
- **HK304: Advanced Human Anatomy** | HK204
  - *This course meticulously examines human body systems and offers an integrative laboratory experience to further anatomy knowledge and practical experience.*
- **HK321: Human Physiology** | HK204
  - *This course critically examines the typical relationships between all organ systems at the cellular and organismal level via an interactive lab experience.*
- **HK330: Exercise Physiology** | HK204 & HK321
  - *This course explores interplays among neuromuscular, cardiorespiratory, and endocrine systems during activity, including regulation and acid-base balancing. Education & Intersectionality Competency: These courses teach the foundations behind education theory, learning/engagement theories, and power structures with applied practicums.*
- **ED222: Diversity and Equity in Education** | None
  - *This course critically evaluates education theory, practice, and policies in the intersectional context of access, socioeconomics, culture, and educator concerns.*
- **SO246: Sociology of Health and Medicine** | Sociology Course or COI
  - *This course explores the dynamics of public health, the healthcare system, and medicine under an intersectional lens to identify pervasive health inequities.*
- **\*ED250: Ecologies of Learning and Development in Early Childhood** | None
  - *This course critically examines the plethora of factors that shape childhood development,*

*including family dynamics, socioeconomics, education, and food.*

- **ED380: Curriculum Theory and Engaging Pedagogies** | ED101 & ED260
  - *This course critically investigates the design of curricula in light of learning styles, classroom interactions, intersectional awareness, and classroom inclusion.*

Research Methodology Competency: *This course teaches integral skills for producing and interpreting valid and reliable research in the domain of education studies.*

- **ED260: Educational Research Design** | ED101
  - *This course teaches skills like methodological design, SPSS, and critical analysis in the education domain which helps to produce informed educational practices.*

Thesis Competency: *This course highlights and applies such aforementioned competencies via production of original research or review of literature in health science and promotion.*

- **GS400: Senior Thesis I** | Senior Standing
  - *This culminating course allows one to complete an integrative project that amalgamates all above learned theories and applications to yield new knowledge.*

Complementary Literature: Additional multimedia will be referenced throughout my course of study at CC to enhance my understanding of this critical interplay between public health and education, with an intersectional lens to explore the pervasive inequities in the U.S. and abroad.

- *Savage Inequalities: Children in America's Schools* – Jonathan Kozol
- *Handbook of Social and Emotional Learning: Research and Practice* – Joseph Durlak, Celene Domitrovich, Roger Weissberg, & Thomas Gullotta
- *Handbook of Child Psychology and Developmental Science: Ecological Settings and Processes* – Marc Bornstein, Tama Leventhal, & Richard Lerner.
- *Mastering ESL/EFL Methods* – Socorro Herrera & Kevin Murphy
- *Handbook of Health Promotion and Disease Prevention* – James Raczynski & Ralph DiClemente
- *Jekel's Epidemiology, Biostatistics, Preventative Medicine, and Public Health* – David Katz
- *The Status Syndrome* – Michael Marmot

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