

Barriers to Health Engagement for Emerging Adults in Postsecondary Institutions of Durham, North Carolina

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ABSTRACT

The goal of this research project was to identify trends of and barriers to health engagement for emerging adults in postsecondary institutions. The motivation for studying health engagement—which includes all actions taken for, or behaviors relating to, the promotion of an individual’s health—stems from the growing prevalence and financial burden of chronic illness in the United States. Health engagement can help combat chronic illness by promoting more positive health outcomes. Emerging adults represent one target population for this health intervention since they are still forming their identities and lifelong habits. Postsecondary education is pursued by half of emerging adults in the U.S., so these institutions provide a natural avenue for research. This mixed-methods study focused on three postsecondary institutions which included a two-year community college, a public Historically Black University, and a four-year private institution. Statistical analyses on 874 survey responses found that engagement is a significant ($p < 0.001$) predictor of self-reported health status and found significant differences ($p < 0.01$) in the engagement scores and health outcomes among institutions. A regression model on the Youth Engagement with Health Services score identified significant predictors of engagement ($R^2 = 0.15$; $p < 0.001$). Focus groups, which included a total of 30 participants, helped inform the barriers faced by students and helped explain the significance of the variables in the model. Finally, an engagement process emerged that provides a foundation for institutional policy change to address these barriers.

INTRODUCTION

Chronic Illness Burden in the U.S. Establishes Need for Health Promotion

According to the World Bank, the U.S. spends more of its Gross Domestic Product (GDP) on health care than any other country. At 17.1%, its expenditure on health care is nearly 50% higher than the next developed country on the list (The World Bank, 2014). One list on which the U.S. is not ranked so high is that of life expectancy by country; by this measure, Americans are ranked 44th (The World Bank, 2015). Additionally, the U.S. ranks last for health care coverage of all OECD countries (Lorenzoni, Belloni, & Sassi, 2014). While the debate surrounding reform of the system seems endless, the need for change is obvious and is one conclusion most Americans agree upon (Osborn & Schoen, 2013).

A natural first step for improvement is to evaluate the causes of the failures in a system. Where is the majority of this spending going and what is the top cause of death or poor quality of health? For the U.S. health care crisis, the answer to both of these inquiries is the same: chronic illnesses. Unlike acute conditions—such as heart attack, appendicitis, and pneumonia—which are sudden and severe medical occurrences that can be both communicable and noncommunicable, chronic illnesses are long-developing and always non-communicable. Acute conditions have historically been the leading causes of death in the country, but chronic illness has rapidly replaced them for this title (Glasgow, Orleans, & Wagner, 2001). Chronic illnesses—including diabetes, coronary heart disease, and hypertension—are rampant throughout the country. Together, they are estimated to account for over 75% of both the number of deaths and the expenditure on health care annually in the U.S. (Simmons, Wolever, Bechard, & Snyderman, 2014; World Health Organization, 2014). Nearly half of all American adults are living with one or more chronic illnesses which contributes to the tremendous cost of care and hinders their quality of life (Centers for Disease Control and Prevention, n.d.). Due to an aging population and an ever-increasing rate of obesity, which is a leading cause of many chronic illnesses, this number is expected to rise in the coming decades, bringing the cost of caring for these illnesses up with it (Glasgow, Orleans, & Wagner, 2001).

A troubling reality about the current crisis is that the burden of chronic illness is largely preventable. Unfortunately, our medical system, and indeed our culture, favors the traditional “find-and-fix” model that was established around the needs of acute conditions. The fix to an acute condition is a relatively straightforward and immediately recognized concept. Antibiotics will fix the illness. Surgery will remove the inflamed appendix. The “fix” to chronic illnesses require forward-thinking preventive measures. Prevention of these illnesses is less tangible than a dose of antibiotics or the removal of

a malfunctioning body part. Additionally, because chronic illnesses work on a longer time scale, prevention is seen as a less urgent concern and is often forgotten completely. This is a typical example of discounting, a term borrowed from economics which helps explain the human drive for immediate gratification in the present and lack of concern over future outcomes. Discounting contributes to someone's decision to smoke a cigarette now even if they recognize the risk of getting lung cancer *later*. Perhaps this is why, though obesity is a well-known risk factor of many chronic illnesses (and acute conditions), its prevalence in the U.S. is so high; over one-third of all adults are obese (Centers for Disease Control and Prevention, n.d.). The intangibility of chronic illness prevention coupled with discounting helps explain why these conditions are so prevalent and why, for the first time in nearly three decades, the life expectancy in the U.S. has declined and is expected to continue declining (Xu, Murphy, Kochanek, & Arias, 2014).

There is no pill or surgical intervention that will force the human mind into weighing future outcomes more heavily than present actions, but there are steps that the health care system can take to encourage prevention. The return on investment (ROI) for preventing chronic illness takes longer to be realized and is less easily measured compared to that of other health interventions (Glasgow, Orleans, & Wagner, 2001), but there are obvious benefits to decreased chronic illness prevalence. The system must move away from the "find-and-fix" model. A "prevent-and-promote" system focuses on preventing chronic illness through promoting health instead of waiting for health to fail before "fixing" it. One necessary aspect of this shift is a patient's engagement with his or her own health.

BACKGROUND

Health Engagement is Key for Health Promotion

The emergence of health engagement as a concept stems from the movement to shift from reactionary to preventative health care (Snyderman & Drake, 2015). The model recognizes that health is optimized when patients are motivated and prepared to promote their own health. When a patient practices health promotion, as opposed to solely waiting for health *correction* by a medical professional when health fails, he or she is practicing health engagement. An exact definition of health engagement is still emerging, but the concept generally includes actions taken for, or behaviors relating to, the promotion of an individual's health. Areas of engagement can be roughly categorized within four categories: Discourse, Health Services, Mental Health, and Physical Health. Examples of skill and practices for these categories are provided in Table 1 below.

Table 1: Areas of Health Engagement

Health Engagement Area		Examples
Discourse		•Talking about healthy behaviors in a way that establishes health as a priority
Health Services		•Health literacy •Communicating with medical professionals •Understanding insurance
Mental Health		•Practicing healthy stress relief behaviors
Physical Health	Diet	•Eating a balanced diet
	Exercise	•Achieving recommended active hours
	Sexual & Reproductive Health	•Getting tested for STDs

The movement for a health promotion model has resulted in a surge of research on engagement in recent years. Studies have linked higher engagement with improved health outcomes (Hibbard & Greene, 2013; Greene & Hibbard, 2012; Adams, 2010). In a review of the current engagement literature, Simmons et al. (2014) concluded that “engagement should be quantified as part of a comprehensive health risk appraisal” because of its power in predicting health outcomes. These findings indicate that improving health engagement should be a policy priority. One limitation to realizing this goal, however, is that the concept of engagement is still new and most current research focuses on verifying engagement as a predictor for health outcomes. There is a considerable lack of research focusing on predictors and potential areas of improvement for engagement itself.

Exploring a Critical Intervention Point for Emerging Adults

Coinciding with the movement towards a health promotion model has been a rise of a new classification within the human development framework. Arnett situates emerging adulthood between the stages of adolescence and young adulthood, explaining that people between 18 and 25 years old are exploring and forming lifelong identities and habits (Arnett, 2000). This transitional phase represents an opportune target for health habit interventions (McCracken, Jiles, & Blanck, 2007). Because nearly half of Americans within this age range are enrolled in postsecondary education, these institutions provide a natural avenue for both research and policy intervention (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008).

Despite the potential, current research on health behaviors in this population is limited in two notable ways. First, most of the literature focuses on health *risk* behavior habits, such as smoking and drinking, and do not capture other components of health

engagement. Avoiding risk behaviors is important to health engagement and health outcomes, but focusing too heavily on this component is indicative of the outdated “find-and-fix” model. Second, research is typically limited to four-year institutions and ignores two-year community colleges (Nanney, et al., 2015). Including these institutions in future research has been identified as a need in the field (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008).

