# The Cumulative Impact of Unmet Essential Needs on Indicators of Attrition: Findings from a Population-Based Sample of Public University Students in the Bronx, NY

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# Abstract

In recent decades, a growing proportion of college students have experienced financial stress, resulting in unmet essential needs including food insecurity, housing instability, lack of healthcare access, and inadequate mental health treatment. Given that urban-based public universities constitute a substantial proportion of the U.S. college student population, understanding how unmet needs affect academic achievement in this population is crucial for developing strategies that alleviate college failure and dropout. We examined the cumulative impact of unmet essential needs on indicators of college attrition (dropout, leave of absence, risk of academic probation). The sample comprised a population-representative sample of 1,833 students attending one of three urban public colleges in the Bronx, NY. Employing multinomial and binomial logistic regression models, we assessed how total unmet essential needs predicts any indicator of college attrition. Each unit increase in unmet need increased the odds of having any attrition indicator by 32% (p < 0.01). Students with one unmet need had 17% greater odds (p = 0.04), students with two unmet needs had 55% greater odds (p < 0.01), students with three unmet needs had 73% greater odds (p < 0.01), and students with four unmet needs had 82% greater odds (p < 0.01) of having any attrition indicator. Findings revealed a modest dose-response relationship between the number of unmet needs and the likelihood of experiencing indicators of attrition, supporting a potential causal link between unmet needs on the risk of attrition. Designing interventions aimed at college students with multiple unmet essential needs, and addressing these needs holistically, can potentially enhance student retention and graduation rates.

# Introduction

Adequate food, stable housing, physical health, and psychological well-being provide a foundation for retention, graduation and academic success among college students.[1,2] The long-standing conventional belief that most college students have these essential needs met obscures a stark reality faced by many in the United States (U.S.).[3,4] In recent decades, the proportion of college students facing financial distress has increased as the rising cost of higher education has outpaced wages and diminished the purchasing power of financial aid.[5] As such, many students are forced to rely on personal funds or to take on debt contributing to financial instability.[6] Simultaneously, there has been an increase in the share of Black, Latino, and immigrant-origin students enrolling in college, many of whom lack familial wealth to support them.[6] Accordingly, some higher education leaders and public officials have recognized that food insecurity, housing instability, lack of access to healthcare, and unmet need for mental health treatment may undermine the ability of many students to persist and succeed in their academic pursuits.[4,7–10]

Existing research has predominantly examined unmet essential needs independently, focusing on individual needs rather than considering them collectively. However, multiple unmet needs may have compounding effects on the challenges urban college students face and their ability to succeed in college. The objective of this study is to contribute a comprehensive understanding of the impact of unmet essential needs on college persistence by examining their cumulative effects among urban college students.

The high prevalence of food insecurity and housing instability among U.S. college students is recognized as a significant threat to student well-being and success.[5,7] A recent nationally representative survey found that 22% of college students face food insecurity, with prevalence estimates ranging from 14–59% across campuses nationwide.[11,12] Housing instability, characterized by the inability to pay rent/mortgage and utilities, unstable or unreliable housing situations, or living in overcrowded or unsafe conditions, is also a pressing concern.[5,7] Data from a nationally representative study estimated that nearly 10% of undergraduate students are homeless or at risk for homelessness. Results from a recent literature review of research utilizing multiple measures and samples indicated that 45% of students experience some form of housing instability.[5] Evidence from every college type in the U.S., including public, private and for-profit, and at community colleges and bachelor's-level institutions shows the presence of food insecurity among college students. However, community college students are consistently at greater risk than their peers at bachelor's-level institutions.[5,13]

Unmet food and housing needs have been shown to disrupt students' education, as those facing these challenges are less likely to attend class and are at higher risk of failure to complete their degrees.[14,15] Research has also linked food and housing insecurity to lower academic achievement and grade point average (GPA).[16–18]

The negative effects of basic needs insecurities extend beyond academic outcomes. Evidence shows associations between food and housing insecurity and poorer health, depression, and increased perceived stress.[19,20] Thus, ensuring students' psychological and physical health needs are met is also crucial for ensuring academic success. Anxiety, depression, and post-traumatic stress disorder (PTSD) are among the most common mental health challenges facing college students.[21] Several studies have found that these mental health disorders are negatively associated with academic performance and retention.[22–24]

