



**University of Maryland, Baltimore Affordability Study
Phase 2**



Introduction

Background

As the cost of higher education continues to climb and new stories in the mainstream media appearing daily, it is clear that addressing the tremendous increase in student debt is a critical problem to address. With outstanding student loan debt nationwide reaching \$1.5 trillion, such policy proposals as elimination/forgiveness of student loan debt and free tuition to some and even all public postsecondary institutions. Many of these proposals correctly aim to address an important and obvious problem, but there is generally a dearth of analyses to understand the causes and important features of student debt.

As a leader among national public universities, the University of Maryland, Baltimore recognized as part of its 2016 MSCHE accreditation self-study a need to maintain and enhance the accessibility and affordability of its academic programs. To this end, the priorities identified in the Self-Study included *Establish “affordability metrics” that form the basis of a financial aid program that ensures UMB’s academic offerings remain affordable and accessible to Maryland residents from a diverse range of ethnic and socioeconomic backgrounds.*ⁱ

The subsequent UMB 2017-2021 Strategic Plan thus contained as its Student Success Theme the strategic objective to *Design contemporary teaching and learning environments that are accessible and affordable to prepare students to be exemplary professionals and leaders in society.*ⁱⁱ One of the outcomes for this objective is to provide *academic programs and offerings that are affordable and accessible to Maryland’s residents of all races, ethnicities, and income levels.*ⁱⁱⁱ

To accomplish these strategic foundations, however, required an in-depth understanding of what accessibility and affordability look like, not just in theory but in practice. To understand these issues, UMB partnered with HelioCampus in 2017 to

- 1) Develop a framework for understanding affordability, particularly in the context of professional programs, which are exemplified by much higher debt but also much greater ability to repay that debt;
- 2) gather and integrate the available data to produce an understanding of historical debt and repayment; and
- 3) develop tools to estimate and model what affordability might look like to a diverse range of current and prospective students.

College Affordability

The problem of college affordability has become increasingly urgent over the past decade, to the extent that there is now a question as to whether there is sufficient return on investment for attending college. Despite plentiful research on the wage premium of a college degree (and evidence that this wage premium is increasing), the prospects of incurring six figures in debt to realize an earning premium that occurs over decades is still daunting.

For baccalaureate degrees, research aiming at understanding college affordability, the earnings premium of a college degree, and the return on investment of a program of study is fairly plentiful. In fact, affordability issues

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

have been a major focus in the late stages of the Obama administration, leading to policy initiatives such as the College Scorecard, the Financial Aid “Shopping Sheet,” and the Net Price Calculator.

Phase 1 of the Affordability Project used as its preliminary basis work accomplished by the Lumina Foundation, who in 2014 published an account of college affordability from the student perspective in *College Affordability: What Is It and How Can We Measure It?*^{iv} Going beyond the simple measure of unmet need to distinguish between “expensive” and “unaffordable,” they propose viewing college affordability by institution prices; graduate earnings; income-based characteristics such as savings rate and discretionary income; and student debt. This led to a subsequent publication, *A Benchmark for Making College Affordable: The Rule of 10.*^v Under the “Rule of 10” model, an undergraduate degree could be considered “affordable” if a graduate could pay for college using 10% of discretionary income over 10 years in addition to earnings from working 10 hours per week while in school. It is important to recognize several features of this model. First, it is prospective, and suggests that savings prior to entering college are a major component of avoiding loan debt as a result of attending college. Second, it defines “discretionary income” as 200 percent of the poverty rate. Third, it proposes to provide a benchmark for what students can afford to pay, rather than how much a college education should cost. Finally, this model is focused on the cost of an undergraduate (two year or four year) degree.

Phase 1 Summary

For Phase 1, we improved our understanding of the socioeconomic and demographic characteristics of debt accrual and how debt incurred during professional education affected a proposed definition of affordability. HelioCampus’ approach to data modeling and analysis allowed us to incorporate two novel features. First, we used unit record level files, which allowed us to model affordability in a retrospective fashion for individual students, rather than hypothetical or “average” students. Second, we applied this model to professional degree programs, in which students typically and willingly incur very high levels of debt with the expectation that this debt will be dischargeable within a reasonable time based on the high earnings associated with these degrees.

Using a data model that incorporated enrollment, completion, and financial aid (including debt and repayment) data, we developed a “Graduate Extract,” which we then combined with publicly available occupational wage data (“Wage Extract”). The resultant Affordability Extract was used to analyze and visualize graduate demographics, debt, and repayment. These analyses were in turn used to create an Affordability Estimator, a dynamic data visualization tool to understand based on multiple inputs (debt, salary, repayment rate) whether a given program was affordable under a 20-year horizon.

Overall, we found in Phase 1 that UMB professional programs are broadly affordable. Student debt at graduation had increased, but at a slower rate than the cost of attendance. School of Pharmacy graduates are most likely to pay down their debt within the seven years available for study, and School of Dentistry graduates exhibited the highest debt at graduation. Repayment rates (dollars per year) varied widely by program, but repayment ratios (proportion of debt paid per year) was consistent, typically in the high single digits.

Affordability based on expected wages vs. accumulated debt was fairly idiosyncratic. The interplay of accumulated debt, wages at entry into the workforce, and repayment rate made it unrealistic to generalize. However, for many graduates, relocating to the lower Eastern Shore and western Maryland would be much less affordable than practicing in high-cost/high-earning areas of central Maryland.

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Finally, we identified a number of data gaps. These include a somewhat limited repayment sample, lack of actual wage data, and longitudinal and locational data.

Phase 2 Research and Deliverables

For Phase 2, our goal was to expand the coverage of our data set in breadth and scope, generate a survey of data sources for graduate wage data, and provide a comparative analysis of affordability for UMB relative to its peers at the program level.

- 1) Expanding the scope of programs included in an understanding of affordability within UMB.

The initial phase of the Affordability Study, by design, focused on high-debt and high-income professional degree programs. Phase 2 will incorporate degree programs beyond the first professional, specifically Master's- and Bachelor's-level Nursing and Social Work, as well as research-focused pathways. In addition, we explicitly incorporate post-graduation professional trajectories that delay or defer income and debt repayment, e.g. medical residencies.

- 2) Extending the depth of data relating to debt and its repayment temporally and programmatically.

Debt repayment data were limited due to high effort levels required for each data point. Therefore, both the number of graduates and the time frame available was limited in scope. We will expand the scope of repayment to approximately triple the number of graduates.

- 3) Review of sources of data to understand actual wages of graduates

The largest hurdle in understanding student success is a better understanding of post-graduation employment outcomes. Several sources of improved wage data are potentially available to better understand affordability. For Phase 2, we reviewed vendors and other entities who purport to provide wage data.

- 4) Understanding the affordability of UMB programs relative to other similar institutions.

Affordability Revisited: Student Debt and Repayment

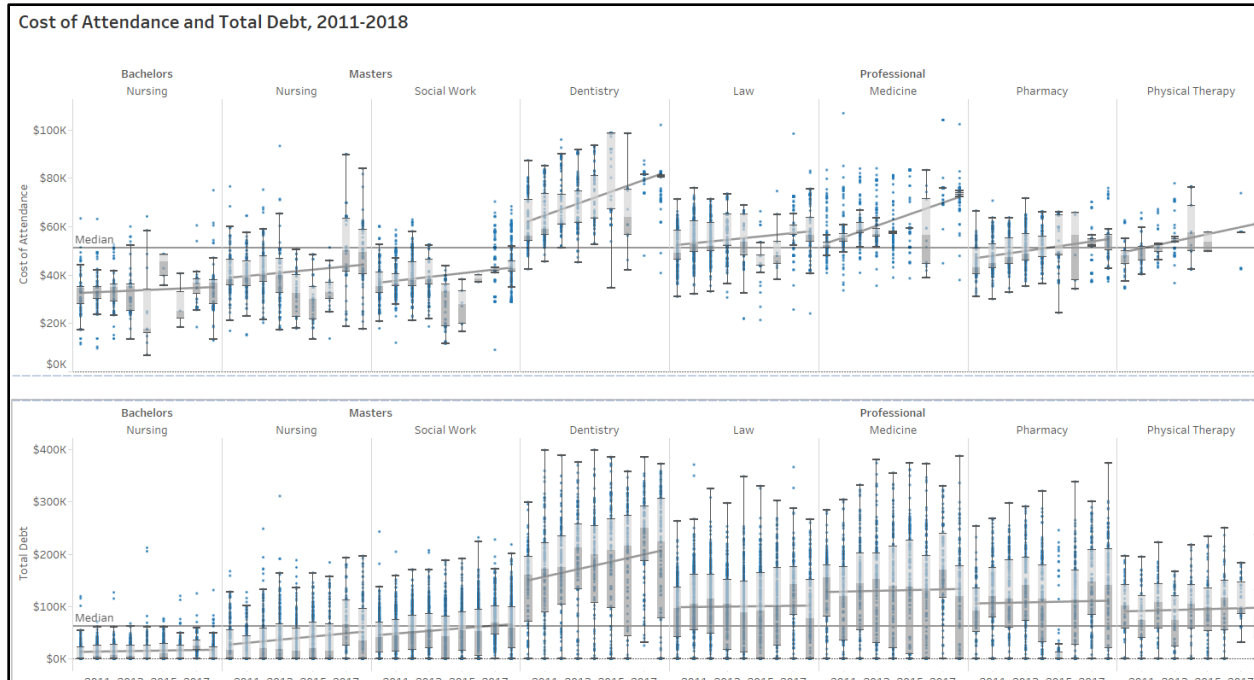
Debt Trends

In Phase 1, we used data on debt at graduation for approximately 13,000 graduates from 2009-2016 and repayment rates on a subsample of almost 500 of these graduates. Our analyses focused on the professional degrees offered by UMB by the Schools of Pharmacy, Dentistry, Law, and Medicine. We found that debt levels were increasing at a rate somewhat lower than the cost of attendance, suggesting that affordability has not decreased in recent years. We also found a robust programmatic and demographic signal to both debt levels and repayment dynamics, with African American and Dental School graduates experiencing higher debt loads and slower repayment rates and amounts than their demographic and programmatic counterparts. Conversely, Pharmacy and Physical Therapy students faced much lower debt obstacles upon entering their professional careers.