Current Health Disparities

Adding to general concern about the rise of chronic illnesses is a concern about who the burden is affecting the most. There is a well-established link between minority status and low socioeconomic status and both of these characteristics have been further linked to poorer health outcomes, such as higher rates of chronic illness and lower life expectancies (Glasgow, Orleans, & Wagner, 2001; Adams, 2010; Bodenheimer, Chen, & Bennett, 2009; Rosenbloom, Young, Joe, & Winter, 1999; Woolf & Braveman, 2011). Potential causes have been identified as the high cost of health care, barriers to health information, and challenges surrounding healthy lifestyle choices, such as availability of fruits and vegetables (Woolf & Braveman, 2011). The disparity of health outcomes heightens the importance of studying a diverse range of institutions since those who are most at-risk for poorer health outcomes tend to be enrolled in two-year community colleges at higher rates than those who are of higher SES or are not racial minorities.

Research Goals and Expected Outcomes

The main objective of this research is to identify trends in and barriers to health engagement for emerging adults in postsecondary institutions. In doing so it also aims to several gaps in the literature, namely the lack of research on predictors of engagement, components of engagement outside of risk behaviors, and diversity of institutional research. Though the analysis is largely exploratory, several predictions can be made from the literature. First, it is expected that higher engagement will be a significant predictor of better health outcomes. Next, as a reflection of trends in current research, the diet and exercise subcategories of physical health are predicted to be the most commonly mentioned areas of health engagement that students consider as part of their conceptualization of “health.” Finally, institutions with a greater presence of racial minority students are expected to see worse health outcomes and engagement scores.

METHODOLOGY

Overview

This research project uses a combination of quantitative and qualitative approaches to analyze health engagement of emerging adults in postsecondary institutions. The study was divided into three case studies representing three different types of institutions, all located in Durham, North Carolina. The three cases are Durham Technical Community College (“Durham Tech”) which is a two-year community college, Duke University (“Duke”) which is a four-year private institution, and North Carolina Central University (“NCCU”) which is a public Historically Black University (HBU). The goal of studying this diverse group of institutions was to help fill the institutional diversity gap in the literature which currently focuses on four-year institutions.

I used the software package *R* for quantitative analysis and used the software *NVivo* for qualitative analysis. First, I analyzed the quantitative data gathered through a survey that was distributed to students at all three institutions. The goal of the statistical analysis was to compare institutional differences and to identify variables that are significant in predicting engagement, measured by the Youth Engagement with Health Services (YEHS!) score. To obtain a more comprehensive understanding of the barriers to health engagement faced by students at each institution, I also conducted focus groups at each institution which I then qualitatively analyzed. The research question was informed through an examination of the trends in the findings of both methods.

Quantitative

Data Overview

The dataset used for this analysis was collected and provided by the Center for Research on Personalized Health Care (“the Center”) at Duke University. The survey was distributed to students at all three institutions and asked questions within five main themes: Academics, General Health, Self-Management Behaviors, Other Health-Related Behaviors, and General Demographics. The Center recruited participants for the survey through their educational email addresses and administered the survey through an online portal. A full description of the variables taken from the dataset for this analysis is listed in Table 2 (below). The variables for race and sexual orientation were recoded to consolidate low-frequency responses into an “Other” category. The recoded variables used in the analysis are indicated by the prefix “mod_”.

Table 2: Description of Independent Survey Variables

Name	Type	Description
Age	Continuous	Age of participant in years
BMI	Continuous	Body Mass Index
Chronill	Continuous	Number of respondent's diagnosed chronic illnesses
Famhis	Continuous	Number of unique diagnosed chronic illnesses in respondent's family
Hbarr	Continuous	Summative score of health accessibility barriers, such as affordability of fresh foods
Hisp	Categorical	Indicator for Hispanic or Latinx identity
PHQ	Continuous	Patient Health Questionnaire-2 depression screening score; higher PHQ indicates higher level of depression
Mod_Race	Categorical	Racial identity: Asian, Black, Other, White
Gender	Categorical	Gender identification: female, male
Mod_Sexor	Categorical	Sexual orientation: lesbian or gay, other, straight
Stress	Continuous	Summative score of stress measures

The response was engagement, measured with the variable *hengage* which represents a score using the Youth Engagement with Health Services (YEHS!) survey questions, which were embedded within the Center's survey. This validated score has a maximum of 41 and includes measures relating to "knowledge of where to get care, health insurance, and confidential services...accessing care, working in partnership with health care providers, and carrying out plans made with a provider" (Sebastian, Ramos, Stumbo, McGrath, & Fairbrother, 2014, p. 335). Higher YEHS! score corresponds to higher engagement.

The final variable included in this analysis is *self* which is a respondent's self-reported health status as reported on a scale from "Excellent" (1) to "Poor" (5). Self-reported health status has been shown to be a significant indicator of actual health outcomes (Miilunpalo, Vuori, Oja, Pasanen, & Urponen, 1997; McGee, Liao, Cao, & Cooper, 1999) and so was used as such.

Statistical Analysis & Model Selection

First, I used Analysis of Variance (ANOVA) testing to compare the average engagement score, BMI, number of chronic illnesses, and self-reported health status across institutions to determine if the differences in these health outcomes were statistically significant.

Next, to verify the expected positive correlation between engagement and health, I ran a linear regression model on self-reported health status, controlling for institution so the result was not swayed by any one institution's responses. If higher engagement is associated with a better self-reported health status, the coefficient on the institution variable should be significant and negative, since a lower self-reported health status corresponds to better health.

Finally, I used Multiple Linear Regression (MLR) to identify variables which were significant in predicting the health engagement score. I ran an initial regression using all variables to have a baseline from which to check MLR assumptions, which were met. I used a method of backwards selection to narrow the scope of predictor variables. Backwards selection is a step-wise regression method which is useful for cutting out insignificant variables from a regression model. Each step identifies and removes the variable which is the least significant in the model. This process is repeated until all remaining variables are significant ($\alpha=.05$). The general structure of the linear model is:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n + \epsilon$$

Here, there are n independent variables (x) which predict the outcome variable (y). The coefficients explain how a one-point increase in x is predicted to correspond to a change in y . ϵ encompasses the variability in the outcome variable that cannot be explained by the model (James, Witten, Hastie, & Tibshirani, 2013).

For this analysis, the outcome variable being measured is the health engagement score, *hengage*. Positive coefficients predict the increase in engagement for every 1-point increase in the predictor variable while negative coefficients predict the decrease. Categorical variables are split into their levels (e.g., "Female" and "Male" for *gender*). For these levels, positive coefficients predict the associated change in engagement for that level as compared to the base level for that categorical variable. Again, positive coefficients predict higher engagement and negative coefficients predict lower engagement.

Sample Overview

The survey dataset included 2,000 responses in total, though the total number used in this analysis was significantly lower due to filtering. Only respondents within the emerging adult age-range, 18 to 25 years old, were included. Responses with missing data for the variables of interest were also eliminated.

Table 3 (below) the breakdown of relevant responses by institution and in the overall sample. There were 874 qualifying responses in total, though a majority of these responses came from Duke ($n=513$); almost one-third of total responses came from

Durham Tech (n=241) and about 15 percent came from NCCU (n=120). The percentage of respondents identifying as a racial minority was largest at Durham Tech (86.3%) followed by NCCU (54.2%) and then Duke (32.9%). This was slightly inconsistent from the actual racial demographic breakdown of each institution, where NCCU reports the highest percentage of minority students (88%) (North Carolina Central University, n.d.), followed by Durham Tech (66%) (Durham Technical Community College, 2017) and then Duke (50%) (Duke University Office of Undergraduate Admissions, 2016). Of the overall sample, 50.5 percent of students were White, 29.0 percent were Black, and 18.1 percent were Asian. Most students of Asian race reported from Duke.

Table 3: Survey Results Summary Statistics

		Durham Tech	Duke	NCCU	Total Sample
Respondents		241	513	120	874
Engagement (max: 41)		31.46	28.42	27.75	29.16
Age		20.85	21.68	20.65	21.31
BMI (normal: <25; obese: ≥25)		28.03	23.2	26.14	24.92
Number of Chronic Illnesses		0.74	0.49	0.88	0.61
PHQ Depression Score (max: 27)		1.61	1.32	1.90	1.48
Race	Asian	7	135	11	153
	Black	196	27	23	246
	Other	5	7	21	33
	White	33	344	65	442
Gender	Female	201	325	86	612
	Male	40	188	34	262
Self-Reported Health Status (Excellent=1...Poor=5)		2.54	2.15	2.59	2.32

Qualitative

Focus Group Design

Focus group participants were recruited with flyers and, at NCCU, through personal contact through a faculty member. The focus groups were semi-structured meaning, as the moderator, I followed a predetermined set of guiding questions but also asked probing and follow-up questions. Focus group sessions lasted between

approximately 30 to 60 minutes. I complete two focus groups each at Durham Tech and Duke and one focus group at NCCU.