Student well-being and success require meeting physical needs as well. Health concerns common among college students include sexual and reproductive healthcare needs, chronic diseases such as asthma, diabetes or hypertension, or disabilities requiring specialized services.[10] Several factors complicate adequate access to comprehensive healthcare for college students, especially those attending community colleges or under-funded public universities that lack college-based health services. Young adults are more likely to be uninsured than the rest of the population. In 2021, 8% of all U.S. adults lacked health insurance, but 15% of those between 19 and 25 years were uninsured.[25] Undocumented immigrants ineligible for federal insurance are even more likely to be uninsured.[26] One study found that more than half of uninsured young adults went without needed care, including not seeing a doctor, failing to fill a prescription, or skipping a recommended test, treatment or follow-up visit, because of cost.[27] While research on the impact of healthcare access on academic success is limited, improved access may lead to increased utilization of preventive services, early intervention for mental health issues, reduced unwanted pregnancies, better management of chronic conditions, and decreased medical debt, all of which may positively affect students' educational pursuits.[10]

While unmet essential needs have significant implications for college students, existing research addresses these needs in isolation. This study aims to fill this knowledge gap by assessing whether variations in the number and types of unmet needs among students may have varying effects on student retention. By

considering the cumulative number of unmet needs and their association with academic attrition, including dropout or risk for dropout, this research seeks to better understand the relationship between the severity of unmet needs and college success. We hypothesize that the interconnected nature of essential needs may have compounding effects on students.

## Methods

## Study Population and Survey Design

The City University of New York (CUNY), the largest urban public university in the U.S., comprises 25 colleges located throughout New York City. During the 2021-22 school year, approximately 243,000 matriculated students enrolled at CUNY, with 27,000 attending three campuses in Bronx county, including two community colleges (Bronx Community and Hostos) and one bachelor's-level and graduate college (Lehman College). This study focuses on understanding the experiences of students at these campuses and serves as a baseline assessment for a three-year pilot demonstration project called CUNY Comprehensive Access to Resources for Essential Services (CARES). CARES aims to connect Bronx students to services and benefits programs that support their essential needs. The student population in the Bronx is predominantly people of color, with 92% of students identifying as Black, Hispanic/Latino or Asian/Pacific Islander, and 56% are full-time students.

To better understand the experiences of Bronx students in meeting their essential needs, CARES partnered with the CUNY Office of Applied Research, Evaluation and Data Analytics (OAREDA) to disseminate a survey to a population-representative sample of Bronx students enrolled during the 2021-22 academic year. The survey aimed to collect information from a simple random sample of 10,000 students who had been enrolled at BCC, Hostos, and Lehman during the fall of 2021. Selected students were invited via email to participate in an online survey between September 7th and September 30, 2022. The survey explored various aspects of students' experiences, such as their education, food security, housing, mental health, and healthcare. Respondents received a $20 gift card and three were randomly selected to receive an additional $100 gift card for participation. People were encouraged to participate in the survey, even if they no longer attended CUNY because they had graduated or dropped out.

Of the 10,000 students invited, 1,833 completed the survey (18.3% response rate). The study was approved by the City University of New York Institutional Review Board (IRB) (protocol # 2022 – 0388). In this analysis, we assessed the association between number of unmet essential needs and academic attrition indicators, including dropping out, taking a leave of absence, or being at risk for academic probation.

## Defining Cumulative Unmet Essential Needs

We identified four types of unmet essential needs prevalent in the student population: food insecurity, housing instability, lack of healthcare access, and unmet need for mental health services. Our predictor variable was cumulative number of unmet needs per respondent- from zero to four where unmet essential needs were defined as follows:

## Food Insecurity

We used the United States Department of Agriculture's US Household Six-Item Food Security Module to generate a validated measure of respondents' food security status during the previous 12 months. We created a binary variable where respondents were categorized as either food insecure (low or very low food security) or food secure (high or marginal food security).

## Housing Instability

Respondents that selected 'yes' to any of the following situations in the last 12 months were categorized as experiencing housing instability: 1) Unable to pay or underpaid rent or mortgage, 2) Received a summons to appear in housing court, 3) Unable to pay the full amount of gas, oil, or electricity bill, 4) Moved in with others due to financial problems, 5) Lived with others beyond the capacity of the house or apartment, 6) Left household due to feeling unsafe, or 7) Was homeless.

## Lack of Healthcare Access

We defined lack of healthcare access as either the absence of health insurance coverage, the inability to obtain necessary medical care when needed in the past year, or both. To assess health insurance coverage, respondents were asked whether they currently had health insurance. Participants responding 'no' were categorized as being uninsured.