The repayment analyses in Phase 1 suffered from lower statistical power than is generally preferred. Therefore, for Phase 2, in addition to including graduates from the years 2017 and 2018, and including in our analyses students from the MSW, BSN, and MS Nursing programs, we also generated repayment data for a total of 1,000 graduates.

As with Phase 1, we find little evidence that Costs of Attendance and total debt at graduation are increasing when additional programs and graduating classes are added to the data set (Figure 1).

Figure 1. Trends in Cost of Attendance and student debt at graduation.

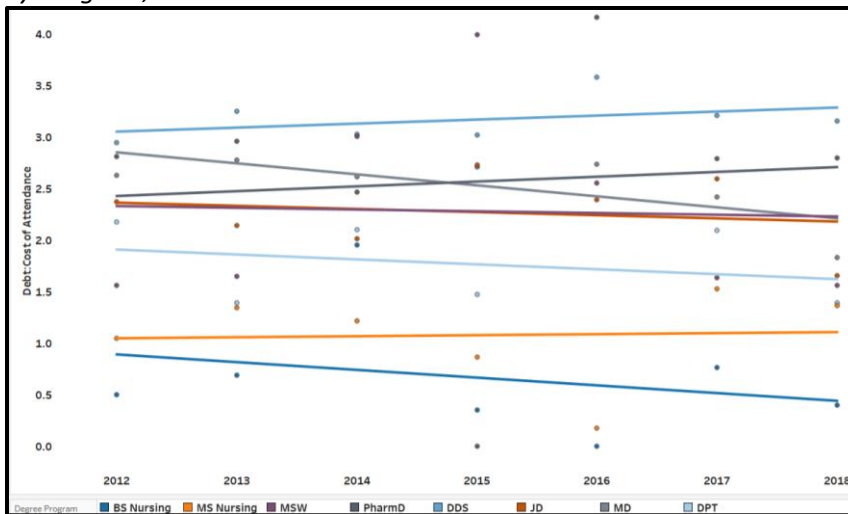


Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

In fact, with the exception of Dentistry and Medicine, reported attendance costs are increasing less than \$1,000 per year. In the case of Medicine, debt at graduation is increasing much more slowly, at ~\$700 per year, while actual cost of attendance has increased several thousand dollars.

We would expect that, all else equal, debt at graduation to increase at a rate consistent with the cost of attendance. We can test this assumption by asking whether the ratio of debt to average cost of attendance (debt-to-cost ratio; DCR) is consistent over time (Figure 2). A regression analysis testing the effects of degree program and year of graduation shows that for doctoral programs, there is not a statistically significant increase in total debt at graduation relative to cost of attendance. The DDS program is the exception to this pattern, showing a small but significant DCR increase. Several programs, including the JD and MD programs, show a statistically significant (albeit very small) decline in debt relative to educational costs.

Figure 2. Median Debt at Graduation relative to Cost of Attendance by Program, 2013-2018.



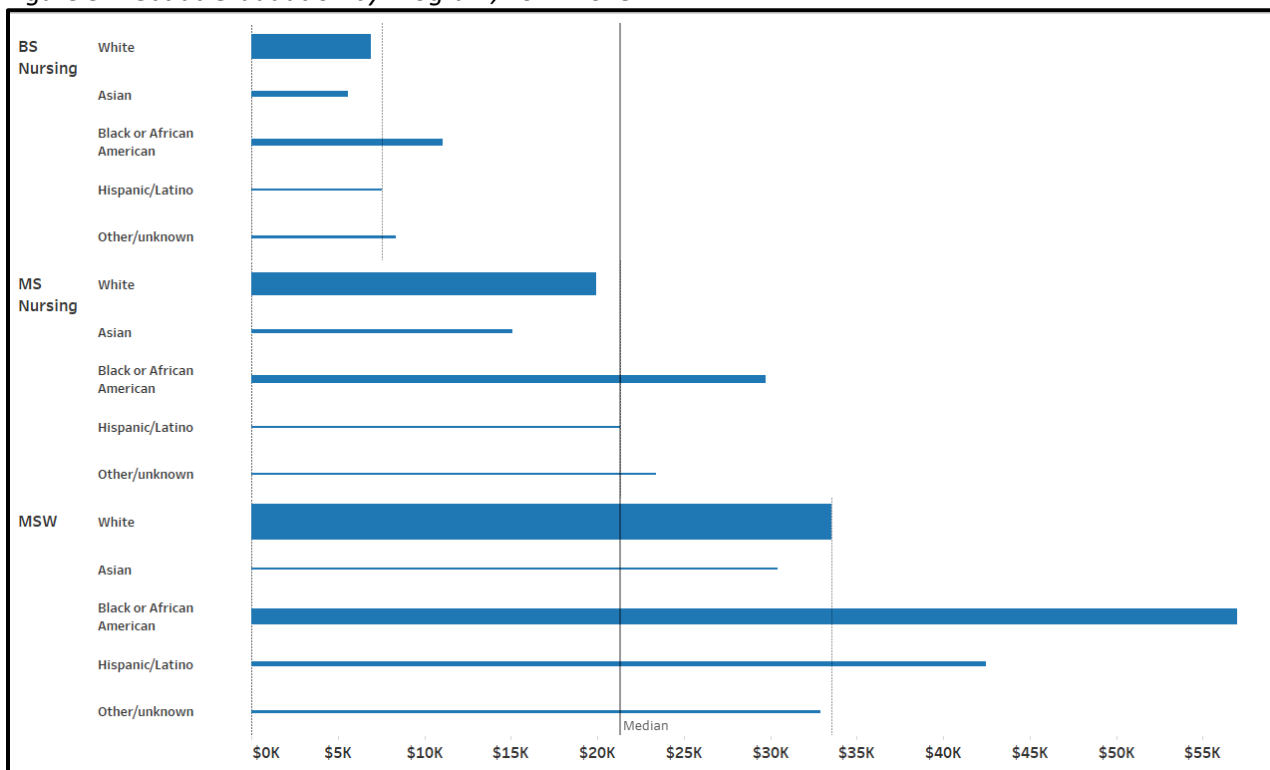
We do not, however, find a similar decline in debt-to-cost ratio among other UMB graduate programs. There are some indications that MS Nursing (~1.6 DCR) and MSW students are taking on debt at a rate somewhat higher than other programs. Even though the relationship between average cost of attendance and average debt is statistically similar across programs (Figure 2), this pattern should be monitored for future changes.

The Demography of Debt

In Phase 1, we found a striking disparity in debt levels and repayment rates by race across programs. African American graduates had uniformly higher debt levels, slower repayment rates, and a lower likelihood to repay in the time period investigated than other graduates. The difference was especially striking for the School of Dentistry, where the average African American graduate had debt 30% greater than that of the average White graduate. These patterns were consistent using the temporally expanded data set.

The demographic patterns also persisted with the expanded data set that included the MSW, BSN, and MS Nursing programs (Figure 3). For African American MSW graduates, debt levels were 70% greater than White graduates. These debt levels are especially relevant given the lower salaries reported for MSW-related occupational fields.

Figure 3. Debt at Graduation by Program, 2012-2018



Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Repayment

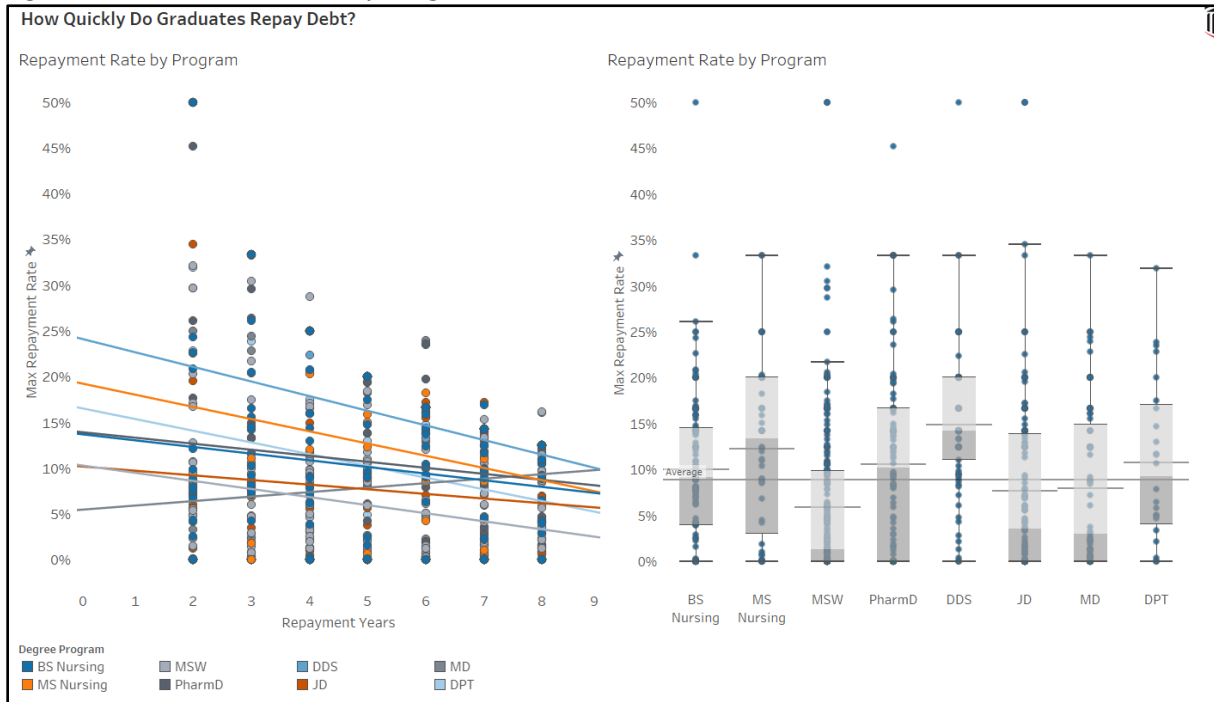
For Phase 1, we submitted ~450 names to NSLDS to identify the amount still owed at the time of submission and use this point-in-time debt to estimate a repayment rate. Dental School graduates repaid debt at the greatest rate, along with Pharmacy School graduates. There was surprisingly low variation in estimated rates of repayment by program, averaging 8-13% per year. Debt clearance among UMB graduates was ~30% after 7 years, the longest time period available for that data set. Pharmacy School graduates had a 38% payoff rate at 7 years, highest among all programs.