I audio-recorded, transcribed, and coded the focus group sessions for analysis. There were five primary coding categories, each housing several subcategories. The five primary coding categories were: Barriers, Institutional Resources, Knowledge of Health, Perceptions of Engagement, and Health Engagement Areas. A list of the guiding questions can be found in the Appendix (A1).

Qualitative Analysis

Matrix coding creates a table of references that are coded in multiple coding categories or subcategories. I analyzed coding matrices by comparing the counts of references in each cross-coded section. If one subcategory, such as “Positive Perception,” had more references than another subcategory, such as “Negative Perception,” the conclusion was that category with more references was dominant. I also reviewed every reference included in the coding matrix to assess the count accuracy and relevance. There were no cases where I felt that the result of comparing counts of references was misaligned with the conclusion of the discussion. I completed this type of analysis to assess student conceptualizations of health and health engagement, perceptions of student health engagement, barriers to health engagement, and assessment of institutional resources.

Focus Group Participation

11 Durham Tech students participated in one of two focus groups. Of these, seven were female and four were male. Six of the students identified as Black or African American and 5 identified as Hispanic or Latinx.

13 Duke students participated in one of two focus groups. Of these, seven were female and six were male. Three of the students identified as Asian, two identified as Black or African American, and seven identified as White. Two students also identified as Hispanic or Latinx in addition to White.

Six NCCU students participated in one focus group. Of these, five were female and one was male. Five of the students identified as Black or African American and one identified as American Indian or Alaskan Native.

RESULTS

Quantitative Results

Initial Checks & Institutional Differences

Engagement was found to be a significant predictor of self-reported health status in the expected direction ($p < 0.01$), meaning that higher engagement was correlated with a better status. The difference between institutions' engagement scores was significant ($p < 0.001$), with Durham Tech reporting the highest score (31.46), followed by Duke (28.42), and then NCCU (27.75). Of the 18 to 25 year age range, Duke students were older on average (21.68) than those at Durham Tech (20.85) and NCCU (20.65). Though the average BMI overall (24.92) and at Duke (23.2) was below 25 which is in the "normal" range, the average BMI at both Durham Tech (28.03) and NCCU (26.14) were in the "obese" range. These differences were significant ($p < 0.001$), as were the differences in average number of chronic illnesses ($p < 0.001$) across institutions. On average, NCCU students reported having the most chronic illnesses (0.88), followed by Durham Tech (0.74), and then Duke (0.49). The average self-reported health status, which ranged from 1, being "Excellent," to 5, being "Poor," for Durham Tech and NCCU were similar (2.54 and 2.59), but Duke's average was significantly better (2.15, $p < 0.001$).

Engagement Model

The final linear model for predicting health engagement is listed below. The R output for this model is in the Appendix (A2).

Equation 1: Engagement Model

$$\text{henage} = 16.76 + 0.47(\text{age}) + 0.71(\text{chronill}) - 0.33(\text{Duke}) + 3.44(\text{NCCU}) - 1.08(\text{Male}) + 2.54(\text{Black}) - 1.40(\text{Other}) + 2.38(\text{White}) + e$$

A breakdown of the significant variables is listed in Table 4 (below). Age, chronic illnesses, institution, gender, and race were all included in the final model as they were found to be significant predictors of engagement ($p < 0.05$). Number of accessibility barriers, BMI, family history of chronic illness, financial security, hispanic ethnicity, sexual orientation, and stress were not found to be significant predictors of engagement in the final model.

Table 4: Significant Variables in the Engagement Model ($R^2=0.1496$)

Variable		β Coefficient (p-value; st. err)
Baseline		16.76 (<0.001; 2.26)
Age		0.47 (<0.001; 0.10)
Chronic Illnesses		0.71 (<0.01; 0.25)
Institution*	Base: DTech	0
	Duke	-0.33 (*; 0.72)
	NCCU	3.44 (*; 0.76)
Gender	Base: Female	0
	Male	-1.08 (<0.05; 0.49)
Race*	Base: Asian	0
	Black	2.54 (*; 0.89)
	Other	-1.40 (*; 1.32)
	White	2.38 (*; 0.63)

Age was positively correlated with engagement ($p<0.001$), meaning for every additional year of age, students are expected to have a 0.47 point higher engagement score. For every additional chronic illness that a student is diagnosed with, their engagement score is expected to be 0.71 point higher ($p<0.01$). All else held constant, students at NCCU are predicted to have the highest score, followed by those at Durham Tech, and then Duke. Male students are expected to have lower engagement scores than female students ($p<0.05$). Compared to students who are Asian, which is the baseline race, White students are expected to have engagement scores that are 2.38 points higher. Black students are also expected to have higher engagement scores than Asian students, but only by 1.54 points. Students that are not Asian, Black, or White (i.e. those in the “Other” category) are expected to have a lower engagement score than those of other races, holding all else constant. Compared to Asian students, these students are predicted to have engagement scores that are 1.40 points lower.

*Categorical variables that remained in the model had at least one level for which the p-value was significant at a 0.05 level. Interpretations of these variables assume all other variables are held constant. “Other” and “DTech” were not significant, but their overall variables were

Qualitative Results

Student Conceptualizations of Health & Health Engagement

Physical & Mental Health Dominate Ideas of Health

When asked to describe a healthy person and the actions a healthy person takes, students' answers in every focus group focused primarily on diet and exercise. These two areas of physical health were those that were collectively mentioned first and the most often when students described health. At Durham Tech and Duke, mental health was also a very common response. Table 5 (below) provides example responses from each institution.

Table 5: Student Conceptualization of Health

Durham Tech	"Someone's who's active and eats right. And that's like, mentally stable."
Duke	"I describe a healthy person as someone who exercises and eats well and isn't, like, struggling with a chronic illness...I think because we are college students, always so stressed, I think we realize the importance of mental health more recently than I think people have in the past. I think that's important."
NCCU	"Someone who, like, works out regularly and eats right."

In one Duke focus group, a student added annual check-ups and reproductive health, but these were infrequent responses.

"Health Engagement" Evokes a More Complete Idea of Health

When prompted to describe health *engagement* and if it differs from general health behaviors, students answered with a wider variety of responses that included not only the previously dominant areas—physical and mental health—but also healthy discourse. Duke students also included engagement with health services, though this area was not mentioned by students at Durham Tech or NCCU. Table 6 (below) provides responses from each institution.

Table 6: Student Conceptualization of Health Engagement

Durham Tech	“I’m thinking now like, someone that’s engaged maybe talks about it. They say—maybe it’s something that they would bring up as like a conversation topic.”
Duke	“Being engaged with your health is sort of like health as a practice,” and “[calling] a doctor...when you start feeling or thinking a certain way.”
NCCU	“You would choose like a salad here and there or something like that. Going to the gym...Getting tested” “I would even say actually sitting in on discussions like this to actually know more about how other perceive their health.”

Perceptions & Barriers

Overview

Table 7 shows a breakdown of students’ perceptions of engagement at each institution. In general, students at all three institutions believe that overall engagement of students is low. This trend is especially evident at Durham Tech, where no area of engagement was perceived to be high. NCCU had a mixed perception regarding engagement in exercise behaviors, but perceived low engagement in all other areas. Duke students’ perceptions were the most positive overall, though they perceived high engagement only in exercise behaviors and healthy discourse.

Table 7: Student Perceptions of Engagement Areas

	Durham Tech	Duke	NCCU
Physical Health: Exercise	-	+	+/-
Physical Health: Diet	-	-	* [*]
Physical Health: Sexual & Reproductive	-	-	*
Mental Health	-	-	-
Engagement with Health Services	-	-	-
Discourse	-	+	-

* Did not discuss perceptions within this engagement area

Physical Health: Exercise

Durham Tech students perceive low engagement in exercise-related health behaviors of students at their institution. This is largely driven by the inaccessibility of space to exercise and a general lack of concern, motivation, and time. Students voice frustration over the lack of workout facilities on the campus. This often leaves them without a safe and accessible space to exercise. Students cannot, for example, run around the campus as the area surrounding it is considered unsafe. Financial instability and lack of transportation are barriers to joining off-campus gyms. Durham Tech students feel that their youth and good current health status prevents them from being concerned about exercising. Time management and motivation are also barriers to exercise. Students feel as though they cannot add exercise into their schedule and instead prioritize homework, jobs, and sleep.

