

# Oregon State University Food Security Study Executive Report

OSU DIVISION OF STUDENT AFFAIRS

FOOD INSECURITY TASKFORCE

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## Introduction

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Food insecurity (FI) is a growing concern on college campuses. Upon request from the Oregon State University (OSU) Food Insecurity Taskforce, this report outlines findings from the first formal assessment of the prevalence and patterns of FI among OSU students on the three campuses—Corvallis, Cascades, and Ecampus—during Fall and Winter terms, 2020-2021. FI was measured using the United States Department of Agriculture (USDA) 10-item Food Security Survey Module (FSSM) with a 2-item food sufficiency screener. At Corvallis and Cascades campuses, two sampling strategies were employed in an effort to improve upon existing sampling methods commonly used for estimating FI among college students. Findings from this assessment can be used to inform OSU’s plan to ensure equitable food access among all students.

Within this report we provide background on the issue of college student FI, broadly and within the context of the COVID-19 pandemic. This is followed by an abbreviated description of the methodology used to estimate FI among OSU students and summarized results for each campus, including indicators and patterns of FI among specific student sub-populations. The report ends with a discussion of the findings, including limitations and areas for potential future research. A full report is also available for each individual campus at the OSU Policy Analysis Lab site [[link](#)].

Findings differed based on sampling methods and across each of the three campuses. Consequently, our findings can be categorized into three main areas:

- Impact of sampling scheme on estimating FI
- Estimate of prevalence of FI on each campus
- Estimate of correlates of FI among student sub-populations within each campus

*We estimate that the FI rates for Corvallis, Cascades, and Ecampus are 24.3%, 24.9%, and 30%, respectively, with a combined rate of approximately 26%. These estimates are based on samples that have high survey participation rates (around 70%) where researchers visited courses (Corvallis and Cascades campuses) to collect data. We found that simply emailing surveys to respondents produced estimates about ten percentage points higher, an inflation we believe is the result of response bias.*

*Among OSU students, race/ethnicity, first-generation college student status, class standing, gender, and receipt of Supplemental Nutrition Assistance Program (SNAP) benefits are significant correlates of FI, though correlates and statistical significance varied between all three campuses. We also found that factors related to living situations, such as living with family or a spouse, impacted the likelihood a student would be food insecure. Likewise, living location correlated with likelihood of FI. Overall, undergraduate students reported higher rates of FI compared to graduate students, suggesting financial resources and food access differences between younger and older students.*

This study corroborates other research indicating that college students are vulnerable to FI and highlights the importance of sampling methodology in estimating FI prevalence. *Our findings also highlight that prevalence of FI is unequally distributed among OSU student sub-populations, with students of color, first-generation students, undergraduate students, and students receiving SNAP benefits at higher risk of FI.* These findings can be used to promote equitable and targeted

campus-based initiatives to increase access to food resources for all students, and particularly for those most vulnerable to FI.

## **Background**

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In Fall 2019, the Oregon State University (OSU) Food Insecurity Taskforce convened to address food insecurity at OSU. A recommendation of the Taskforce was to first assess the prevalence of food insecurity among OSU students. With funding from the OSU Division of Student Affairs and the School of Public Policy's OSU Policy Analysis Lab, Clinical Assistant Professor Jenny Jackson and Professor Mark Edwards assembled a research team including eight undergraduate and graduate students to conduct an innovative survey in the Fall term of 2020 and the Spring term of 2021.

### *Food Insecurity*

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Food insecurity (FI) is the inability to access an adequate supply of food due to lack of money or additional resources. Food insecure households may be further categorized as having low food security (problems acquiring food leading to reduced diet quality) or very low food security (inability to afford food to the degree of multiple instances of reduced food intake). In Oregon, 9.8% of households were food insecure in 2017-19, with 4.3% having very low food security. In the area surrounding the OSU Corvallis campus, overall household FI ranged from 10.8% in Benton County to 13.1% in Linn County and 13.8% in Lane County in 2018. By October of 2020, just prior to the beginning of our study and during the COVID-19 pandemic, household FI for the state of Oregon had surged to around 25%.