For Phase 2, we were able to extend repayment rates to eight years (Figure 4). We find that variance in repayment rates is reduced beyond five years and repayment rates continue to decline linearly over time. This reduction in variance is likely due to graduates discharging a high percentage of debt soon after graduation accounting for high early repayment rates. On average, repayment rates are in the high single digits, with the notable exception of MSW graduates, who pay on average just 6% per year of their total debt. For the nursing programs, the combination of lower debt, relatively high expected wages, and relatively high annualized repayment rates suggests good affordability.

The proportion of graduates with their debt eliminated over time (from two to eight years) is shown in Figure 5. Overall, and by program (Figure 6), there is a rough inflection point typically near the five-year point. Somewhat surprisingly, in this sample, less than 15% of DPT graduates repay their debt within eight years, even though this program appears to generally be one of the more affordable, based on the Affordability Estimator tool, average debt levels at graduation, and relatively low DCR (Figure 2). The current result may be due to several factors, such as relatively small sample size (compared to other programs), or graduates allowing some low level of debt to persist. The former is likely, with ~20 graduates. However, it may be useful to expand this data set to align what appears to be somewhat inconsistent patterns.

Overall, the expansion of the data set to incorporate greater repayment windows and more graduates served to reaffirm the findings from Phase 1 of generally affordable professional programs, even though debt levels are fairly high. Incorporating nursing programs reinforces the overall notion of affordability, but Social Work is an area that is ripe for further attention.

Figure 4. Debt at Graduation by Program, 2012-2018



Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Figure 5. Proportion of graduates (across all programs) with debt fully repaid after x years.

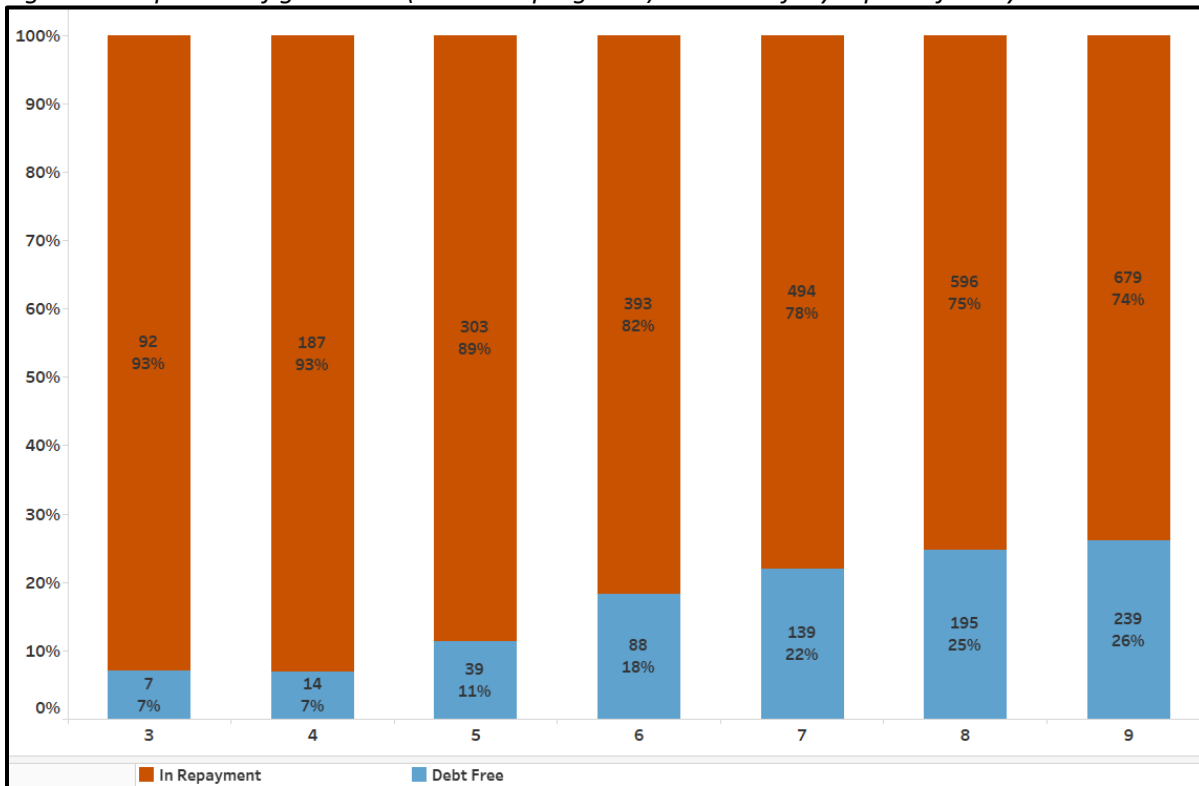
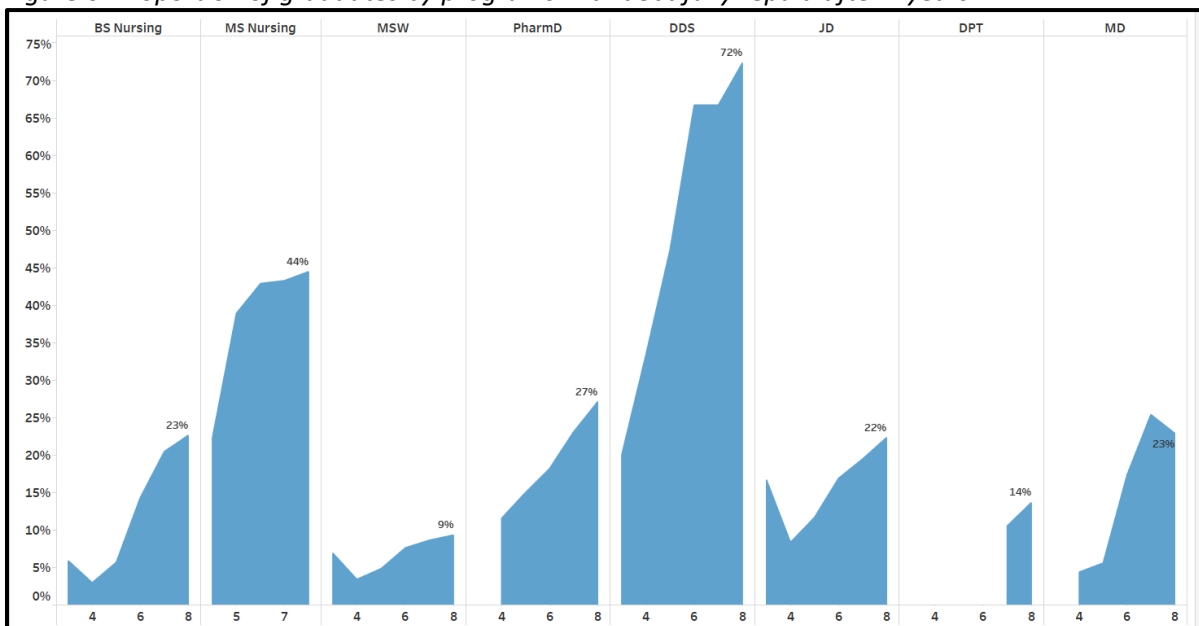


Figure 6. Proportion of graduates by programs with debt fully repaid after x years.

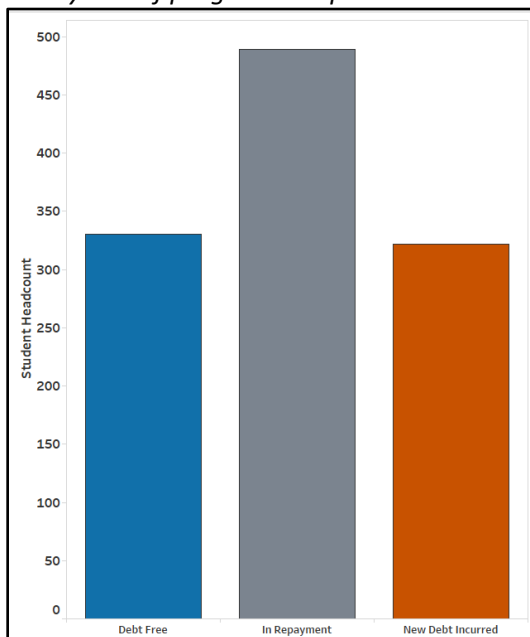


Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Debt Increases: An Unexpected Pathway

In Phase 1, estimates of repayment rates were available for a fairly small subset of graduates. Expanding the data set highlighted a previously unnoticed dynamic: an increase of debt load for a number of graduates. Of the approximately 1,100 graduates for whom we obtained residual debt data, over 300 incurred some new debt. This is roughly the same number in our sample that were debt free over the same nine-year time period (Figure 7).