Duke students perceive high engagement in exercise-related health behaviors of students at their institution. Students describe the campus culture, where “athletic health or physical health is very much idealized because...we’re a big Division 1 school [with] all these athletes around,” as a motivator for exercise. Barriers to exercise include time management and balancing their workload with physical health, though some students also feel as though exercise helps them manage their stress.

NCCU students have a neutral perception of engagement in exercise-related health behaviors of students at their institution. Some students seem to prioritize exercise while some do not. One student describes this as “a 45-55 divide,” indicating that slightly less than half do engage. Those who do engage in exercise seem to be driven solely by a desire to improve their appearance rather than their physical well-being, because “no one wants to look crazy.” The biggest barrier to exercising is a campus culture that does not promote exercise but instead encourages social activities. One student described this barrier, saying “If you just went partying all night you're not gonna go to the gym the next morning.”

Physical Health: Diet

Durham Tech students perceive low engagement in diet at their institution, largely driven by food insecurity and limited healthy food options on campus. The campus and its surrounding area provides few fresh food options and those which are offered are financially inaccessible. The cafeteria “relies a little bit more on the fryer and the prices aren’t necessarily the best for people,” according to one student. The vending machines similarly offer mostly unhealthy soda options instead of fruit or vegetable juices. Durham Tech offers a food pantry for food insecure students, but this is often stocked with traditionally donated items such as canned foods and lacks the fresh foods students desire.

Duke students perceive low engagement in diet at their institution. This is almost completely driven by a campus climate that puts, as one student explains, “an emphasis on binge-drinking and not necessarily, you know, [having] a nice casual drink. And then like, coming home and having all these options for late-night food.” Most students who live on campus feel as though they have the motivation and resources to choose healthy foods for daily meals, but financial accessibility of healthy food is a barrier for some students who live off campus.

NCCU students did not discuss perceptions of diet engagement directly, but they do feel as though students prioritize their physical appearance which may include eating a healthier diet than those who do not.

Physical Health: Sexual & Reproductive Health

Durham Tech students perceive low engagement in sexual and reproductive health at their institution. The primary barrier to sexual and reproductive health for students is social and religious stigma. They feel as though the religious beliefs of many people in their area discourage engagement with their sexual and reproductive health and also silence discussion surrounding such topics. One student feels this stigma so strongly that she explains, “if someone had to outweigh the option of getting an abortion or going through with the pregnancy, more people would go through with the pregnancy because there’s more stigma in an abortion.” These cultural barriers leave students feeling embarrassed about seeking sexual and reproductive health information and testing. Instead of seeking care, they often turn to the internet for answers about sexual and reproductive health questions.

Duke students perceive low engagement in sexual and reproductive health at their institution, though female students specifically expressed some level of engagement in this area due to the presence of a Women’s Center on campus and a visibility of women’s sexual and reproductive health on campus. Barriers to engaging in sexual and reproductive health care primarily relate to knowing about resources. Students are often unsure if sexual and reproductive health care services are included with their insurance plans or student health fees and do not know how to effectively find information this information. This problem persists for both on- and off-campus care in this area, though some students are aware that they can access services on-campus.

NCCU students are aware of student groups on campus that promote safer sex, but did not express a perception of the general level of sexual and reproductive health engagement of students at their institution.

Mental Health

Durham Tech students perceive low student engagement with mental health at their institution, though it is improving. Students’ primary barrier to engaging with mental

health was that it was not addressed in their racial minority group cultures. Despite this barrier, efforts by the Student Government Association to establish a Mental Health Awareness Day on campus is helping to improve visibility of mental health care.

Though the campus climate encourages mental health care visibility, Duke students perceive low student engagement with mental health. Students claim that sleep deprivation and high stress levels from schoolwork lead to poor mental health on campus. These causes are amplified by a campus culture of perfectionism in which students strive to achieve “aesthetic health” and find it hard to balance all aspects of college academic and social life. An additional barrier is access to adequate mental health care services on campus.

NCCU students perceive low student engagement in mental health, largely due to its absence in campus culture. As one student put it, “[Mental health is] just not talked about in general...It’s just not there.” As such, they believe mental health care comes last on students’ priority lists.

Engagement with Health Services

Durham Tech students perceive low student engagement with health services. Determining what services are needed and where to get them is a barrier to engaging with health services. Once students understand what services are available, accessibility of these services proves to be a barrier. Many students do not understand or know where to find information about their insurance coverage. Some students also express concern that being uninsured or undocumented citizenship prohibits them from accessing health services completely. Even with insurance, students still find it difficult to financially access care. One student described having to postpone seeing the doctor because she could not afford her \$40 copay and claimed that this is “probably a common discourse on a community college campus.”

Duke students perceive low student engagement with health services generally, though some students feel very engaged with their health in this area. Those who do feel engaged do so because of a family background that encouraged communicating with health care providers or because they had the most experience with health services due to chronic or recurring illness. Most students, however, feel disconnected with from health care services and cite common barriers to engaging with them. The primary barriers relate to accessing insurance information and understanding which services are provided by Duke and how much other services will cost. Students also consider time management a major barrier to seeking out health services: “More generally, I think just workloads prevent people from—like not exercising—from [interacting with services]. If you’re sick, you don’t want to go to student health. You’ll forget to breathe—literally.” Other barriers include coordinating care over multiple

locations as most students at Duke do not reside in the area outside of the academic year. Additionally, female students express difficulty finding female providers. They often put off care until a female provider is available instead of seeing a male provider with whom they would feel less comfortable discussing certain aspects of health.

NCCU students perceive low student engagement with health services with primary barriers relating to transportation, finances, and insurance. Students do not understand insurance and are used to their parents coordinating their care. They are often surprised by the cost of care or medications or choose not to seek out these services out of fear surrounding an unknown cost. They also report being unable to physically access care. Many services are not offered on campus or are inadequate on campus, but there is limited public transportation that students are aware of to connect them to service locations.

Discourse

Durham Tech students perceive low student engagement with healthy discourse at their institution. Health is not a topic of conversation among students. This is largely influenced by a belief in some racial minority groups that health is not changeable. One student explained that in her culture, people “think that [chronic illness] is a part of life rather than thinking ‘Oh, was there something I could have done differently to avoid this?’ A similar sentiment was expressed for mental health.

Duke students perceive high student engagement with healthy discourse at their institution. Physical health discourse, though primarily positive, does become a barrier to healthy engagement in certain ways, such as when students accept an illness as “the inevitable freshman plague” in a joking manner rather than working to prevent it. Mental health awareness on campus, however, drove the positive perception in this area. One student describes mental health care as “something you hear about, something you read about in the [student newspaper]...something people are talking about.” This is particularly beneficial for students in racial minority groups whose backgrounds with mental health care are limited who are taught, at Duke, “that mental health is actually rooted in neurology and stuff like that [and that] everyone has mental health issues and you need to take active steps to keep yourself healthy mentally as well...you change your perception about it.”

NCCU students perceive low student engagement with healthy discourse at their institution because health is not a topic of conversation among students.