To determine inability to access medical care, respondents were asked: "Was there a time in the past 12 months when you needed medical care but didn't get it? Medical care includes doctor visits, tests, procedures, prescription medication, and hospitalizations." Participants responding 'yes' were categorized as being unable to get medical care when they needed it.

Participants who were uninsured, unable to access medical care or both were subsequently categorized as lacking healthcare access.

## Unmet Need for Mental Health Treatment

Unmet need for mental health treatment was defined first by identifying individuals screening positive for anxiety, depression, or at least one symptom of post-traumatic stress disorder (PTSD), followed by assessing their utilization and/or satisfaction with mental health services they received in the past 12 months.

Anxiety and depression were assessed using PHQ-4, a validated tool that detects symptoms of anxiety and depression. It consists of four items that ask participants to rate the frequency of specific problems experienced over the past two weeks. Participants responded on a 4-point scale, with options ranging from "not at all" (scored as 0) to "nearly every day" (scored as 3). A positive screening for anxiety was determined if the total score for the anxiety-related

symptoms was three or higher. Similarly, a positive screening for depression was assigned if the total score for the two depression-related symptoms was three or higher.

PTSD symptomology was evaluated using the PC-PTSD-4 screening scale.[28] Participants were considered positive for PTSD symptoms if they experienced any of the listed events in the past year: having nightmares or intrusive thoughts, trying to avoid thoughts or situations related to the event, being hyper-vigilant or easily startled, or feeling emotionally detached or numb.

To assess the utilization of mental health services, respondents were asked if they received counseling or therapy from a mental health professional within the past 12 months. Respondents who selected "yes" were categorized as utilizing mental health services. Additionally, these respondents were asked to rate their satisfaction with the mental health service(s) received, with response options ranging from "very satisfied" to "not at all satisfied." Those indicating that they were "not at all satisfied" were categorized as being dissatisfied with the services they received.

Respondents identified as having anxiety, depression or any PTSD symptoms and who also 1) did not utilize mental health services, or 2) utilized mental health services but were dissatisfied with the services they received, were categorized as having an unmet need for mental health treatment.

## Defining Attrition Indicators

The outcome variable of interest was any academic attrition indicator as measured by three variables: dropping out, taking a leave of absence, or being at risk for academic probation.

Dropping out was evaluated using the question, "How many years in total do you expect it will take to complete your current degree from the time you began?" Response options ranged from 2 to 7 + years, with an additional option for respondents to indicate, "I dropped out/withdrew/failed out of the program." Participants selecting the latter option were categorized as having dropped out. Leave of absence (LOA) was assessed by asking, "Did you take a leave of absence (formal or informal) in Spring 2022 and/or Fall 2022?" (yes/no) Participants who responded affirmatively to either semester were categorized as having taken LOA.

To define risk for academic probation, we adapted criteria for academic probation from two of the Bronx CUNY campuses and created a variable indicating if the respondent was at risk for academic probation.[29] We defined this as a GPA less than 2.50 for students that completed 25 or more credits, a GPA of less than 2.25 for those with 13–24 credits, and a threshold of less than 2.00 for students with 0.5–12 credits. To ensure accurate assessment, the university's official GPA data were matched to the probability sample.

Respondents who were identified as being at risk of academic probation, having dropped out, or having taken a LOA were subsequently categorized as having experienced any attrition indicator.

## Covariates

Most variables included as covariates in the adjusted model were provided by OAREDA from the university student database matched to the probability sample. These included age (continuous), sex (women vs. men), race/ethnicity (American Indian/Alaska Native, Asian/Pacific Islander, non-Hispanic Black, Hispanic/other, non-Hispanic White), college type (community vs. senior college), and enrollment status in fall 2021 (part-time vs. full-time). In addition, sexual orientation (heterosexual vs. LGBTQ + vs. missing) was also included as a covariate and was a self-reported measure in the survey.

## Analysis

The sample was weighted to account for survey non-response bias based on demographic criteria used to select the initial probability sample including age, race/ethnicity, sex, campus, year in school, and GPA. To provide an overview of our findings, Table 1 shows weighted estimates with chi-squared tests to compare socio-demographic characteristics with academic attrition indicators and two or more unmet needs. Next, we examined the prevalence and composition of total unmet needs in the Bronx student population and examined Pearson's correlation coefficients between the types of unmet needs. Finally, we conducted weighted crude and multivariable regression models. Using logistic regression, we estimated how academic attrition indicator among students with one or more unmet needs compares to students who have all these needs met. Using multinomial regression, we estimated how each unit increase in the number of unmet essential needs predicts experiencing an indicator of attrition.