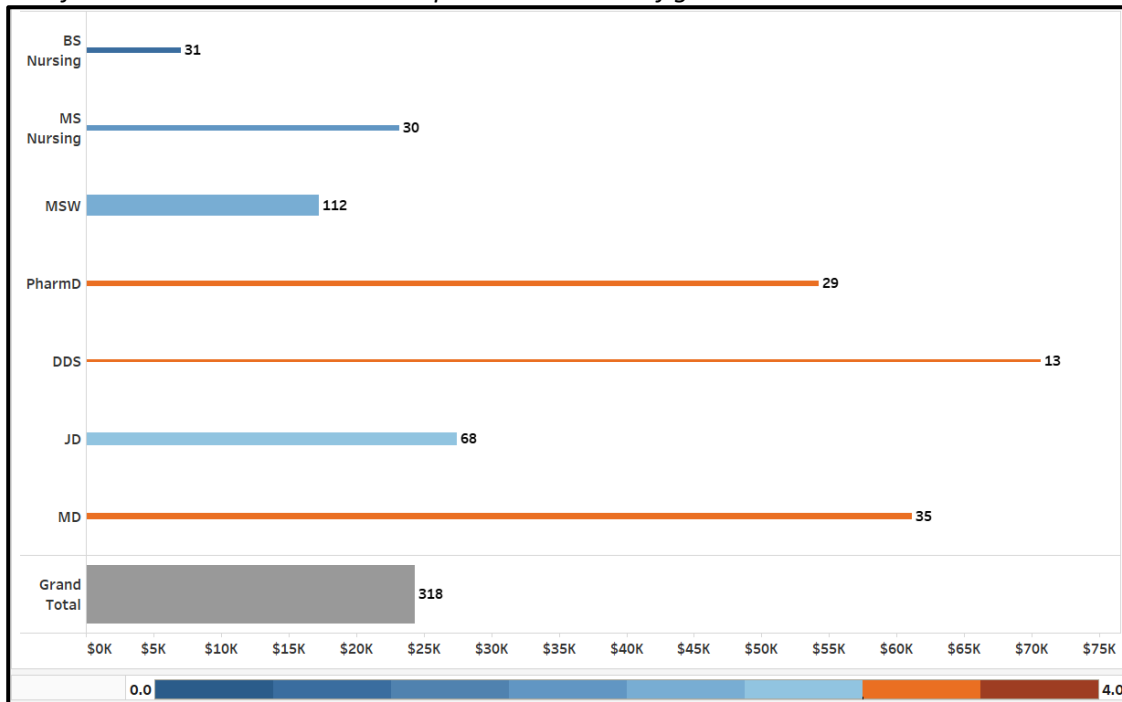
Figure 7. Outcomes of UMB graduates within nine years of program completion.



The greatest number of debt-increasers are graduates of the MSW program (Figure 8). While this may indicate that MSW graduates feel a need for continued educational attainment or even a change in career based on employment opportunities, it may also indicate internal business-process issues. For instance, if an MSW student expects to graduate in a given term, their debt at graduation is reported as of that term. This delayed-graduation interpretation is supported by observation that the median level of increased debt for MSW “graduates” is roughly the annual cost of attendance for the program (Figure 8). However, this dynamic is unlikely to account for more than a moderate percentage of the total debt increases. Removing the MSW program from this analysis results in nearly 25% of graduates incurring additional debt post-graduation. Furthermore, for a subset of the MSW graduates in our data set, we obtained debt levels at graduation, at May 2017 (between two and six years post-graduation), and at June 2019 (between four and eight years post-graduation). Of the 62 students in this subsample, 23 had debt greater at the second time point relative to the first time point. Of these 23 graduates, 18 had debt increases of at least \$10,000. This reflects nearly 10% of the 262 MSW graduates in our data set for whom non-zero debt at graduation was observed.

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Figure 8. Increases in debt 2-8 years post-degree. Colors indicate amount of increased debt relative to annual cost of attendance. Bar widths corresponds to number of graduates.



In addition, the underlying causes and rationale for increased debt need further investigation. Beyond business-process issues, a small number of graduates (fewer than 10) who incurred new debt subsequently pay this debt down completely in the space of a few years. These are most often MD or JD graduates.

The timing and level of increased debt across programs suggests that a small but meaningful number of graduates incur new debt at a point in time when they have been in the profession long enough to recognize the need for further education. In some, if not most, of these cases, this is entirely reasonable. For instance, continuing certification to enhance one post-graduate skill set and professional credentialing might be expected in some cases. However, we recommend further investigation into these dynamics by reaching out to a subset of these individuals to understand whether these debt increases might be minimized by changes in how educational or career guidance are provided. While the number and reasons underlying debt increases may well be idiosyncratic and small for any specific program, there may be enough instances of debt increases to undermine UMB’s message (and reality) of affordability.

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Updates to the Affordability Estimator

In Phase 1, an Affordability Estimator was developed that provided a means of looking forward in time to understand affordability. Using generic as well as customizable debt levels at graduation, we were able to use government-reported and area-specific wage levels (using median wages as a baseline, with the ability to customize wages as desired) to project a time frame for debt repayment. These values were used to determine whether a degree was affordable based on whether the total debt was paid off after 20 years. The Affordability Estimator thus allowed campus leaders, students, and other stakeholders to understand how geographic, professional, and lifestyle choices affected debt repayment, the best current proxy for affordability. The user is able to choose wage, salary, and discretionary-income levels based on what most accurately reflects their educational plans and professional goals, in addition to using “typical” or custom debt levels.

For Phase 2, we extended the utility of the Affordability Estimator by incorporating new functionality. Specifically, we want to know the effect of delaying repayment and/or delaying high-salary situations. We achieved this by adding a “Years to Delay First Payment” option whereby the user can postpone repayment up to 10 years after graduation. This functionality was primarily added to account for medical residencies, but could be used in any circumstance. In addition, because data-suppression requirements often result in missing data for some geographic areas for some occupations, we provide the option of viewing occupational affordability at the state level.

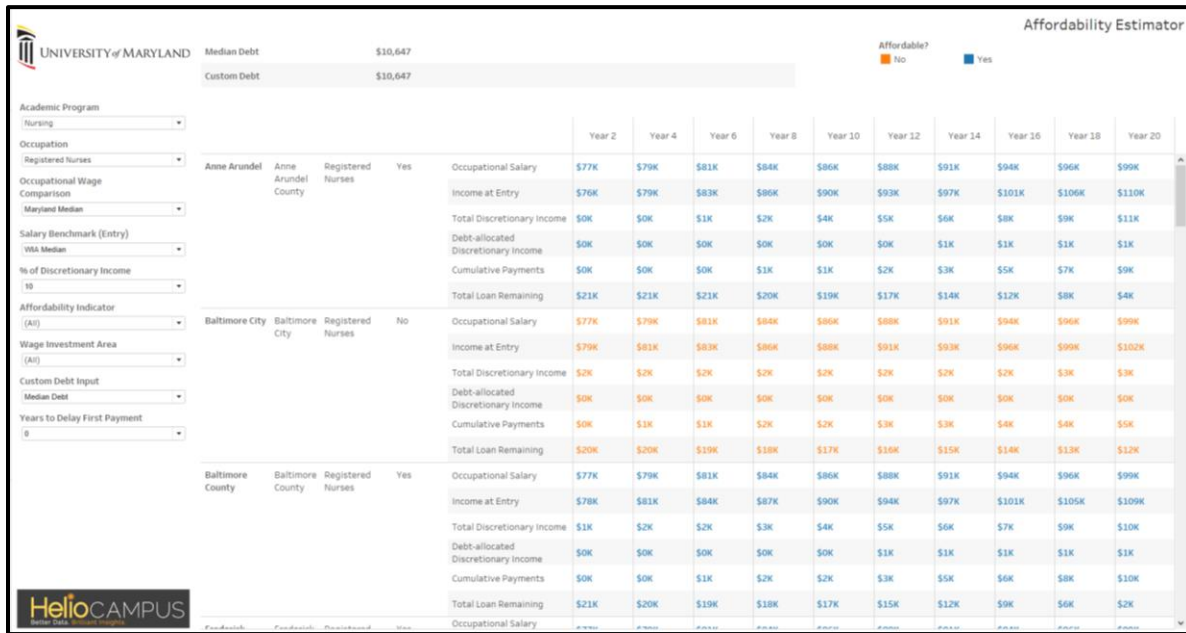
Using the Affordability Estimator

Because the Affordability Estimator incorporates such a large swath of data and can support many different variable permutations, we recommend using it as follows. A sample output is shown in Figure 9.

- 1) Select the program of interest (Academic Program filter). Note that Nursing does not distinguish between BS and MS degrees, but can be accounted for using other inputs such as debt and salary.
- 2) Select a specific Occupation associated with that degree program, if specific occupations are of interest. By default, all occupations are shown in the output table and affordability maps.
- 3) Select an Occupational Wage Comparison (Wage Benchmark). This value serves as a proxy for area-specific cost of living. These can correspond to national or state wages as desired. This is also used to estimate discretionary income.
- 4) Select a Salary Benchmark (Entry), which represents entry-position benchmark salaries specific to Workforce Investment Area (MD multi-county areas) wages.
- 5) The difference between 3) and 4) is represented by the Total Discretionary Income row in the affordability table. Selecting low values for the Wage Benchmark (3) and high values for Salary Benchmark (4) results in higher discretionary income, all else being equal.
- 6) Select the proportion of discretionary income devoted to debt repayment. The corresponding dollar amount is shown in the Debt-Allocated Discretionary Income row in the table.
- 7) Select a custom debt level, if desired. By default, the debt level is set to the median debt level in 2018, the most recent year data is available, for the program of interest.
- 8) Incorporate a delay in repaying loans by using the Years to First Delay First Payment selector.
- 9) The output table shows each of the inputs, along with cumulative payments made and total loan amount remaining over 20 years. For those conditions where remaining debt is less than \$1,000, then that set of program, debt, and repayment conditions is considered affordable.

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Figure 9. Representative sample output of the Affordability Estimator.



Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Affordability Case Studies

Because Phase 1 was intended to focus primarily on first-professional programs, we focus on several other important programs, specifically nursing (BSN and MS Nursing) and social work (MSW). Certainly, even though there is and will be a high demand for health care professionals throughout the state, it is critical to understand whether demand in less urban and central areas support the wages necessary to justify debt that is incurred by graduates of these programs. On the other hand, social work graduates enter into a field that tends to have lower expected wages than other fields that other graduates of UMB tend toward.