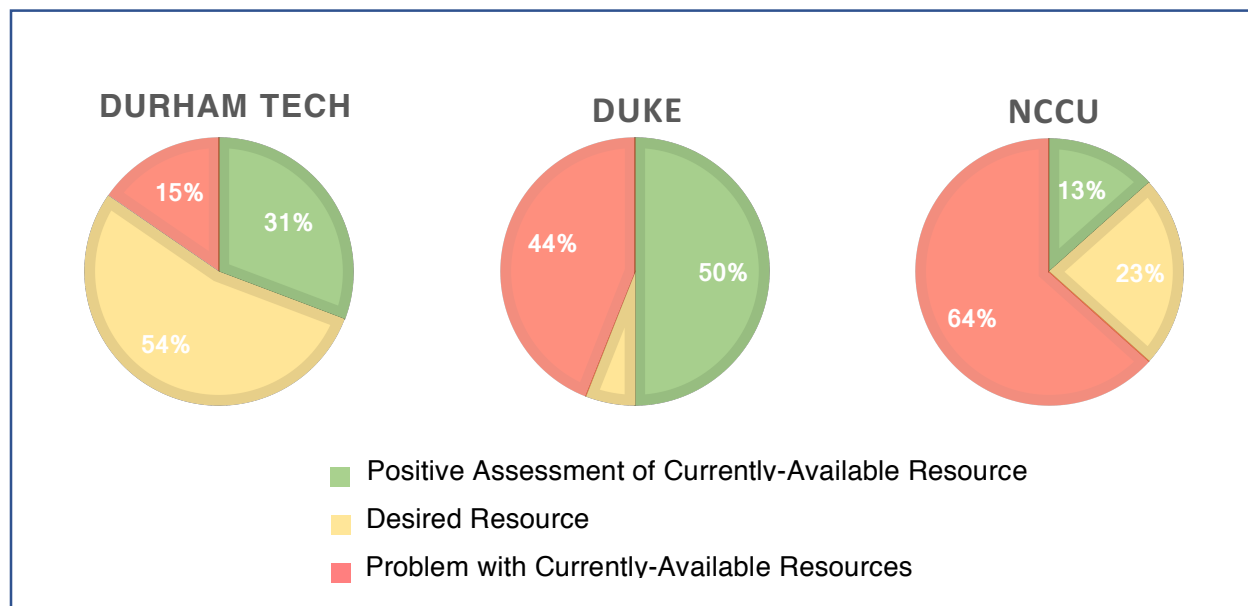
Institutional Resources

Discussion of institutional resources was coded into three categories:

- 1) Positive assessment of currently-available resources,
- 2) Problems with currently-available resources, and
- 3) Desired resources

At Durham Tech, most of the discussion about institutional resources was regarding desired resources. At NCCU, the majority related to problems with currently-available resources. At Duke, about half of the discussion about institutional resources related to positive assessments of those currently-available and about half related to problems with those currently-available. These results are summarized in Figure 1 (below).

Figure 1: Assessment of Institutional Resources



Durham Tech students believe that the institution's partnership with a local community garden to provide fresh produce to the student food pantry is a positive resource. They also view the institution's tobacco-free policy positively. However, they desire more healthy food options in the campus cafeteria and in the food pantry. They also desire exercise facilities, such as a basketball court or a track on campus, and believe that it is the institution's responsibility to provide such facilities. The most desired resource at Durham Tech is more discussion and active information-sharing surrounding health behaviors, health services, and insurance. Many students do not know how to access such information on their own and believe they would benefit from,

for example, “more people on the ground to actually go and talk about it.” This lack of knowledge translates directly into lack of engagement with health services, as evident through the fact that many students are unaware that there are counseling and general health services available on campus.

Duke students believe their institutions offers better resources than many other schools, ranging from exercise facilities, healthy dining options, student health services, and health-related classes. Positive assessments about these currently-available resources included the convenience of the new location of their Student Health building, access to the Duke Hospital, Duke Recreation’s class availability and accommodations for those who are differently-abled, and the first-year online seminar on alcohol. Duke students do wish for campus academic policies that encourage a more balanced health state, citing curriculum review as “a good place” to start addressing the mental health pressures that are exacerbated through “pre-professionalism and grade pressures.” Students’ problems with currently-available resources relate to information availability and mental health services at their institution. First, students desire more explicit information about insurance coverage, student-fee coverage, and health services in general. Though students recognize that many issues with insurance are a product of the U.S. health care system, they do believe that their institution could and should offer more explicit information regarding its own insurance plan, Duke Blue, which it offers to students. Students are also unsure which of the institution’s health services are included in their tuition and which require payment, and wish there were easily-accessible avenues through which to determine the answers.

Problems surrounding Duke’s mental health counseling service, CAPS, were discussed extensively and many students feel that this provided the most obvious area for improvement. First, students feel that it is too difficult to make and continue with appointments at CAPS. They believe this is caused by understaffing problems, which manifest into a general unwelcoming feeling toward students. One student explained that the inconvenience of having to physically go into the CAPS office or call to make appointments is discouraging, saying “It feels like ‘You don’t want me here. You don’t want me to go. I know you don’t.’” Several students also expressed frustration with the apparent appointment-cap, which they claim has forced them to stop getting counseling services. Within the counseling setting, students often feel apprehensive discussing their personal feelings with counselors who are still in training or who have very different identities from themselves. They desire better intersectionality of campus counselors so that students of diverse racial, ethnic, gender, and sexual orientation identities have a counselor that they can relate to and who will better understand their background.

NCCU students feel as though their institution does well at promoting healthy lifestyles through health-related student groups and classes through the recreation center, but that these resources are not used to their full potential by students. They

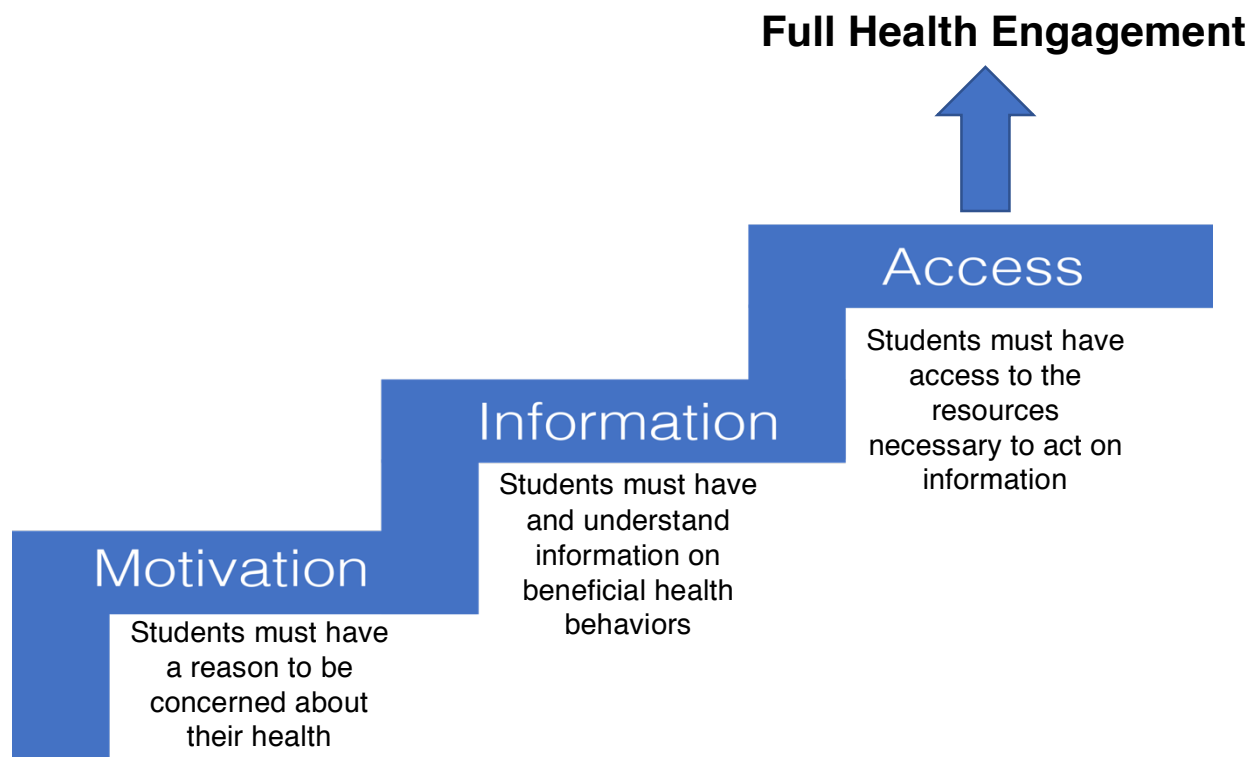
desire transportation services to connect them to resources that are not provided on campus. However, if on-campus resources improved, they may not feel the need to leave for treatment. They feel as though both mental and physical health services are understaffed and that there is not clear information on when these services are available. They also believe that since many of these services are not included in their tuition, they would be better served spending their money somewhere else.

A Health Engagement Process

Overview

Within the focus group discussions about health engagement, there arose a process of needs through which engagement is realized and practiced. The process was evident in the discussions of, and can be applied to, every area of health engagement. The first step in this process is having the motivation to engage. Once students are concerned about their health they will move onto satisfying the next need which is information about how to engage in that area of health. Finally, they will use this information to utilize available resources and engage with their health. There are universal barriers to each of the steps in this process which must be overcome to achieve engagement. Figure 2 (below) shows this three-step process to full health engagement.