Table 1
Descriptive characteristics of Bronx City University of New York (CUNY) students enrolled in fall 2021 by any indicator of attrition (stopping out, taking leave of absence or at risk for academic probation) and having two or more unmet needs

| Characteristic | Total (n = 1,833) | | Any Attrition Indicator° (n = 1,817) | | 2 + Unmet Needs (n = 1,750) | |
|---|---|---|---|---|---|---|
| | N | Wt. % | Row Wt. % | P-Value‡ | Row Wt. % | P-Value‡ |
| Total | 1,833 | 100 | 24.2 | | 49.4 | |
| Food Insecurity | 767 | 43.6 | 27.0 | < 0.0001 | 75.7 | < 0.0001 |
| Housing Instability | 879 | 49.0 | 27.7 | < 0.0001 | 69.8 | < 0.0001 |
| Lack of Mental Health Treatment | 753 | 41.1 | 26.9 | < 0.0001 | 43.5 | < 0.0001 |
| Lack of Healthcare Access | 360 | 20.2 | 27.1 | 0.0005 | 78.3 | < 0.0001 |
| College Type | | | | < 0.0001 | | < 0.0001 |
| Community College | 812 | 45.4 | 32.2 | | 53.5 | |
| Senior College | 1,021 | 54.6 | 17.6 | | 46.1 | |
| Race/ethnicity | | | | < 0.0001 | | < 0.0001 |
| American Indian or Alaska Native | 5 | 0.2 | 0.0 | | 39.5 | |
| Asian or Pacific Islander | 140 | 5.6 | 16.6 | | 42.8 | |
| Black, non-Hispanic | 630 | 36.6 | 25.9 | | 51.3 | |
| Hispanic, other | 969 | 51.8 | 25.6 | | 49.5 | |
| White, non-Hispanic | 89 | 5.8 | 8.8 | | 42.4 | |
| Born outside of US | 749 | 41.3 | 18.6 | < 0.0001 | 49.7 | 0.5649 |
| Enrollment Status | | | | < 0.0001 | | < 0.0001 |
| Full-time | 1,205 | 60.2 | 20.3 | | 46.5 | |
| Part-time | 628 | 39.8 | 30.1 | | 53.7 | |
| Age | | | | < 0.0001 | | < 0.0001 |
| 18−20 | 513 | 26.2 | 26.0 | | 39.8 | |
| 21−24 | 519 | 28.1 | 29.2 | | 47.8 | |
| 25−30 | 325 | 19.0 | 22.2 | | 55.4 | |
| 31−71 | 476 | 26.7 | 18.6 | | 55.9 | |
| Sex | | | | 0.0001 | | < 0.0001 |
| Women | 1,379 | 66.8 | 25.3 | | 52.5 | |
| Men | 454 | 33.2 | 21.8 | | 43.0 | |
| Sexual orientation | | | | < 0.0001 | | 0.0732 |
| Heterosexual | 1,207 | 65.9 | 21.7 | | 36.4 | |
| LGBTQ+/ other | 441 | 24.1 | 29.2 | | 38.9 | |
| Missing | 185 | 10.1 | 28.5 | | 35.6 | |
| Wt.=weighted | | | | | | |
| ‡Chi-squared test used for comparison | | | | | | |
| ° Any attrition indicator is defined as dropping out, taking leave of absence, and/or being at risk for academic probation (Grade Point Average 2.50 if 25 + credits, 2.25 if 13−24 credits, 2.00 if 12 or fewer credits) | | | | | | |

## Sensitivity Analysis

As there is no official definition in the literature about what constitutes low GPA, we conducted a sensitivity analysis expanding the definition of this threshold. This threshold is derived from the observation that 45% of students who drop out of college nationwide complete their first year with a GPA ranging from 2.0 to 3.0. We defined this as a GPA less than 3.00 for students that completed 25 or more credits, a GPA of less than 2.75 for those with 13−24 credits, and a threshold of less than 2.50 for students with 0.5−12 credits.

# Results

The most prevalent unmet need within the population was housing instability, affecting 49.0% of students, followed by food insecurity (43.6%), unmet need for mental health treatment (41.1%), and lack of healthcare access (20.2%). Housing and food insecurity were moderately positively correlated ($r^2 = 0.35$) while there was low positive correlation between all other combinations of unmet needs with coefficients ranging from 0.06 to 0.17.