### *Variability in Food Insecurity Across Institutions*

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Pre-pandemic estimates of the prevalence of FI among college students ranged from 9% to well over 50%. In 2014, a study at another university in Oregon (not OSU) reported 59% of the student body was food insecure. In 2017, a review of FI in postsecondary education settings in the U.S. found an average FI rate of 32.9%. The high level of variation among estimates of FI in higher education is likely due to differences in study methodology, particularly survey modality and sampling design. Surveys present inherent obstacles for validity and accuracy related to human responses, sampling representativeness, and generalizability. Nonetheless, surveys are the only method available to assess FI in populations of students, suggesting that careful attention must be given to improving external validity.

Concerns regarding FI survey validity may be exacerbated by the context of exploring this topic at a college campus. Some limitations related to using standard FI surveys in the college setting include students' differing interpretations of FI questions, varying campus dining plans and practices, and difficulty quantifying students' financial resources and parental support. Additionally, college student FI rates reported by campus surveys have shown differences based on the timing of the survey within both the school term and the school year, as well as the type of campus when comparing online, metropolitan, and suburban campuses.

Research shows the prevalence of FI is greater among some groups, with race, ethnicity, parenting status, living arrangement, and income level demonstrating a relationship with FI in the college student populations as well among US households. In college students, gender identity and sexual orientation also have shown a correlation with FI. Additionally, college students' year

of study and first-generation status have been associated with FI.

An examination of FI at several universities during COVID-19 found average FI rates of 22% among undergraduates and 19% among graduate students, with rates reaching greater than 30% in many historically marginalized and underrepresented groups. Various studies identified significant growth in college student food insecurity during the early stages of the pandemic.

### *Research Goals*

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Previous FI surveys of college students have produced questionably high and wide-ranging levels of FI, which may be the result of non-response bias among food-secure students. Thus, our research team undertook an effort to compare sampling methods while also estimating FI among OSU students in Fall term of 2020 and Winter term of 2021. These data are intended to inform OSU's strategies to ensure equitable food access among students, both in terms of the current COVID-19 pandemic response and long-term interventions on campus. This report provides information about students by OSU campus, including the Corvallis Campus, Cascades Campus, and Ecampus (online students).

## Methodology

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The United States Department of Agriculture (USDA) defines a range of FI including “food security” and “food insecurity,” which can be further categorized into “low food security” and “very low food security.” The USDA Food Security Survey Module (FSSM) is a validated, widely used instrument for measuring food security and is available in multiple forms (available on the USDA website). The survey used to assess the prevalence of FI among OSU students consisted of the USDA 10-item FSSM with a 2-item food sufficiency screener, arguably the most valid survey instrument currently available for determining FI among college students.

Individuals were categorized as FI if they responded affirmatively to 3 or more items; otherwise, they were categorized as food secure. For our purposes of better understanding which groups of students were more likely to be food insecure, the survey also included questions about student demographics, financial aid, and living situations (For full surveys, refer to individual campus reports).

This study used two sampling strategies – one based on survey distribution within a sample of courses, and the other based on survey distribution via email to the entire student body. The first sample included courses from the OSU Fall 2020 and Winter 2021 course catalogs; specifically, a purposefully selected cross-section of courses that offered the survey to students across all colleges, including undergraduate students from first to final year as well as graduate students at all levels. The course selection also sought to oversample for demographic groups for whom the literature suggests an especially high prevalence of FI and/or who make up a small proportion of the OSU student body. For example, our sample selected multiple courses in the College of Liberal Arts (CLA) because enrollment data provided by the Office of Institutional Research indicate that the CLA includes more students of color than other colleges. This dual sampling methodology was utilized on the Corvallis and Cascades Campuses; however, we did not collect data through course visits for the Ecampus component of this study due to the asynchronous nature of Ecampus courses.

To conduct course-visits to administer the survey, researchers contacted instructors to request permission to attend the first 5 minutes of a remotely delivered (i.e., Zoom) course session and administer the survey to willing students. Prior to the class visits, our team provided detailed information about the study and the consent form for the instructor to share with students prior to our visit. Survey data were collected online via Qualtrics. During the in-class visits, student researchers introduced the survey to the students, who were invited to indicate eligibility, informed consent, and complete the survey using a link posted in the chat box. At the end of the course-sampling effort, the same survey was emailed by the OSU Registrar to the entire Corvallis and Cascades campus student bodies. Thus, results from the course-sampling method could be compared to the results from the campus email-sampling method. Students who participated in the course-sample wave of the survey were precluded from participating in the emailed survey. For each sample (course-based and email-based), entry into a raffle for a \$100 gift card was offered for survey participation. Data were de-identified and stored separately from the student information collected for the \$100 gift card raffle. Table 1 displays the timeline and outcome of the three campus surveys.