Figure 2: Health Engagement Process



Motivation

Students must have a reason to be concerned about their health. Motivation was mentioned as a barrier for every area of health engagement. Lack of motivation was largely due to youth and current health status leading to lack of concern about health. For example, a Durham Tech student says “as a young person, because you have more capacity, more energy...[you] don’t feel inclined. I know I *could* do those things and improve, but it’s not something that I’m like, very stringent about.” Similarly, a Duke student explains:

I think part of it is the fact that we're all twenty-something. Late teens, early twenties. And so you tend not to feel like things coming on to some extent... But you hear a lot of cases of people going to see a doctor after a check-up, after having felt fine for years and years and years and they find that there's a tumor, there's diabetes, there's hypertension, there's something, right? Because we don't feel these things, they're so asymptomatic, it becomes harder and harder to pick up on to some extent.

NCCU students mentioned motivation barrier as well, though more in the context of campus culture than age. One student explained that “Our health’s important, but people don’t really put any emphasis on it. Whereas if people see other people put emphasis on it, they’ll be drawn to it.” A lack of emphasis on health was also cited as being a cultural aspect of minority groups. Without an active discussion or visibility of health, students will not be motivated to move to the next steps in the engagement process.

Information

Once motivated to engage with health, students need information on how to do so. Included in this step is information about available services, insurance plans, and healthy behaviors. A lack of information necessarily limits a student’s engagement with health. For example, students at both Durham Tech and NCCU learned about currently-available resources at their institution through other students during the focus groups. Without knowing, for example, that there is a student clinic on Durham Tech’s campus, many students reported that they never interacted with it.

Students describe seeking information online and often feel frustrated when the information is missing or incorrect. The need for accessible health-related information was evident throughout discussions at all three institutions. Table 8 (below) provides responses from each institution.

Table 8: Students' Desires for Information

Durham Tech	"I think that I would also like to see different health care representatives coming through this school to talk to different students about signing up for health care [and] what's available."
Duke	"I think another thing that could be a little bit clearer about Duke's health system where it applies to students is [that] there are free services and what are some—like what means are provided by Duke...I feel like they...tend to not really advertise or teach well what that means."
NCCU	<p>"We should probably have more knowledge about health [insurance]. Just cause you get those emails but if you choose to read them as opposed to not read them...I don't know nothing about health care. I don't even get a pamphlet on health care."</p> <p>"It can get tedious, especially with the health insurance 'cause I'm at that age where like, I still have Medicaid but it doesn't cover everything so...I'm still learning."</p>

Information barriers such as these limit students' abilities to access care and may discourage and demotivate even those who are initially interested in engaging with their health.

Resources

Though students need adequate information about resources to engage with them, providing information alone does not always allow for engagement. To engage with health, students need the resources to act on health information. Examples of necessary resources include a safe space to exercise, the financial means to purchase healthy foods, and adequate counseling services. Students at all three institutions describe lack of financial resources as a barrier to engaging with services or having a healthy diet, for example. Students at Durham Tech report low engagement in exercise behaviors largely due to a lack of workout facilities on campus and in surrounding areas. Duke students describe avoiding care services because of "nebulous copays," which is a sign of missing insurance information. NCCU students' lack transportation to reach off-campus services. All of these examples show that without resources, even a motivated and well-informed student cannot engage with their health.

DISCUSSION

Engagement is a Significant Predictor of Health Outcomes

The findings of this research have important policy implications, starting with the significance of engagement as a positive predictor of health outcomes. Though correlation does not directly imply causality, it does validate the link between high engagement and better outcomes. This supports the theory that engagement can be a useful component in designing health interventions to improve health, decrease prevalence of and spending on chronic illness, and improve quality of life. The results, therefore, establish health engagement as a priority for institutions to address policy change. The striking similarities between the significant variables in the engagement model and the barriers discussed in the focus groups provide especially useful information for putting this priority into practice at postsecondary institutions.

Institutional Comparisons

Across institutions, most areas of engagement are perceived to be low and students are able to point to direct barriers to engaging with their health. Many of these barriers are institution-specific, but some are universal among all three institutions. A major finding across all institutions was that students think of diet, exercise, and mental health first when thinking about their idea of “health.” They almost never consider engagement with health services or healthy discourse until asked specifically about health *engagement*. Even then, these areas of engagement are not always brought up. Sexual and reproductive health is similarly a component of engagement that is mentioned infrequently.

According to the survey data, NCCU has both the lowest engagement score and the worst average health outcomes according to PHQ depression score, number of chronic illnesses, and self-reported health status. The average BMI at NCCU was in the “obese” range. This trend does not hold true in the opposite direction though. While Durham Tech had the highest average engagement score, Duke’s health outcomes were, on average, better. This included a lower PHQ depression score, lower number of chronic illnesses, and better self-reported health status. Durham Tech’s average BMI was also in the “obese” range while Duke’s was in the “normal” range.

In the engagement model, Duke students were predicted to have lower engagement than those at Durham Tech and NCCU holding all else constant. On all health outcome measures, however, Duke had significantly better averages than the other two institutions. These paradoxical results demonstrate that, though engagement is significant in predicting health outcomes, it is not the only predictor. One possible explanation is lack of access to adequate health resources.

Students at Duke, which is a 4-year private institution, expressed the highest level of satisfaction with currently-available resources among all three institutions and explicitly recognized that these resources were superior to those of many other institutions. Meanwhile, those at Durham Tech and NCCU—a community college and an HBU—primarily expressed a desire for more resources and problems with currently-available resources. This trend was also present in students' perceptions of different types of health engagement at their institutions; Duke was the only institution in which students perceived high engagement in any area of engagement behaviors (exercise-related and discourse), while students at Durham Tech perceived low engagement in all areas. NCCU similarly reported either neutral or low engagement in all areas that were discussed in the focus groups. This result seems counterintuitive given that Duke's average engagement score was not the highest, but seems to stem from the availability of resources on campus. The engagement score encompasses many skills, some of which revolve around finding care. Durham Tech students may have to put more effort into finding adequate care than Duke students who have more convenient access to services, and thus become more engaged with the system.

Policy Implication: Target Populations & Barriers

Qualitative results from the focus groups help identify some explanations for the significance of the variables in the engagement model. Taken together, the findings specify target populations and describe relevant barriers for institutions to consider when formulating policy change.

Young Students Need Motivation & Information

Younger students tend to not be concerned about their health since they typically do not experience chronic illness and are often unmotivated to focus on health promotion and chronic illness prevention. Additionally, younger students have less experience interacting with the health system and tend to rely on their parents to schedule appointments, find providers, and interact with insurance. These barriers help explain why younger age is a significant predictor of lower engagement. The theory of emerging adulthood also backs up this relationship, as emerging adults are still transitioning to the full responsibility of adulthood.

Given these barriers to engagement for younger students, institutions should consider offering or requiring a health-related course for its incoming students that explains the necessity of health promotion. Students would also benefit from an easily-accessible and comprehensive information source, possibly in the form of an institution-based website. Information that they most often report desiring includes health service availability and insurance or copayment information. Having this information aggregated

in one accessible spot, along with general descriptions of the health engagement areas, would provide a valuable resource for younger students.

Healthy Students Need Motivation

The relationship between engagement and chronic illness seems counterintuitive given that higher engagement has been shown to be a significant predictor of *improved* health status. This result is supported, however, by students' descriptions of dealing with their own chronic or recurring illnesses. Some students with these illnesses describe necessarily interacting with health service more than their peers. This interaction typically related to understanding how to find specialty care and communicating with their insurance company to determine payment structures. Increased interaction with health services helps explain the significant association between more chronic illnesses and higher engagement. Another explanation lies in the lack of concern that young and healthy students report. Those who do not feel unhealthy often do not feel a need to engage with health, even if preventive health care could improve future health outcomes. Those with fewer chronic illnesses would consequently benefit from interventions that communicate the value in preventive care and health promotion. They should be reminded often that today's actions will influence future health and that many chronic illnesses tend to appear at older age but are largely preventable. This can be communicated by institutions fostering a culture of health promotion through, for example, health-promoting events and discussions.