Almost a quarter (24.2%) of the Bronx CUNY campus student population faced at least one indicator of attrition (Table 1). This was primarily driven by risk for academic probation (15.4%) and taking an LOA (11.4%); 2.0% of respondents reported having dropped out of their studies. About half (49.4%) of students had two or more unmet needs while one in five (21.9%) had at least three unmet needs (Table 2).

Table 2
Prevalence and Composition of Total Unmet Essential Needs in the Bronx CUNY Student Population *(n = 1,750)*\*

| # Unmet needs | Total Prevalence (N, wt. %) | Food Insecurity (N, row wt. %) | Housing Instability (N, row wt. %) | Lack of Mental Health Support (N, row wt. %) | Lack of Healthcare Access (N, row wt. %) |
|---|---|---|---|---|---|
| 0 | 387 (22.3) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| 1 | 498 (28.3) | 109 (22.1) | 150 (30.0) | 194 (38.9) | 45 (9.1) |
| 2 | 486 (27.5) | 303 (62.0) | 350 (72.2) | 228 (46.5) | 91 (19.3) |
| 3 | 290 (16.8) | 265 (91.5) | 268 (92.2) | 219 (74.6) | 118 (41.7) |
| 4 | 89 (5.1) | 89 (100.0) | 89 (100.0) | 89 (100.0) | 89 (100.0) |
| *wt.=weighted* | | | | | |
| *\* Total n includes students with complete data for total unmet needs variable* | | | | | |

Students having any attrition indicator and unmet needs were more likely to attend community colleges, with a higher representation of Black and Hispanic individuals, part-time students, women, and LGBTQ + students. Among age categories, individuals aged 21–24 demonstrated a higher prevalence of having any attrition indicator, while those aged 25 and above experienced a greater number of unmet needs.

In the multinomial regression model adjusted for age, sex, race/ethnicity, college type, and enrollment status, we found that every unit increase in the number of unmet needs increased the odds of having any attrition indicator by 32% (aOR 1.32, 95% CI 1.16, 1.51). In both crude and adjusted logistic regression models, we observed a dose-response relationship between the number of unmet needs and odds of experiencing any attrition indicator (Table 3). Compared to students without unmet needs, students with one unmet need had 17% greater odds of having any attrition indicator (aOR 1.17, 95% CI 1.01, 1.36) while students with two unmet needs had 55% greater odds (aOR 1.55, 95% CI 1.34, 1.80) of any attrition indicator. Students with three unmet needs had 73% greater odds (aOR 1.73, 95% CI 1.47, 2.04) of any attrition indicator and students with four unmet needs had 82% greater odds (aOR 1.82, 95% CI 1.44, 2.29) of any attrition indicator. The results of the sensitivity analysis were consistent with the main findings, demonstrating the persistence of the dose-response relationship, with no substantive changes in the effect measures.

Table 3
Crude and adjusted regression models for the association between total number of unmet essential needs and any indicator of attrition (stopping out, taking leave of absence or at risk for academic probation), *n = 1,738*\*

| Regression Model | # Unmet Needs | N, row Wt % | Crude OR (95% CI) | Adjusted OR\*\* (95% CI) |
|---|---|---|---|---|
| Multinomial | - | - | 1.37 (1.21, 1.55) | 1.32 (1.16, 1.51) |
| Logistic | 0 | 71 (18.6) | -ref- | -ref- |
| | 1 | 102 (21.6) | 1.20 (1.04, 1.39) | 1.17 (1.01, 1.36) |
| | 2 | 127 (27.3) | 1.64 (1.43, 1.89) | 1.55 (1.34, 1.80) |
| | 3 | 85 (28.4) | 1.73 (1.49, 2.02) | 1.73 (1.47, 2.04) |
| | 4 | 28 (32.1) | 2.06 (1.65, 2.58) | 1.82 (1.44, 2.29) |
| *Wt.=Weighted; OR = Odds Ratio; CI = confidence interval* | | | | |
| *Total n includes students with complete data for both total needs and any academic progression risks variables* | | | | |
| *\*\*Adjusted for age, race/ethnicity, gender, college type (community vs. senior), student status (full-time vs. part time), and sexual orientation (heterosexual vs. LGBTQ + vs. missing)* | | | | |
| *\*Total n includes students with complete data for both total needs and attrition variables* | | | | |

# Discussion

This study is one of the first to explore the relationship between cumulative unmet basic needs and indicators of academic progress among college students. The findings revealed a modest dose-response relationship between the number of unmet needs and the likelihood of experiencing indicators of attrition in

adjusted models, suggesting a cumulative impact of unmet needs on the risk of attrition among public college students. While the current study is cross-sectional, the observed dose-response supports a potential causal link between unmet needs and academic success. These findings suggest that developing and testing new interventions that target students with multiple unmet needs could contribute to student retention and graduation. Furthermore, these results emphasize the significance of addressing students' essential needs holistically, rather than treating each need in isolation.