We believed that response bias would artificially inflate estimates of food insecurity, anticipating that food secure students would opt out of survey participation at higher rates than food insecure students who may have been more motivated to participate in a survey related to their experiences of food insecurity. This response bias would be more likely in emailed survey invitations while campus visits would create greater opportunity and motivation for all students, food secure and food insecure, to participate. Table 2 provides information on response rates for the different campuses and sampling approaches. In the Corvallis and Cascades studies, the response rate of the course-based sampling method was considerably higher than that of the email-based sample. Thus, we believe the course-based sample suffers from less response bias than the email-based sample and therefore provides a more conservative and likely more valid estimate of the prevalence of FI on the Corvallis and Cascades campuses. Due to the asynchronous nature of Ecampus courses, the course-based sampling method was not possible.

Table 1: Timeline of campus FI studies

<b>Campus</b>	<b>Course Visit data collection period</b>	<b>Email Survey data collection period</b>
Corvallis	November 9 <sup>th</sup> - November 17 <sup>th</sup>	November 18 - November 25
Cascades	February 15 <sup>th</sup> and February 26 <sup>th</sup>	February 27 <sup>th</sup> - March 8 <sup>th</sup>
Ecampus	NA	March 1 <sup>st</sup> - March 31 <sup>st</sup>

As anticipated, our estimates of FI among the OSU student body varied between campuses and differed depending on the two sampling methods, indicating that methodology is an important consideration for measuring FI among college students. Table 2 shows the number of observations by sampling method and campus. As displayed, the course-sampling scheme yielded higher response rates than the email-sampling scheme.

Table 2: Sample size and response rates by campus

<b>Campus</b>	<b>Course-Sample N</b>	<b>Response Rate</b>	<b>Email Sample N</b>	<b>Response Rate</b>	<b>Total N</b>
Corvallis	734	72%	2510	12%	3244
Cascades	289	72%	78	9.3%	367
Ecampus	NA	NA	779	6.3%	779

## **Results**

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### **Institution-wide Findings**

*Across all three campuses, we estimate a FI rate among the OSU student body to be approximately 26%. This estimate stems from the combined estimates from all three campuses, using the course visit methods where possible and an adjusted estimate from the emailed survey for Ecampus students, taking into account sampling bias. Table 3 shows these campus specific estimates.*

Table 3: FI estimates by campus

<b>Campus</b>	<b>FI rate from Course-Sample</b>	<b>FI rate from Email-sample</b>
Corvallis	24.3%	31.6%
Cascades	24.9%	46.8%
Ecampus	NA	39.5%

### Campus-specific Findings

Each assessment revealed patterns of FI specific to the campus and student body. Table 4 shows how each demographic characteristic was associated with FI, accounting for the other variables measured, on each campus. This table reports adjusted odds ratios, or the likelihood of being food insecure given that a respondent is in a specific demographic group while controlling for other factors. For each campus we used all respondents (i.e., the course and email-based samples combined).

Table 4: Adjusted Odds of FI for each OSU Campus

<b>Variable<sup>1</sup></b>	<b>Corvallis<sup>2</sup></b>	<b>Cascades<sup>3</sup></b>	<b>Ecampus</b>
<i>Class standing</i>			
Frosh/Soph (referent)			
Jr/Senior+	1.35***		0.77
Graduate - Masters	1.32		0.45**
Graduate - PhD	1.21		0.28
College	0.99		0.88***
<i>Credit Hours</i>			
Part-time (referent)			
Full-time	0.96		1.20
<i>Race/Ethnicity</i>			
White or Caucasian (referent)			
American Indian or Alaska Native	1.20		6.00*
Asian	1.32**		1.49
Black, African American, African diaspora	1.7		0.83
Latinx or Hispanic	1.36		1.43
Native Hawaiian or Pacific Islander (NHPI)	8.23***		1.92
Multiracial / Two or more	1.22		1.87**
<i>First-generation College Status</i>			
Not first-generation (referent)			
First-generation	2.00***	1.54	1.51**
<i>Gender<sup>4</sup></i>			
Male (referent)			