For a first approximation, we use a debt level reflecting that of a typical UMB BSN graduate, \$25,000. The salary reference point (intended to serve as a proxy for cost of living in different areas) is set at the statewide median, and the expected salary at entry is 75th percentile, reflecting the expected high quality of the state's flagship institution. Dedicating 20% of discretionary income in this case suggests that this (admittedly low, but reflective of actual) debt level is generally acceptable, i.e. fully repaid in our 20-year window. Strikingly, those areas where this education is not affordable focus in areas where these health care practitioners are most needed: northern Maryland (Harford/Cecil counties) and the Eastern Shore. When we relax the assumption of 75th percentile wages, western and southern Maryland also become less affordable. When wages and cost of living are averaged across all nursing fields throughout the state, the less affordable areas are concentrated in the Upper Shore.

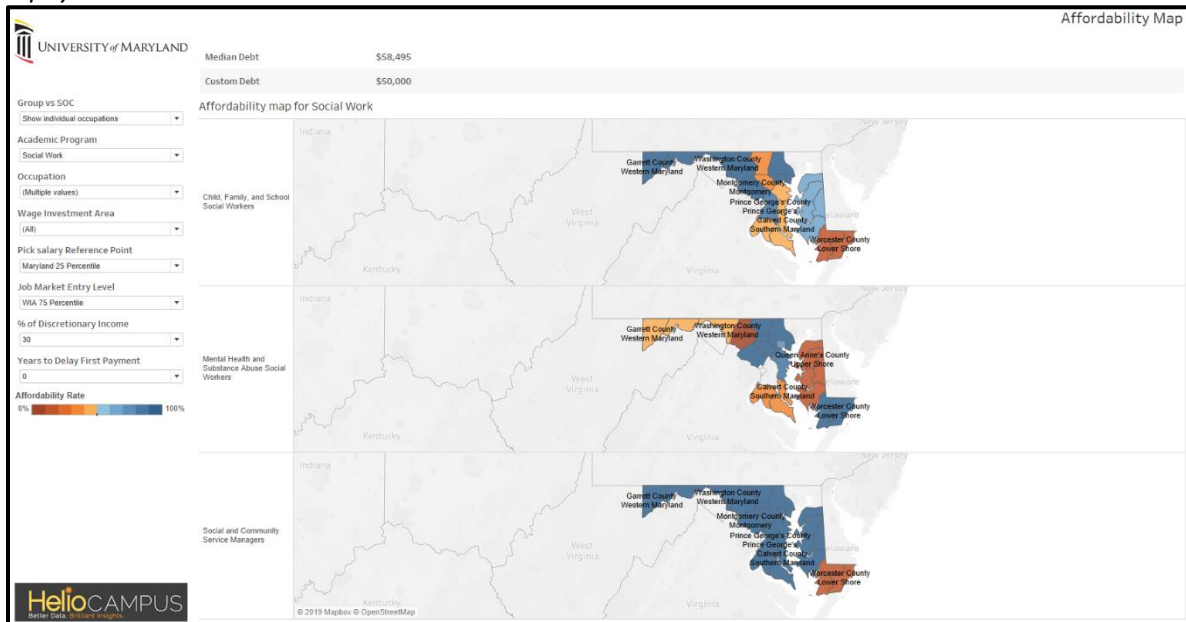
Master's nursing graduates, as expected, tend to have higher debt levels. At \$50,000 used as a median (reflecting recent data), and with the expectation that completion of the MS Nursing results in concomitantly higher wages (in this case, 90th percentile), in almost all counties in Maryland, debt is fully discharged in the same time frame at 20% of discretionary income allocated to debt. In many cases, this debt is paid in less than 10 years. As before, pockets of "unaffordability" tend to be concentrated in the Upper Shore.

Knowledge of the affordability status of Social Work degree recipients is perhaps the most urgent among the various programs for UMB. Regardless of potential employment opportunities, the combination of moderately high debt levels (over \$50,000 for the time period discussed in this report) and relatively modest wages (all of the occupations associated with the degree programs included herein are in the bottom half of wages across cited occupations) makes it crucial to review how affordable these degrees are, for both financial stability of graduates who stay in the field and whether graduates stay in the field due to financial shortcomings.

For MSW graduates, some disparate patterns of affordability are present relative to other degree programs. First, across all social work occupations statewide, some of the expected areas are relatively less affordable: Western Maryland, Northern Maryland, and the lower Eastern Shore. Somewhat surprisingly, the Upper Shore and all of central and southern Maryland appear to be relatively affordable using the standard 20% discretionary income. However, when a more granular WIA perspective is used, much of central Maryland becomes much less affordable. This pattern suggests that changes in wages relative to cost of living are much more dramatic in central Maryland relative to less urban areas. Under somewhat better wage conditions (stepping occupational wages from median to 75th percentile) has a quite strong effect, rendering most of the state affordable, except (sporadically) the western, northern, and eastern reaches (Figure 10). This result suggests that current debt levels being taken may be at an inflection point at which affordability can be perceived dramatically differently with fairly small changes in inputs, e.g. starting salaries.

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Figure 10. Affordability of MSW programs is moderately affordable under some reasonable debt and repayment conditions.



As with Phase 1, while the Affordability Estimator is useful for providing high-level insights into patterns of geographic affordability, incorporating specific individual wage data into the data set would provide a much-enhanced level of insight. Sources of individual level data are reviewed in the next section.

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Overcoming Data Gaps: Sources of Individual Wage Data

In Phase 1 of the UMB Affordability Project, we highlighted a number of limitations due to a lack of data. Data not readily available included individual level wage data, particularly non-survey data, as well as sparse educational program-to-career mapping. Repayment data are sporadic and periodic, and only provide estimates of actual rates that more consistent and complete coverage might provide.

Recognizing the need to link employment and educational outcomes is crucial for continued economic development, a few states, as well as public and private entities have begun to address the lack of availability of economic data. A number of providers offer solutions that can address the challenges encountered in efforts to fully understand wage data. We do not include several vendors (e.g. Chmura) who focus on broad-scale workforce development analyses using only publicly available data sets.

Maryland Longitudinal Data System (MLDS) (<https://mldscenter.maryland.gov/>)

Established by Maryland state law in 2010, the MLDS Center is responsible for coordinating and collecting student (K12 and postsecondary) and workforce data from three partners representing each constituency: the Maryland Higher Education Commission (MHEC); the Maryland State Department of Education (MSDE); and the Maryland Department of Labor, Licensing, and Regulation (DLLR). Data collected are stored and used to inform policy leaders and other stakeholders for improving decision making and outcomes. The ultimate goal of the data center is to maintain unit record data from time of entry into the educational system through the individual's entry into the work force and for a period thereafter.

MLDS workforce data include quarterly wage data, demographic information, and employer information sourced from Maryland Workforce Exchange, Maryland Higher Education Commission, and Maryland Unemployment Insurance.

Unit-record level data are available subject to some constraints. These constraints include (but are not limited to) the following.^{vi **}

- Research must be conducted for the purpose of evaluating a state or federal education program and be in alignment with the MLDS Research Agenda.
- The research must produce a product that is **specifically for the Center**. State law only permits staff of the Center to have access to unit record data. **Accordingly, an external researcher must become staff of the Center prior to data access, and a ... product... be provided to the Center.**
- A review process and approval from the Governing Board.

While these conditions appear significant as espoused above, in practice these requirements reflect a typical process and output surrounding any research project, and should not be regarded as especially onerous. A research collaboration requires the fulfillment of a straightforward set of conditions. These conditions include an individual researcher from UMB to join the MLDS research team and undergo a short training program. As noted above, the culmination of any research would be a product aligned with the MLDS agenda. Clearly, any research focused on program affordability and student outcomes for the Maryland work force is suitable.

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Given the above, a review by MLDS of data gaps (summarized in https://mldscenter.maryland.gov/egov/Publications/Datagap/MLDSCDataGapAnalysis_August2016.pdf) found that:

- Workforce outcome data, which are delinked after 5 years, is longitudinally sparse. (This may be less of a constraint for the subjects of the research in this report.)
- Occupational codes are not collected by DLLR, although industry codes are collected. It is recognized that there is often a large gap between industry and occupation.
- Federal employees, military employees, individual proprietors, members of an LLC, and independent contractors are not included in MLDS data. These categories comprise over 7% of the state’s workforce.
- Data do not include anyone outside of Maryland.

The resolution to each of these gaps is either not identified or requires state legislative action. However, to the extent that data are available, it should be a useful avenue, particularly for the School of Social Work, since 1) it is likely that many (if not most) of its graduates remain in Maryland; 2) its graduates are more likely than graduates of other Schools to be included in unemployment insurance data; and 3) there appear to be important and addressable issues related to graduate outcomes and employment.

Despite the shortcomings of the MLDS database as it currently exists, there is likely great value currently and even more value for the future based on the deliberate expansion of data maintained there. To ascertain the extent of coverage that currently exists, a report was developed that matched UMB graduates between May 2013 and December 2015 against wage records from the third quarter of 2013 through second quarter of 2019. The visibility (number of quarters for which wage data exist) of graduates by program is shown in Table 1. With the exception of the several programs where little visibility is the expectation (DDS and MD), visibility is typically quite good, particularly given the data gaps discussed above. Given the relatively low hurdles involved in obtaining these data, **we strongly encourage School Deans and UMB broadly to engage with MLDS to study workforce outcomes.**

Table 1. UMB graduates with Graduation Dates between May 2013 and December 2015 with Wage Data in fiscal quarters between Q3 2013 and Q2 2019.