These findings align with the current literature linking food insecurity, housing instability, and poor mental health with adverse academic outcomes, including dropout and poor academic achievement. They also provide supporting evidence for our hypothesis that the interconnected nature of various essential needs have compounding effects on students. For example, food and housing insecurity often coexist, with limited resources forcing trade-offs between rent and food.[30] High housing costs may leave little funds for nutritious meals, posing a threat to both mental and physical health, issues which may be further compounded by inadequate healthcare access, as students who lack access may delay necessary medical services, leading to higher medical expenses in the future.[10] Notably, prior research by our group suggests that the relationship between food insecurity and academic progress might be partially mediated by poor mental health.[15]

Our study revealed alarmingly high rates of unmet needs among students in the Bronx, with approximately half experiencing two or more unmet needs and only one in five having all of these needs met. Food and housing insecurity continues to be a pressing issue across New York City where food and housing costs have soared to unprecedented levels; As a result, numerous households, particularly those with low-incomes, struggle with how to pay for rent and their next meal.[31] CUNY has been working to meet these needs for students; the CUNY Lifting New York strategic plan for 2023–2030 recognizes the importance of fulfilling students' overall well-being in order to excel academically and prioritizes student support.[32]

There are several programmatic and policy strategies colleges and policymakers may consider to reduce the number of unmet essential needs for the college student population to promote retention, persistence, and overall academic achievement. Many colleges across the country have already implemented programs to address basic needs insecurity and student health; these include food pantries, meal vouchers, emergency aid, cross-sector partnerships, and supporting student access to public benefits.[33] However, many colleges face limited resources to meet the essential needs of their students. Furthermore, many colleges have limited or no provisions for student housing or comprehensive health services. This is often the case at public universities where the focus is primarily on classroom spaces and academic facilities. Moreover, many higher education officials hold the view that assuming responsibility for their students' food, housing, and health care needs represents mission creep, going beyond the institution's core objectives.[34]

Campuses, policymakers, and government institutions can work together to create innovative solutions that connect students to existing campus and community-based resources. To aid in this process, campuses may consider implementing data collection systems to monitor the level of unmet needs among students and aid in the development of targeted strategies to support them. Such evidence can inform policy decisions and guide the development of effective interventions that target those with more than one unmet need. Additionally, embedding support structures within colleges, including dedicated staff positions responsible for coordinating and implementing essential needs programs can ensure ongoing attention and coordination of efforts.[35]

This study has several limitations. The reliance on self-reported survey data for unmet essential needs and LOAs/dropping out introduces the potential for recall bias, although we used validated measures to the extent possible. Additionally, students that dropped out of CUNY may have been underrepresented in the study. Our response rate was 18.3%; while we estimated weights to adjust for response bias based on sociodemographic characteristics, our population estimates may still be biased due to non-response. Additionally, LOA does not always lead to future lost retention; for some students, it may help facilitate return to college following parental leave, starting a new job, or addressing health issues. The distinct characteristics of the Bronx student population, such as socioeconomic status, cultural diversity, and urban environment, may influence the prevalence and impact of unmet needs in ways that differ from other regions or types of higher education institutions.

Securing students' fundamental needs is essential for their lifetime well-being and evidence suggests it also facilitates learning and college completion. University administrators and policymakers should work together to create an environment that holistically supports student well-being, reduces prevalence of unmet needs, and increases the likelihood of student success and graduation.