Female	1.05	1.62*	1.39
Nonbinary	1.62*		3.29**
<i>Transgender status</i>			
Cis (referent)			
Transgender	1.80		1.81
<i>Funding</i>			
No funding (referent)			
Pell Grant	1.96***	2.20***	1.44*
Work-study	1.36**		0.58
Other funding	1.69**		
Graduate funding	0.73*		
<i>Participation in SNAP Food Assistance Program</i>			
Has not received SNAP with past year (referent)			
Currently on SNAP	1.61*	1.88	1.60
Has received SNAP within past year	1.42	2.56*	2.75***
<i>Current Employment Status</i>			
Not employed (referent)			
Employed	1.17*		0.81
<i>Living Arrangement<sup>5</sup></i>			
Lives with children	1.02	0.47*	
Lives with family	0.46***	0.49**	
Lives with spouse	0.90	1.35	0.65**
Lives in local county	1.39**	1.88	
Lives in Oregon			1.00
Lives in the U.S.			3.42**
<i>Age</i>			
Constant	0.15***	0.15***	0.44
N <sup>6</sup>	2697	327	675

<sup>1</sup> Variables were included in the multivariate analysis if they were significant in univariate analyses of food insecurity on a 90% confidence interval. This varied across campuses leading to different variables in each analysis.

<sup>2</sup> Using data from the Office of Institutional Research, we evaluated the representativeness of our sample and applied statistical weights to better reflect the known demographic composition of the OSU Corvallis Campus.

<sup>3</sup> Using data from the Office of Institutional Research, we evaluated the representativeness of our sample and applied statistical weights to better reflect the known demographic composition of the OSU Cascades Campus.

<sup>4</sup> The “female” and “male” categories include all respondents who identified as “female” or “male,” including those who also identified as transgender. The transgender variable is a binary variable indicating if a respondent selected “transgender” as a gender identity whether in conjunction with other identities such as male or female or independently.

<sup>5</sup> The referent category for each of the variables within “Living arrangements” is the opposite, such as “Does not live with children.”

<sup>6</sup> Sample number includes respondents totaled from both surveys (course-based and email-based survey respondents) and does not include those respondents with incomplete surveys. Respondents were only able to complete the survey once.

### *Corvallis Campus*

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Among OSU Corvallis campus students, class standing, race/ethnicity, first-generation college student status, and receipt of Supplemental Nutrition Assistance Program (SNAP) benefits were observed to be significant correlates of FI.

Our data show that third- and fourth-year students had greater odds of being food insecure compared to undergraduate students in their first or second year of school, suggesting financial and food access differences between younger and older students. These findings warrant further investigation.

First-generation status also appeared as an important influence on FI among Corvallis students. According to our data, a student was two times as likely to be food insecure if they were a first-generation college student. Additionally, among most racial/ethnic groups, being a first-generation college student appeared to account for the higher odds of FI. However, this was not the case for students who identified as Pacific Islander or Native Hawaiian. Even when controlling for other variables, our data showed significantly higher odds of FI among Pacific Islander or Native Hawaiian students compared to students who are not Native Hawaiian or Pacific Islander. Notably, however, the sample size was very small.

Students living with their families had lower odds of FI, indicating that living situation and familial support may provide a protective effect against FI.

We also found that students who identified as nonbinary may be at a higher risk of FI. In this study, the finding was statistically significant, but this is perhaps due to the small sample size. Future investigation of potentially unique risks for nonbinary students would benefit from a larger sample size.

Finally, after adjusting for other variables, enrollment in Pell Grants and work-study increased the odds of being food insecure. This non-intuitive finding is consistent with the other non-intuitive finding of higher FI rates among SNAP recipients. These programs provide resources intended to reduce FI, and enrollment in these programs signals a level of need. Qualifying for such programs is an indicator of financial hardship, which would be worse in the absence of these resources. Thus, we interpret these findings with caution. Participation in assistance programs promises to improve the situation and serves as an indication that a real need exists.

### *Cascades Campus*

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Among OSU Cascades campus students, gender, funding, and receipt of Supplemental Nutrition Assistance Program (SNAP) benefits were significant correlates of FI. Additionally, living arrangements such as living with children or living with family were significant correlates of FI.

First-generation college students reported slightly higher rates of FI, though, unlike Corvallis, this finding was not significant when accounting for other variables. Similarly, these data did not reveal any significant relationship between race and FI, as was present in the Corvallis data.