Improving Mental Health Services Can Help Engage Students with Higher Levels of Depression

The relationship between higher PHQ depression score and lower engagement could not be explained by the reviewed literature and was not directly explained in the focus groups. A trend did appear, however, that could help explain why those with poorer mental health have lower engagement. At all institutions, mental health services were mentioned as an area of potential improvement. Rarely do students feel satisfied by the counseling services available at their institution. Even when students feel as though mental health care is a visible and acceptable topic in their campus culture, they are often unsure of how to translate this talk into action. Accessing on-campus counseling services is particularly difficult at all institutions because of understaffing issues. At Duke, it is difficult not only to find counselors who have adequate cultural knowledge to help with the issues of students with certain identities, but students are often forced to try and find off-campus counseling after only a few appointments. This introduces further difficulty, especially for students whose insurance does not cover these services. Those with fewer mental health needs may avoid this troubled area of

health service interaction and therefore have higher overall engagement than their peers who struggle to interact with their mental health services. Institutions should recognize their students' mental health needs and focus on making counseling services more easily accessible, inviting, and relevant to students' identities, backgrounds, and needs.

Racial Minority Students Would Benefit from Encouragement to Engage with Health and Accessibility Assistance

The significance of race as a predictor of engagement supports previous research on health inequalities in the U.S. White race predicted higher engagement than minority races, holding all else constant. This result parallels established links between minority racial groups and lower SES, which translates into more accessibility barriers to care. Other explanations for racial minority groups having lower predicted engagement were discussed in the focus groups. Religious stigma surrounding sexual and reproductive health and cultural disregard for health promotion are barriers to engagement for Asian, Black, and Hispanic students that were not mentioned by White students. Similarly, undocumented citizenship status is a cause of anxiety mentioned exclusively in the Durham Tech focus groups that prevents interaction with health services. These barriers can help explain the inequality in engagement score predictions for Asian, Black, and Hispanic (classified under "Other") students when compared to White students in the model.

Addressing the representation of service providers may benefit racial minority students who often find counselors unrelatable. In addressing racial minority status as a predictor to lower engagement, institutions should be sensitive to cultural differences while encouraging engagement. This result highlights the need for health engagement promotion specifically at minority-majority institutions. It is supported by the literature, which relates racial minority status, lower SES, and poorer health outcomes, and by the focus groups. Racial minority students at the two minority-majority institutions studied here reported low levels of health engagement while those at the primarily White institution reported feeling engaged in health because of campus culture and available resources. Regardless of the demographic composition of an institution, promoting the care and validity of mental health in particular on campus is one step that should be taken to help all students become more aware of and comfortable with talking about mental health care. Addressing accessibility needs, such as transportation and financial barriers, may also be particularly beneficial.

Students Need Gender-Specific Health Information and Services

While male identity was a significant predictor of lower engagement in the model, this factor was largely missing in the literature and the qualitative results. One possible explanation mentioned in the focus groups is that female students engage more with sexual and reproductive health, on the basis of seeking out birth control options and STD testing. Duke's presence of a Women's Center and lack of a corresponding "Men's Center" supports the idea that female students both engage and are encouraged to engage more with their health than male peers. Taking more steps to promote specifically men's health and the need for male students to engage with health points to one possible intervention point for institutions. An additional explanation for the correlation between gender and engagement was provided by female Duke students, who feel the need to seek out female health service providers. This added level of interaction with health services helps explain why female students are predicted to have higher engagement, but this barrier for female students should still be addressed by institutional effort for diversifying health services on campus. Institutions should also continue to encourage female students' engagement by providing information and services specifically in the area of sexual and reproductive health.

Discussion of the Institution Variable

The significance of institution in predicting engagement score provides insight into an important trend. Despite having access to the most resources and having the best health outcomes, Duke students are predicted to have a lower engagement score than Durham Tech and NCCU students, holding all else constant. These findings signify that convenience of and accessibility to health resources on campus may limit students' need to engage in seeking care or understanding insurance. While this implies a positive outcome while attending the institution, this may be detrimental to students when they leave campus and have not yet learned how to engage with health services in these ways. To combat this while preserving the benefits of providing resources to students, institutions should be sure to encourage students to engage with their health system. This could be done through providing an easily-accessible source of aggregated information, which is also beneficial for younger students in general. This source should not only list available resources, but should also describe aspects of engagement, such as how to contact insurance companies for service coverage information, that students may not become familiar with when interacting with these services. Exit counseling in the form of a seminar or webinar around the time of graduation would benefit students in navigating the health system out of the campus setting.

When paired with the comparisons of health outcomes among institutions, these findings expose a clear disparity in factors of health beyond engagement. Engagement

stems from the individual, but, as the emerged engagement process demonstrates, the individual is limited by his or her access to engagement information and resources. While Duke students' assessments of available resources were primarily positive, those at both Durham Tech and NCCU were not. Though every institution should be concerned with its students' health and health engagement, this trend implies that there is more of a need for resources at some institutions over others.

The significant difference among these institutions may be case-specific, but could indicate trends for similar institutions. A major difference that separates the three institutions is racial demographics. Durham Tech and NCCU are both minority-majority institutions, meaning that a majority of students are racial minorities, and Duke is a primarily White institution. Though the two minority-majority institutions did see a general lack of resources, this is likely not the explanatory factor since race was also present in the final model and so was accounted for.

Based on the literature, two-year institutions like Durham Tech are often attended by students of low SES, which has been frequently related to health outcomes. This relationship may imply that two-year institutions see worse health outcomes and this trend was seen in the results. The two-year or four-year disparity in health outcomes does not hold true when adding NCCU, which is a four-year institution but saw the worst outcomes overall, into the comparison. Another primary difference among the institutions which may help explain their engagement and general health outcomes is how they are funded. Durham Tech and NCCU are both public institutions whereas Duke is a private institution. This difference may imply a difference in emphasis of health policy between public and private institutions and could also imply a need for more health-related funding at public institutions.

Discussion of Other Variables

Despite being insignificant in the final engagement model, accessibility barriers, stress, and financial security were brought up as barriers in the focus groups. It is possible that these barriers were explained through other avenues. For example, the significance of institution may be partially explained through differences in resource availability, accessibility, and student SES. PHQ depression score may be related to stress. Still, it may be useful to keep these variables in mind in addressing intervention design.

BMI, family history of chronic illness, and sexual orientation were not discussed in the focus group and were also not found to be significant in the model. Hispanic ethnicity was also insignificant, but this is likely because it was explained within the race or institution variable.

Policy Implication: How Institutions Can Utilize the Process

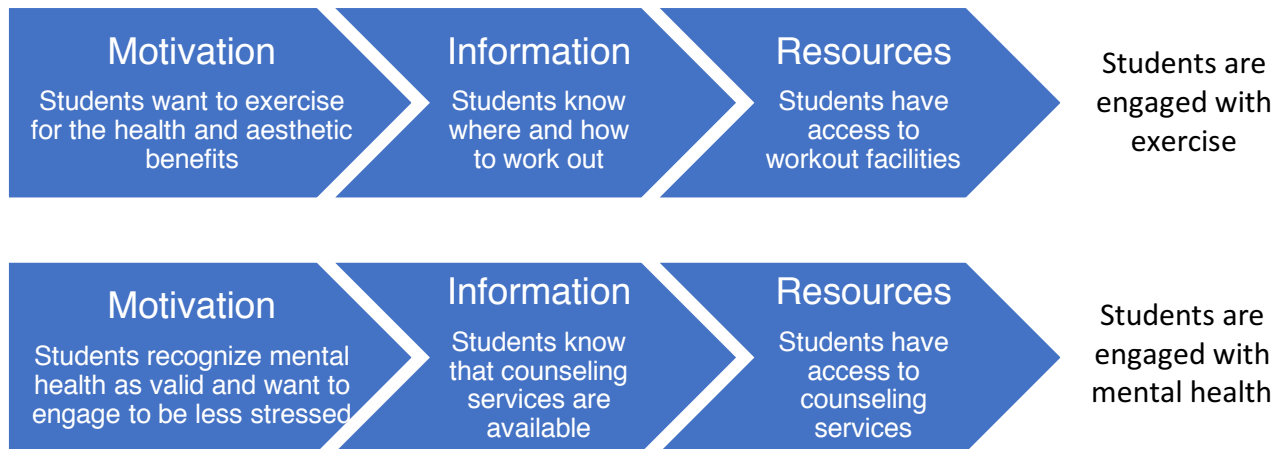
The engagement process that emerged provides a foundation for institutional policy change to address the multitude of variables that students face to health engagement. Each step of the engagement process model was included in the discussions of every health engagement area. This shows that the model can and should be applied to any area of engagement when designing interventions. Intervening at any step in the process is valuable, so long as previous steps have already been reached. Providing exercise facilities, for example, is not useful unless students are both motivated to exercise and are informed on how and where to access the facilities.