# Declarations

# References

1. Manze M, Lattanzio A, Larsen J, Keegan J, Freudenberg N, Jones HE. The primacy of meeting public university students' essential needs in the wake of COVID-19: An overdue higher education priority. *Journal of American College Health*. 2022;0(0):1-6. doi:10.1080/07448481.2022.2076105

2. Moore A, Nguyen A, Rivas S, Bany-Mohammed A, Majeika J, Martinez L. A qualitative examination of the impacts of financial stress on college students' well-being: Insights from a large, private institution. *SAGE Open Med*. 2021;9:20503121211018122. doi:10.1177/20503121211018122

3. Broton KM, Goldrick-Rab S. Going Without: An Exploration of Food and Housing Insecurity among Undergraduates. *Educational Researcher*. 2018;47(2):121-133. doi:10.3102/0013189X17741303

4. Goldrick-Rab S, Broton K, Eisenberg D. Hungry to Learn: Addressing Food and Housing Insecurity among Undergraduates. Published online 2015. Accessed November 1, 2022. https://www.acct.org/files/Publications/2015/Wisconsin_hope_lab_hungry_to_learn.pdf

5. Broton KM. A review of estimates of housing insecurity and homelessness among students in U.S. higher education. *Journal of Social Distress and Homelessness*. 2020;29(1):25-38. doi:10.1080/10530789.2020.1677009

6. Bareham H. Why Students Who Need Financial Aid The Most Aren't Getting Enough Of It. Bankrate. Accessed July 20, 2023. https://www.bankrate.com/loans/student-loans/why-students-dont-get-enough-financial-aid/

7. Goldrick-Rab S, Baker-Smith C, Coca V, Looker E, Williams T. *College and University Basic Needs Insecurity: A National #RealCollege Survey Report*. The Hope Center; 2019. Accessed June 30, 2023. https://www.insidehighered.com/sites/default/files/media/HOPE_realcollege_National_report_EMBARGOED%20UNTIL%20APRIL%2030%203%20AM%20EST.pdf

8. Martinez SM, Frongillo EA, Leung C, Ritchie L. No food for thought: Food insecurity is related to poor mental health and lower academic performance among students in California's public university system. *J Health Psychol*. 2020;25(12):1930-1939. doi:10.1177/1359105318783028

9. Brandy J, Penckofer S, Solari-Twadell P, Velsor-Friedrich B. Factors Predictive of Depression in First-Year College Students. *Journal of psychosocial nursing and mental health services*. 2015;53:38-44. doi:10.3928/02793695-20150126-03

10. Healthy CUNY Survey Group, Palmeco C, and Freudenberg N. *Q&A on Lack of Access to Health Care as a Barrier to Academic Success at CUNY*. CUNY Graduate School of Public Health and Health Policy; 2019. Accessed June 30, 2023. https://sph.cuny.edu/wp-content/uploads/2019/03/Report_04_Health-Care-Access_Final.pdf

11. Nikolaus CJ, An R, Ellison B, Nickols-Richardson SM. Food Insecurity among College Students in the United States: A Scoping Review. *Adv Nutr*. 2020;11(2):327-348. doi:10.1093/advances/nmz111

12. Riddle ES, Niles MT, Nickerson A. Prevalence and factors associated with food insecurity across an entire campus population. *PLoS One*. 2020;15(8):e0237637. doi:10.1371/journal.pone.0237637

13. Keefe S, Garagiola-Bernier A, Kiley E, England J, Schmitt SR, Shore M. Campus Food Insecurity: Bringing Private Institutions into Conversations on Basic Needs. *Journal of Hunger & Environmental Nutrition*. 2021;16(5):628-642. doi:10.1080/19320248.2020.1838984

14. Silva MR, Kleinert WL, Sheppard AV, et al. The Relationship Between Food Security, Housing Stability, and School Performance Among College Students in an Urban University. *Journal of College Student Retention: Research, Theory & Practice*. 2017;19(3):284-299. doi:10.1177/1521025115621918

15. Berger E, Larsen J, Freudenberg N, Jones HE. Food insecurity associated with educational disruptions during the COVID-19 pandemic for college students and the role of anxiety and depression. *Journal of American College Health*. Published online July 14, 2022:1-4. doi:10.1080/07448481.2022.2093115

16. Martinez SM, Webb K, Frongillo EA, Ritchie LD. Food insecurity in California's public university system: What are the risk factors? *Journal of Hunger & Environmental Nutrition*. 2018;13(1):1-18. doi:10.1080/19320248.2017.1374901

17. Broton K. Poverty in American Higher Education: The Relationship Between Housing Insecurity and Academic Attainment. *Journal of Postsecondary Student Success*. 2021;1(2):18-45. doi:10.33009/fsop_jpss129147

18. Maroto ME, Snelling A, Linck H. Food Insecurity Among Community College Students: Prevalence and Association With Grade Point Average. *Community College Journal of Research and Practice*. 2015;39(6):515-526. doi:10.1080/10668926.2013.850758