Degree Sought	Total Graduates	No Visibility	No Visibility, %	1 to 10 Quarters	1 to 10 Quarters, %	11 or More Quarters	11 or More Quarters, %
BSN	877	116	13%	177	20%	584	67%
MS Nursing	838	150	18%	140	17%	548	65%
MSW	1,137	164	14%	196	17%	777	68%
DDS	333	182	55%	67	20%	84	25%
MD	417	221	53%	90	22%	106	25%
PharmD	412	123	30%	83	20%	206	50%
DPT	143	31	22%	21	15%	91	64%
JD	746	260	35%	178	24%	308	41%

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

[Emsi](https://www.economicmodeling.com/) (<https://www.economicmodeling.com/>)

Emsi presents themselves as a Labor Market Analytics entity that “tracks nearly every existing job in the economy” to support improved educational program-workforce linkages and workforce development. One of their key products provides individual-level data (based on probabilistic matching) of place of residence, industry, occupation, and employer. This information, collected from publicly available sources such as LinkedIn and other social media sites, is then mapped to federal data sources to generate wage estimates for that occupation by geographic location.

While this data source would likely enhance coverage of UMB graduates (and, related to a possible cause of debt increases, changes in employment fields), the level of detail of actual wages is not any greater than the data sources used to date for these studies. In addition, wage estimates may not even be available, since the same occupations that are suppressed in data sources that have already been identified would also be present in Emsi’s data sets, notwithstanding proprietary modeling techniques that are used to statistically “unsuppress” data. This statistical suppression effectively provides a somewhat more granular level of detail than most BLS data sets. This also provides a means to obtain a more accurate wage estimate based on time since graduation for subsets of graduates.

Related to this is the known shortcomings (discussed in Phase 1 and herein) of using SOC codes to determine professional occupations, given the inconsistent relationship between educational and occupational codes. Emsi is working to develop a “skills library” to better clarify and relate educational and occupational categories.

We recommend using Emsi only if greater occupational detail in addition to MLDS data is desired.

[Equifax](https://www.equifax.com/business/graduate-outcome-metrics/) (<https://www.equifax.com/business/graduate-outcome-metrics/>)

As part of their Workforce Solutions offerings, Equifax has leveraged their access to unemployment insurance and wage data to provide Graduate Outcome Metrics. Designed to provide a means of fulfilling the need for higher education institutions to understand postgraduate outcomes. Their core offering, Payroll Metrics, includes summary income and graduate-destination (geographic) data by a suite of standard academic dimensions, including institution, degree, college, and program. These same dimensions are used for industry-based metrics. Income can further be apportioned by various demographic characteristics such as gender, ethnicity, and other academic and socioeconomic characteristics as provided by the institution.

Equifax has entered into partnerships with other entities to provide a broader range of data. For instance, in partnership with Emsi, aggregated income data can be generated by industry and occupational codes. These Market Metrics therefore have high-level information that does not include student-specific wage information. In partnership with the National Student Clearinghouse, Equifax markets a set of Education Metrics that similarly aggregates income by degree level, enrollment/retention activity, and time to degree. Essentially, Equifax is overlaying individual-level data at an aggregate level on top of the Clearinghouse’s standard StudentTracker data set. Finally, Equifax plans to provide educational loan data along with other financial data such as credit score aggregated as above.

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

For Equifax, a number of caveats exist, including data aggregation (and therefore no access to unit-record-level data) and fairly low match rates even for undergraduates. We would expect hit rates for independent contractor and self-employed professionals to be much lower. Finally, inability to provide SOC codes in almost all cases would limit the level of inference one might make using these data, notwithstanding the (potentially) prohibitive cost.

Given the likely prohibitive cost and overlapping coverage of Equifax data, we recommend engagement only if an understanding of gaps in MLDS data (e.g. graduates who leave Maryland) is desired.

12Twenty (<https://www.12twenty.com/>)

A more recent entrant into the market space of providing outcomes data to educational institutions, 12Twenty uses internally developed surveys to obtain first-destination data for graduates. While their initial product was developed to support career services offices, the data are currently primarily used for accreditation support, especially in the context of MBA and JD programs. They claim 90%+ response rates for most professional-school clients, as well as a 40%+ response rate for undergraduate programs. Notably, these response rates are from UMB peers.

Besides the high response rate and accreditation value, there may be a benefit in leveraging this platform as a means to establish a baseline longitudinal data set in a relatively straightforward manner. In addition, and especially once multiple responses are gathered, this tool may support a more sophisticated perspective on the relationship between CIP educational and SOC occupational classifications.

While 12Twenty's services and coverage appear initially compelling, their cost structure, coverage, and support levels remain opaque. **Until such time as information for these areas is available, we cannot recommend engaging this vendor.**

Burning Glass (<https://www.burning-glass.com/>)

Burning Glass provides labor market data to understand market demands and skill sets to enhance educational and corporate outcomes. This is done by analyzing market demand for various job markets and helping to align market demand and associated skill sets with academic programs.

Most of the market space occupied by Burning Glass is at a higher resolution than what is needed to understand affordability. Although it is crucial to understand market trends and impending labor dynamics to understand affordability for many educational and professional areas, this is an issue that is fairly well understood in the state of Maryland, and due to the work done by entities such as the Jacob France Institute and MLDS, will likely only improve. Given the generalized nature of data and overlap with other data providers, **we do not recommend engaging further with Burning Glass.**

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Table 2. Summary of occupational-data vendors.

Vendor	Record Level	Wage Response Rate (Prof School)	Raw Data Available	Wage data	Longitudinal	Cost basis	Cost/unit	Setup cost
Emsi	Unit	.....	Yes	BLS; Social Media	Yes	Lump sum	\$10k	NA
12Twenty	Unit	90%	Yes	Self-reported	No	FTE	.....	.....
Equifax	Unit, Aggregate	.....		UI	No?	Hit rate	.....	.....
MLDS	Unit	50%+		UI	Yes	NA	None	None
Burning Glass	Aggregate	.....		.....	No	.....	.....	.....
Chmura	Aggregate	Unknown	No		Yes	Subscription	\$10k?	None

In summary, there are an increasing number of entities in the wage-reporting space that are attacking the problem from different approaches. These approaches are very divergent, and the reasoning for using any given service should depend on the intended use of the data. Currently, there is no single vendor that can provide sufficient data for all UMB Schools included in this analysis to support a deep understanding of affordability, but several of the vendors included may provide a sufficient (if incomplete) picture. Furthermore, some of the vendors above are engaged in strategic partnerships, such as Emsi and Equifax.

Affordability Relative to UMB Peer Schools

University of Maryland, Baltimore, as a national leader in health care, human services, and legal education, strives to produce the best graduates in the nation from their programs, and moreover to do so in a manner that provides its graduates the opportunity to attain an affordable education. This is consistent with their mandate to promote the University's commitment to diversity, equity, and inclusion. One key means of addressing whether these goals are being achieved is by benchmarking metrics of affordability across its peer institutions.

We collected cost and wage data for UMB and several key peer institutions using publicly available Bureau of Labor Statistics, Bureau of Economic Analysis, and Department of Education College Scorecard data on wages, regional cost of living and industry concentration, and debt at graduation, respectively. We derived normalized comparative indices to understand potential ease of debt repayment based on expected wages, cost of education, and total debt at graduation. This approach allows us to compare UMB's peers against peers whose graduates remain in the immediate metropolitan area, as well as those who disperse across the state. Certainly, a much greater granularity could be achieved, but the approach used here provides a baseline perspective and allows for further conversation into which comparative metrics are most useful for further development and analysis.

These data are summarized in Tables 3-9. Derived wage/cost, and wage/debt greater than 1.25, and debt/cost values lower average are highlighted. A ratio of 1.25 for wages was used based on distributions of these values across schools and programs.

Overall, UMB compares favorably, if not dominantly in being affordable relative to other premier schools. UMB is more affordable to in-state students than UVA, and is less affordable overall than Ohio State and UNC, based on the metrics we use for comparison. For UNC, this is likely due to the much lower cost of living and greater dispersion of professionals. Relative to Virginia, affordability appears to be generally better, and may bode well for Virginia professionals relocating to Maryland post-degree. Other peer institutions, based on derived values comparing wages, debt, and cost of education, are broadly comparable in their affordability.

For a few schools, notably the School of Dentistry and the School of Law, UMB should consider the cost of education relative to opportunities in the area. For the former, this is especially important given other debt and repayment data that suggest a lower level of affordability. For the latter, UMB's proximity to the crucial Washington, D.C. market is likely to ameliorate any relative lack of affordability. Finally, even though the School of Pharmacy shows indications that it may be less affordable, our empirical analyses suggest that the PharmD program produces graduates who diligently pay down their education debt, implying a healthy level of affordability.

These comparative benchmark analyses and related infographics (Figure 11) could be used in a number of ways, including accreditation support, internal resource allocation, and University marketing efforts.