Student perceptions of health, which indicate that diet, exercise, and mental health tend to be higher priorities than other areas, provide a starting point for institutional intervention. These areas are more visible to students and thus, they are more motivated to engage within these areas than others. One implication of this finding is that institutions should capitalize on students' motivations in these areas. If students are motivated to engage with diet and exercise to improve their appearance or to engage with mental health because of the stresses of workloads, the first step in the engagement process has been met and institutions should invest first in providing for the next steps in these engagement areas. In line with the engagement process model, institutions should provide easily-accessible information surrounding healthy diets and exercise behaviors as well as mental health care practices. They should also invest in the resources so that students can act on this information; a safe space to exercise, healthy food options, and adequate counseling services are essential.

Another implication of this finding is that there is a need to promote a more complete conceptualization of health and health engagement to students. It is evident that students are not fully motivated to engage with health services or with healthy discourse, as they do not consider these engagement areas when thinking about what health means to them. Institutions should, therefore, focus on the first step of the engagement process in these areas before moving on. This effort could focus on helping students see the benefits in receiving care and the necessity of understanding insurance in order to do so. It could also include fostering a campus culture which prioritizes health as a whole. Once students are motivated to engage with health services and in healthy discourse, institutions can move on to providing information to and improving accessibility for students. These resources could take the form of an aggregated health information website or as a seminar for incoming or outgoing students.

Figure 3 (below) shows what this engagement process can look like in practice.

Figure 3: The Engagement Process in Practice



One warning that accompanies the engagement process model is the importance of helping all students reach each step rather than being satisfied when some students have reached health engagement. This warning comes from research that has shown some interventions to increase disparities when they only reach a certain subset of the target population. Many times, resources that are implemented through intervention policies to promote health outcomes and engagement are used the most by those who are already healthy or engaged (Glasgow, Vogt, & Boles, 1999; Adler & Newman, 2002).

CONCLUSION

Summary

This analysis identified clear trends in and barriers to health engagement for emerging adult at the three postsecondary institutions and provided evidence in favor of several expected relationships. First, health engagement was found to be a significant predictor of health outcomes, as measured by self-reported health status, in the expected direction, further validating the relationship which has previously been found. Next, it confirmed the expectation that students' perceptions of health would be primarily reflections of current literature of health on college campuses, focusing on physical and mental health aspects over other areas of health engagement. It confirmed one expectation about the differences among the three institutions, but found evidence against the other. The primarily White institution, Duke, was found to have significantly better health outcomes than the two institutions with a greater presence of racial

minority students. This trend was not true, however, for the differences in engagement score across the three institutions, where Durham Tech students were found to have significantly higher engagement. In addition to addressing the predicted outcomes, this research explored and identified barriers to health engagement faced by emerging adults at the postsecondary institutions.

Contributions to the Field

This research contributes to the fields of health engagement research and research on health at postsecondary institutions. First, it adds to previous research showing a positive correlation between and health outcomes. It also takes the study of engagement a step further by providing an exploration of its predictors, instead of solely studying engagement as a predictor itself. The engagement process and recommendations to combat significant barriers provides a foundation for policy intervention at postsecondary institutions and for further research. In achieving these outcomes, it also provides results for a diverse set of postsecondary institutions, including a two-year community college, filling a gap in the research.

Limitations & Directions for Further Research

This study was subject to several limitations. First, the sampling methods for the survey and focus groups were not Simple Random Samples, but were instead convenience samples. As such, they may not have been fully representative of the student population at each institution. This was reflected in the difference in demographic characteristics found in the survey compared to those reported by each institution as a whole. Second, the case study method necessarily limits the ability to extrapolate these results outside of the context the cases represented. Therefore, these results may not be transferrable to other institutions or to emerging adults outside of the postsecondary education context.

The findings of this research indicate a need for further research on the best practices in promoting health through engagement. Though many variables and barriers were found to be predictors of health engagement, the low R^2 value (0.1496) indicates a space for identifying more of these factors as areas of possible intervention. Finally, since the survey was static in time, it cannot relate a change in engagement to changes in health outcomes, but can only indicate that the two variables are correlated. Further experiments and longitudinal studies are needed to assess the power of engagement in changing health outcomes.

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APPENDIX

A1. Focus Group Guiding Questions

1. How would you describe a "healthy person"?
2. How would you describe someone who is engaged with their health?
 - a. What does health engagement mean to someone like you?
3. **DEFINE ENGAGEMENT FOR PARTICIPANTS (handout)**
 - a. (Using YEHS questions for consistency w/ quantitative results)

Health engagement includes most actions taken for, or behaviors relating to, an individual's health. It is considered active, rather than passive. Engaged patients are prepared and motivated to promote their own health. Some qualifications of *health engagement* are:

- Knowing where and how to find medical care
 - Knowing and feeling comfortable talking to adults about health concerns
 - Knowing how to use health insurance for care and medications
 - Knowing which health care services are confidential and which are not
 - Knowing where young people can go to see a doctor or other health care provider without their parents knowing about it
 - Communicating concerns with health care providers even if they do not ask
 - Talking to health care providers about different options to address health problems or concerns, rather than accepting the first option heard
 - Making appointments on your own to see a doctor or other health care provider
 - When making a plan with a doctor or other health care provider (medication schedule, diet plan, etc.), following through on the plan at home
 - Having a safe and trusting relationship with at least one doctor or other health care provider
 - Having the capacity and motivation to seek, understand, and act on health information
 - Actively avoiding risk behaviors (such as smoking) and engaging in promoting behaviors (such as exercise)
4. How would you summarize *health engagement* in one or a few sentences?
 5. How important are these things to students at your institution?
 6. What do you perceive as being the most difficult parts of health engagement for students at your school? Why?
 7. What are some obstacles that students at your school face that prevent them from engaging with their health in these ways?
 8. Are there resources that your institution offers that help support or encourage these behaviors?
 9. Are there actions that your institution takes that help support or encourage health engagement?

10. Are there resources that you *wish* your institution provided to encourage health engagement or support your health? This can be about things we haven't yet covered.
11. If these resources were available at your school, do you realistically think they would help improve student health engagement?
 - a. Why/Why not?
12. Do you have any final thoughts on health engagement for students in general?

A2. R Output From Regression Analyses

Self-Reported Health Status by Engagement & Institution Output

```
summary(lm(self-hengage + factor(institution), data=all))

##
## Call:
## lm(formula = self ~ hengage + factor(institution), data = all)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.8760 -0.5574 -0.1307  0.5652  2.9919
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    2.498283   0.130951  19.078 < 2e-16 ***
## hengage        -0.012253   0.004395  -2.788  0.00542 **
## factor(institution)2  0.433418   0.090492   4.790  1.96e-06 ***
## factor(institution)3  0.426689   0.070933   6.015  2.64e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.8919 on 870 degrees of freedom
## Multiple R-squared:  0.0565, Adjusted R-squared:  0.05325
## F-statistic: 17.37 on 3 and 870 DF,  p-value: 5.869e-11
```

Engagement Model Output

```
summary(hengage_model)

##
## Call:
## lm(formula = hengage ~ age + chronill + phq + factor(mod_race) +
##     factor(sex) + factor(institution), data = all)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -24.329  -3.933   0.035   4.577  16.649
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    16.7638    2.2634   7.407 3.08e-13 ***
## age             0.4704    0.1011   4.652 3.80e-06 ***
## chronill        0.7063    0.2546   2.774 0.005654 **
## phq            -0.9398    0.1584  -5.934 4.27e-09 ***
## factor(mod_race)black  1.5367    0.8942   1.719 0.086056 .
## factor(mod_race)other -1.3997    1.3242  -1.057 0.290798
## factor(mod_race)white  2.3785    0.6295   3.778 0.000169 ***
## factor(sex)2        1.0825    0.4930   2.196 0.028374 *
## factor(institution)2  0.3271    0.7231   0.452 0.651194
## factor(institution)3  3.4416    0.7646   4.501 7.69e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 6.505 on 864 degrees of freedom
## Multiple R-squared:  0.1496, Adjusted R-squared:  0.1407
## F-statistic: 16.88 on 9 and 864 DF,  p-value: < 2.2e-16
```