19. Kim K, Frongillo EA. Participation in food assistance programs modifies the relation of food insecurity with weight and depression in elders. *J Nutr*. 2007;137(4):1005-1010. doi:10.1093/jn/137.4.1005

20. Jones AD. Food Insecurity and Mental Health Status: A Global Analysis of 149 Countries. *Am J Prev Med*. 2017;53(2):264-273. doi:10.1016/j.amepre.2017.04.008

21. Pedrelli P, Nyer M, Yeung A, Zulauf C, Wilens T. College Students: Mental Health Problems and Treatment Considerations. *Acad Psychiatry*. 2015;39(5):503-511. doi:10.1007/s40596-014-0205-9

22. Kivlighan DM, Schreier BA, Gates C, et al. The role of mental health counseling in college students' academic success: An interrupted time series analysis. *J Couns Psychol*. 2021;68(5):562-570. doi:10.1037/cou0000534

23. Boyraz G, Horne SG, Owens AC, Armstrong AP. Academic achievement and college persistence of African American students with trauma exposure. *J Couns Psychol*. 2013;60(4):582-592. doi:10.1037/a0033672

24. Boyraz G, Granda R, Baker CN, Tidwell LL, Waits JB. Posttraumatic stress, effort regulation, and academic outcomes among college students: A longitudinal study. *Journal of Counseling Psychology*. 2016;63(4):475-486. doi:10.1037/cou0000102

25. Bureau UC. Health Insurance Coverage in the United States: 2021. Census.gov. Accessed July 11, 2023. https://www.census.gov/library/publications/2022/demo/p60-278.html

26. Helping Immigrants And Refugees Access Health Services. Online Masters in Public Health. Published October 11, 2022. Accessed July 31, 2023. https://mphdegree.usc.edu/blog/health-insurance-for-immigrants/

27. Rite of Passage? Why Young Adults Become Uninsured and How New Policies Can Help, 2009 Update. Published August 6, 2009. Accessed June 30, 2023. https://www.commonwealthfund.org/publications/issue-briefs/2009/aug/rite-passage-why-young-adults-become-uninsured-and-how-new

28. Williamson MLC, Stickley MM, Armstrong TW, Jackson K, Console K. Diagnostic accuracy of the Primary Care PTSD Screen for DSM-5 (PC-PTSD-5) within a civilian primary care sample. *Journal of Clinical Psychology*. 2022;78(11):2299-2308. doi:10.1002/jclp.23405

29. Satisfactory Academic Progress (SAP) - Hostos Community College. Accessed June 30, 2023. https://www.hostos.cuny.edu/Administrative-Offices/SDEM/SDEM-Student-Services/Student-Appeals/Academic-Eligibility

30. Lee CY, Zhao X, Reesor-Oyer L, Cepni AB, Hernandez DC. Bidirectional Relationship Between Food Insecurity and Housing Instability. *Journal of the Academy of Nutrition and Dietetics*. 2021;121(1):84-91. doi:10.1016/j.jand.2020.08.081

31. Food Insecurity is a Persistent and Pervasive Problem in New York City, New CSS Report Finds. Published April 27, 2023. Accessed July 13, 2023. https://www.cssny.org/news/entry/food-insecurity-is-a-persistent-and-pervasive-problem-in-new-york-city-new-

32. CUNY Lifting New York; 2023-2030 Strategic Roadmap. The City University of New York. Accessed July 13, 2023. https://www.cuny.edu/about/chancellor/strategic-roadmap/

33. *Addressing Basic Needs Insecurity Among College Students*. Institute of Education Sciences; 2021. Accessed June 30, 2023. https://ies.ed.gov/ncee/edlabs/regions/northwest/pdf/addressing-basic-needs.pdf

34. Reed M. Basic Needs and Mission Creep. Inside Higher Ed. Published March 19, 2019. Accessed July 31, 2023. https://www.insidehighered.com/blogs/confessions-community-college-dean/basic-needs-and-mission-creep

35. Goldrick-Rab S, Richardson J, Schneider J, Hernandez A, Cady C. *Still Hungry and Homeless in College*. Wisconsin HOPE Lab; 2018. Accessed June 30, 2023. https://www.bhcc.edu/media/03-documents/voicesofhunger/Wisconsin-HOPE-Lab-Still-Hungry-and-Homeless-April-2018.pdf