Both Pell receipt and SNAP receipt were also positively correlated with FI (Table 4). As eligibility for support programs such as Pell grants and SNAP is income-dependent, this

relationship is not surprising and indicates a financial hardship that is undoubtedly connected to food insecurity and was similarly present in the Corvallis data.

A lower prevalence of FI was found among students who reported living with their families or with children, indicating that living situations and familial support may provide a protective effect against FI.

### *Ecampus*

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Although data indicated a FI rate of 39.5% among Ecampus students, we estimate the rate to be closer to 30%. This adjusted estimate is based on our finding that the course-based approach (at Corvallis and Cascades) revealed a higher prevalence of about ten percentage points for the email-based surveys. Thus, if the Corvallis pattern holds for Ecampus, the estimated rate for Ecampus may be ten percentage points lower, around 30% rather than 39.5%.

Our findings indicate that the college in which a student was enrolled was correlated with FI. Although College appears to be significantly associated with FI (Table 4), this is not a causal relationship. College-level differences in FI are undoubtedly closely related to college differences in the demographic and income characteristics of students in those colleges, though our data are unable to identify specific explanatory variables.

Status as a first-generation college student was a significant correlate FI. Those who identified as first-generation college students were 50% more likely to be food insecure than students with a parent who had a college degree. This pattern was also present in the Corvallis data and has been previously documented in the FI literature. Furthermore, being American Indian or Alaska Native, Asian or Multiracial appeared to be significantly associated with FI among Ecampus students.

Participation in assistance programs that rely on income qualification including Pell Grant, Work-Study funding, and SNAP was also associated with FI risk. As with the Corvallis and Cascades studies, this is a non-intuitive finding that highlights the presence of economic hardship which would be worse in the absence of these resources.

As shown in Table 4, respondents who reported living with a spouse or partner were less likely to be food insecure than respondents who did not live with a spouse or partner. This finding corroborates a pattern identified in the Corvallis study but contradicted by the findings of the Cascades study. Among Ecampus students, neither having other adult family members or children in their household was associated with food security status. This finding is counter to that of the Corvallis data, indicating that the influence of living situation on FI among Ecampus students may differ uniquely from students attending the Corvallis and Cascades campuses.

Our survey for Ecampus students included several questions specific to the unique nature of online learning, including questions related to living outside of Oregon and outside of the United States, and about age. We found that students living in the U.S. were 5.6 times more likely to be food insecure than respondents living in other countries. Notably, this variable was simply a measure of living location and not residency or immigration status. Students living outside the U.S. in this sample may consist of both U.S. citizens living abroad and students who are not from the U.S.

## Discussion

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This study corroborates other research indicating that college students are vulnerable to FI and highlights the importance of sampling methodology in estimating FI prevalence. These findings also highlight that prevalence of FI is unequally distributed among OSU student sub-populations. Depending on campus-specific factors, certain student sub-populations such as students of color, first-generation students, undergraduate students, and students receiving SNAP benefits may be at higher risk of FI.

We found that first-generation status was a significant influence on FI at the Corvallis Campus. While first-generation status was significant in univariate analyses at both Cascades and Ecampus, controlling for other factors such as SNAP or Pell Grant receipt accounted for most of this association. The association between first-generation status and FI warrants further investigation.

While we found that rates of FI vary across racial groups, the significance of race as a correlate of FI was not consistent across racial groups or across campuses. Notably, race did not appear to be a significant correlate of FI for the Cascades campus.

Funding and other supportive resources such as SNAP benefits were positively correlated with FI to some degree at each campus. This finding indicates that economic hardship is a strong predictor of FI and FI would be worse in the absence of these resources.

Finally, and notably, this research shows how different sampling methods can produce drastically different estimates of FI prevalence. To our knowledge, this study is the first to examine and compare two different survey sampling strategies in the college student population. While the course-based methodology estimated the Corvallis campus FI rate to be 24.3% and the Cascades campus FI rate to be 24.9%, the email-based methodology produced much higher estimates of 31.6% and 46.8%, respectively. These findings support the hypothesis that variation among estimates of FI can be attributed in part to the methodology of studies, as suggested in the FI literature. Our findings contribute to the literature on college student FI, as well as the general sampling and survey methodology literature. Further research among college campuses of different sizes is warranted to validate our findings and investigate other methodologies that could be used to improve upon the validity of prevalence estimates. Limitations and future improvements in methodology are further addressed in each of the individual campus reports [\[link\]](#).

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