Table 3. UMB's peer schools and affordability metrics, DDS

University	Program	Total Program Cost	Average Debt	Metro area cost index	RPP Industry concentration	MSA wages/ Program COA	State wages/ Program COA	MSA wages/ Debt	State wages/ Debt	Debt/ COA
University of Virginia	DDS			99.1	1.18					
University of Pittsburgh	DDS	\$193,472	\$197,501	93.4	0.76	0.36	0.59	0.35	0.57	1.02
University of North Carolina	DDS	\$158,580	\$182,688	95	0.73	1.26	1.31	1.09	1.14	1.15
University of Minnesota	DDS	\$173,340	\$256,445	103	0.82	1.05	1.04	0.71	0.71	1.48
UMB	DDS	\$167,980	\$233,257	109.4	1.08	0.89	0.81	0.64	0.58	1.39
UCLA	DDS	\$181,384	\$187,911	118.2	1.03	0.65	0.75	0.63	0.72	1.04
Ohio State University	DDS	\$142,564	\$202,040	93.8	0.72	1.42	1.23	1.00	0.87	1.42

Table 4. A UMB's peer schools and affordability metrics, DPT

University	Program	Total Program Cost	Average Debt	Metro area cost index	RPP Industry concentration	MSA wages/ Program COA	State wages/ Program COA	MSA wages/ Debt	State wages/ Debt	Debt/ COA
University of Virginia	DPT	\$186,432	\$143,667	99.1	1.38	0.51	0.48	0.66	0.63	0.77
University of Pittsburgh	DPT	\$227,416	\$61,150	93.4	1.67	0.30	0.34	1.12	1.27	0.27
University of North Carolina	DPT	\$129,548	\$136,397	95	1.49	0.66	0.64	0.62	0.61	1.05
University of Minnesota	DPT	\$163,660	\$150,062	103	0.9	0.45	0.45	0.49	0.49	0.92
UMB	DPT	\$153,204	\$107,421	109.4	1.1	0.56	0.57	0.80	0.82	0.70
UCLA	DPT	\$162,616	\$142,984	118.2	0.81	0.56	0.57	0.64	0.65	0.88
Ohio State University	DPT	\$122,548	\$178,695	93.8	0.9	0.65	0.68	0.45	0.47	1.46

Table 5. UMB's peer schools and affordability metrics, JD

University	Program	Total Program Cost	Average Debt	Metro area cost index	RPP Industry concentration	MSA wages/ Program COA	State wages/ Program COA	MSA wages/ Debt	State wages/ Debt	Debt/ COA
University of Virginia	JD	\$181,830	\$158,376	99.1	1	0.55	0.68	0.63	0.78	0.87
University of Pittsburgh	JD	\$104,382	\$101,186	93.4	1.01	1.11	1.11	1.15	1.15	0.97
University of North Carolina	JD	\$72,513	\$107,059	95	0.79	1.58	1.53	1.07	1.03	1.48
University of Minnesota	JD	\$134,895	\$111,766	103	1.09	0.82	0.77	0.99	0.93	0.83
UMB	JD	\$100,953	\$118,155	109.4	1.12	1.02	1.04	0.87	0.89	1.17
UCLA	JD		\$121,453	118.2	1.25			1.27	1.23	
Ohio State University	JD	\$92,547	\$97,238	93.8	0.88	1.04	1.03	0.99	0.98	1.05

Table 6. UMB's peer schools and affordability metrics, MD specialties

University	Program	Total Program Cost	Average Debt	Metro area cost index	RPP Industry concentration	MSA wages/ Program COA	State wages/ Program COA	MSA wages/ Debt	State wages/ Debt	Debt/ COA
University of Virginia	MD-Int	\$186,432	\$143,667	99.1		0.86		1.12		0.77
University of Pittsburgh	MD-Int	\$227,416	\$171,388	93.4	0.34	0.00	0.74	0.00	0.98	0.75
University of North Carolina	MD-Int	\$129,548	\$136,397	95		0.00	1.61	0.00	1.52	1.05
University of Minnesota	MD-Int	\$163,660	\$150,062	103	0.85	1.27	1.27	1.39	1.39	0.92
UMB	MD-Int	\$153,204	\$149,476	109.4	1.69	1.07	1.23	1.09	1.26	0.98
UCLA	MD-Int	\$162,616	\$142,984	118.2	0.83	1.19	1.18	1.36	1.34	0.88
Ohio State University	MD-Int	\$122,548	\$178,695	93.8	0.58	1.70	1.70	1.16	1.16	1.46
University of Virginia	MD-ObGyn	\$186,432	\$143,667	99.1		0.00	1.09	0.00	1.41	0.77
University of Pittsburgh	MD-ObGyn	\$227,416	\$171,388	93.4		0.00	0.91	0.00	1.21	0.75
University of North Carolina	MD-ObGyn	\$129,548	\$136,397	95		0.00	1.61	0.00	1.52	1.05
University of Minnesota	MD-ObGyn	\$163,660	\$150,062	103	1.34	1.24	1.27	1.35	1.39	0.92
UMB	MD-ObGyn	\$153,204	\$149,476	109.4	0.61	1.27	1.26	1.30	1.29	0.98
UCLA	MD-ObGyn	\$162,616	\$142,984	118.2	1.2	0.98	1.28	1.11	1.45	0.88
Ohio State University	MD-ObGyn	\$122,548	\$178,695	93.8	1.34	1.70	1.70	1.16	1.16	1.46

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Table 7. UMB’s peer schools and affordability metrics, MSW

University	Program	Total Program Cost	Average Debt	Metro area cost index	RPP Industry concentration	MSA wages/ Program COA	State wages/ Program COA	MSA wages/ Debt	State wages/ Debt	Debt/ COA
University of Virginia	MSW			109.4						
University of Pittsburgh	MSW	\$47,392	\$41,000	93.4	0.44	1.30	1.37	1.50	1.58	0.87
University of North Carolina	MSW	\$32,024	\$54,500	95	0.93	2.14	1.89	1.26	1.11	1.70
University of Minnesota	MSW	\$36,478	\$56,291	103	0.39	0.00	1.53	0.00	0.99	1.54
UMB	MSW	\$32,912	\$47,770	109.4	0.92	2.03	2.09	1.40	1.44	1.45
UCLA	MSW	\$46,866	\$56,291	118.2	1.75	1.47	1.43	1.23	1.19	1.20
Ohio State University	MSW	\$26,194	\$41,000	93.8	1.3	1.76	1.73	1.12	1.10	1.57

Table 8. UMB’s peer schools and affordability metrics, Nursing

University	Program	Total Program Cost	Average Debt	Metro area cost index	RPP Industry concentration	MSA wages/ Program COA	State wages/ Program COA	MSA wages/ Debt	State wages/ Debt	Debt/ COA
University of Virginia	Nursing BS	\$65,848	\$12,000	99.1		0.00	2.85	0.00	15.62	0.18
University of Pittsburgh	Nursing BS	\$95,104	\$25,000	93.4	2.41	1.63	1.66	6.22	6.33	0.26
University of North Carolina	Nursing BS	\$35,948	\$22,461	95		0.00	4.62	0.00	7.39	0.62
University of Minnesota	Nursing BS	\$58,612	\$21,000	103	2.13	2.91	3.07	8.12	8.58	0.36
UMB	Nursing BS	\$44,132	\$15,642	109.4	0.56	3.76	3.61	10.60	10.18	0.35
UCLA	Nursing BS	\$63,760	\$20,500	118.2	0.18	2.96	3.10	9.22	9.64	0.32
Ohio State University	Nursing BS	\$46,732	\$16,500	93.8	1.39	3.18	3.24	9.00	9.17	0.35
University of Virginia	Nursing MS		\$45,885	99.1	2.35			2.11	2.16	
University of Pittsburgh	Nursing MS		\$73,183	93.4	0.56			1.21	1.33	
University of North Carolina	Nursing MS		\$45,940	95	2.07			2.23	2.17	
University of Minnesota	Nursing MS		\$47,792	103	0.92			2.31	2.34	
UMB	Nursing MS	\$53,560	\$66,573	109.4	1.42			1.62	1.57	
UCLA	Nursing MS		\$54,140	118.2	0.68			2.28	2.27	
Ohio State University	Nursing MS		\$50,574	93.8	0.72			1.95	1.96	
University of Virginia	PharmD			99.1	1.31					
University of Pittsburgh	PharmD	\$130,664	\$41,000	93.4	1.06	0.88	0.91	2.79	2.90	0.31
University of North Carolina	PharmD	\$94,372	\$138,919	95	1.25	1.32	1.33	0.90	0.90	1.47
University of Minnesota	PharmD	\$116,292	\$148,500	103	0.8	1.16	1.15	0.90	0.90	1.28
UMB	PharmD	\$109,588	\$133,979	109.4	1.01	1.10	1.10	0.90	0.90	1.22
UCLA	PharmD			118.2	0.87					
Ohio State University	PharmD	\$93,444	\$133,188	93.8	0.95	1.26	1.29	0.88	0.91	1.43

Table 9. UMB’s peer schools and affordability metrics, Pharmacy

University	Program	Total Program Cost	Average Debt	Metro area cost index	RPP Industry concentration	MSA wages/ Program COA	State wages/ Program COA	MSA wages/ Debt	State wages/ Debt	Debt/ COA
University of Virginia	PharmD			99.1	1.31					
University of Pittsburgh	PharmD	\$130,664	\$41,000	93.4	1.06	0.88	0.91	2.79	2.90	0.31
University of North Carolina	PharmD	\$94,372	\$138,919	95	1.25	1.32	1.33	0.90	0.90	1.47
University of Minnesota	PharmD	\$116,292	\$148,500	103	0.8	1.16	1.15	0.90	0.90	1.28
UMB	PharmD	\$109,588	\$133,979	109.4	1.01	1.10	1.10	0.90	0.90	1.22
UCLA	PharmD			118.2	0.87					
Ohio State University	PharmD	\$93,444	\$133,188	93.8	0.95	1.26	1.29	0.88	0.91	1.43

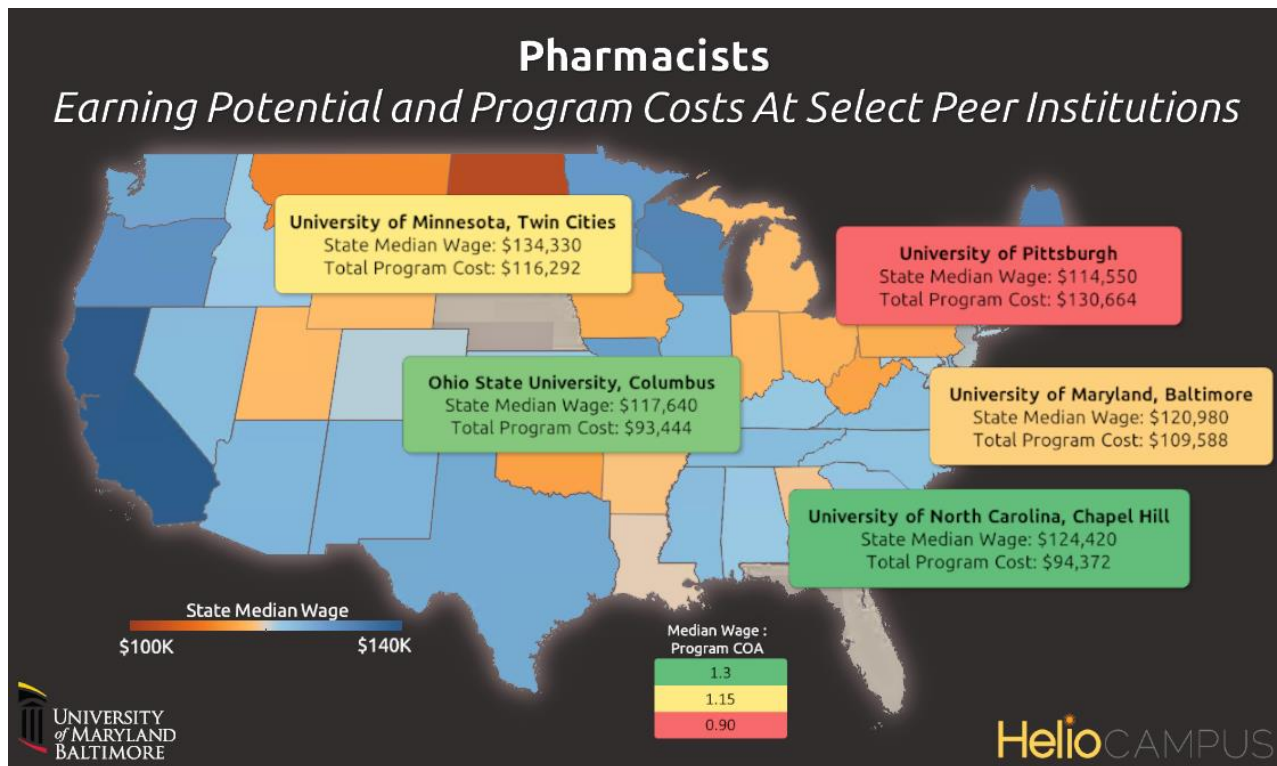
Data notes

- Cost of attendance obtained from UMB Institutional Effectiveness, Strategic Planning, and Assessment (<https://www.umaryland.edu/iespa/institutional-effectiveness/peer-tuition-and-fee-comparison/>).
- SOC codes used reference the highest sample size occupation for that CIP code when there was not a 1:1 CIP:SOC relation. For MD programs, values for the highest-wage specialty (Obstetricians and Gynecologists) and lowest-wage specialty (Internists, General) for the most recently available Maryland DLLR data was used)
- For debt values, Physical Therapy (DPT) values are reported separately when available; otherwise MD-degree debt values are used.
- Occupations for which the annual median salary is \$208,000 or greater are not reported. For these cases, \$208,000 is used as a comparison value.

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

- Regional Price Parities (RPPs) allow comparisons of buying power across the 50 states and the District of Columbia, or from one metro area to another, for a given year. Price levels are expressed as a percentage of the overall national level. Higher RPPs reflect a higher cost of living.
- The location quotient (LQ) measures a region’s industrial specialization relative to a larger geographic unit (usually the nation). LQ values >1.0 indicate a higher concentration than average for that industry/SOC code. Therefore, LQ <1.0 may indicate impending increased demand.
- RPP and LQ data obtained from <https://www.bea.gov/data/prices-inflation/regional-price-parities-state-and-metro-area>
- Debt data are from College Scorecard, and may not align with data used elsewhere in this affordability study

Figure 11. A sample infographic that provides an easy-to-interpret, high-level perspective of affordability of UMB and its peer institutions.



Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

Summary and Recommendations

In Phase 1 of the UMB Affordability Study, we developed a common data model that was used established a foundation for debt and repayment of UMB graduates, finding that UMB professional programs are broadly affordable, but also that this was fairly idiosyncratic. Phase 1 focused primarily on the first-professional programs. In addition, we identified a number of data gaps and limitations based on sample size.

For Phase 2, we addressed the issues we encountered in Phase 1 by

- Expanding the data set;
- Identifying sources of ancillary and supporting data, specifically wage data; and
- Developing a comparative analysis of UMB affordability relative to its peers.

Our analysis of debt-to-cost ratio shows that, overall, debt levels at graduation are essentially static over time relative to cost of attendance, with the exception of the DDS program, which has increased slightly. Several programs show actually show a slight decrease.

For the pre-professional programs (BSN, MS Nursing, and MSW), debt levels (similar to first professional programs as described in Phase 1) show a strong differentiation based on race. For each of these programs, African American graduates carry a much greater amount of debt at graduation. The MSW program exhibits debt levels that may be concerning given starting median wages.

An analysis of repayment rates using expanded data both longitudinally and programmatically reinforced the notion of affordability from this perspective. We find that for most programs, repayment in the high single digits per year was the norm, with only MSW graduates repaying at less than 5% per year. Across all programs, roughly 25% of graduates fully repay their debt by 7 years; this number varies dramatically by program. DDS, even though debt levels (whether absolute or relative to cost of attendance) are much higher than other programs, also eliminate their debt at a much higher rate. This may be the result of folding educational debt into non-educational loans when entering into private practice; however, the extent of this is unknown. Again, MSW graduates show the lowest rate of debt elimination over 8 years.

Debt increases are a phenomenon newly observed in these analyses. While the number of graduates with increased debt is low in any program, overall they represent a nontrivial number of individuals. Specific programs, including JD and MSW, should consider following up with graduates to investigate further.

An update to the Affordability Estimator provides insight into repayment delays and includes MSW and nursing programs, along with updated wage data and cost of living estimates. Case studies continue to support the geographically idiosyncratic nature of affordability. We recommend that the Affordability Estimator should be used to identify affordability “hotspots.”

A review of sources of wage data suggests that further engagement with the Maryland Longitudinal Data System should prove highly productive, with a fairly small set of hurdles to meet to access these data. These fairly small administrative burdens should be borne by the schools. Most important is that these data are effectively cost-free and have good coverage for most programs. We strongly recommend that UMB engage with MLDS in the future. If UMB seeks information on actual occupational fields of graduates, we recommend working with Emsi.

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

While the nature of affordability varies somewhat depending on one's perspective of affordability, this variability is also a feature of UMB's peer schools. Across most measures, however, UMB programs are at least as, and often more affordable than its counterparts. This information should be used to continue to attract talented students. The College Scorecard data set is a new and untapped resource that should continue to improve in quality.

Given the constraints posed by publicly available data sets, it is clear that fully addressing affordability across all programs will require infrastructural input from UMB. Specifically, longitudinal panels or similar survey-based mechanisms will be needed to obtain data across all programs.

In summary, while some situations exist where affordability (in its many senses) could be improved, the bulk of programs can be considered affordable from at least some perspectives. Nevertheless, as educational costs continue to rise, awareness of maintaining an affordable educational experience needs to be maintained and improved wherever feasible. The data and analyses provided in this study are a strong step toward establishing and achieving these goals.

Background and technical information

Affordability baseline

While the Lumina Foundation correctly note that unmet need and Expected Family Contribution are limited in their utility to estimate or parameterize affordability, their work is focused in scope to the cost of education. As their work implicitly recognizes, however, the fundamental driver of affordability is student debt.

We can decompose affordability into two basic equations.
The affordability condition exists where

$$1) \text{ Cost of Education} \leq ([10\% \text{ of discretionary income}] \times [10 \text{ years}]) + [10 \text{ hours/week in-school employment}]$$

As shown in the IHEP study, this condition does not hold for the vast majority of college attendees. The difference, then, is accounted for by loans, which means that students graduate with debt. This debt can be defined as

$$2) \text{ Student Debt} = [\text{Cost of education}] - [\text{financial aid}] - [\text{Monetary contributions from work/family}].$$

Knowing accurately at the student level how much debt a graduate has when they begin their career allows us to estimate how they might repay their debt. But we also need to understand how the debt is repaid, and what correlates exist with debt accrual and repayment. Therefore, we use in a three-pronged approach. First, we visually and statistically analyze actual total debt at graduation to understand

- What are debt levels at graduation across programs?
- What student characteristics correspond to debt level?
- How many students graduate without debt, and what features do these graduates exhibit?

Second, we leverage the National Student Loan Data System to capture current debt among a representative subsample of graduates. This provided a cross section of graduates from across programs over a range of time since graduation. We used these data to ask

- What is the typical time to repayment, and how does it vary?
- What is the typical rate of repayment, and does this vary across programs and over time?
- Are rates of repayment constant in terms of amount repaid and proportion of debt repaid?

Third, we used the insights gained from these exercises to develop an Affordability Estimator, incorporating student debt and demographic characteristics with official state and federal wage data to understand under what conditions a degree would be considered affordable. The tool is a robust and flexible, and helps to answer for whom and where a degree is affordable.

To build the Affordability Estimator, we combined national and state-level Occupational Employment Statistics (OES) data from the Bureau of Labor Statistics. We first summarized the debt detail data from UMB up to median debt levels by HEGIS code. We next used the NCES HEGIS to CIP Code crosswalk data tables to convert the median HEGIS debt to a median CIP debt.

The national data set was obtained from <https://www.bls.gov/oes/tables.htm> for each year from 2012 to 2016. The OES survey is conducted semiannually, and covers ~200,000 establishments per six-month panel; over the course of a three-year cycle, 1.2 million establishments are surveyed. The OES survey covers all full-time and part-time wage and salary workers in nonfarm industries. Missing from the survey are self-employed, owners and partners in unincorporated firms, household workers, or unpaid family workers. This gap in coverage underlies much of the data shortfalls in the Affordability Estimator.

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

BLS data sets are published resolved to standard occupation code (SOC). Before we could blend our CIP median debt data, we needed an additional cross walk. We leveraged a BLS crosswalk table that mapped individual CIP codes to all potential SOC. This resulted in one row per HEGIS/CIP Code per potential career path.

Our debt repayment models and anecdotal evidence have suggested that debt will be repaid within 20 years. In order to project potential repayment scenarios based on present median debt levels, we projected current wage statistics out 20 years. On average, in recent years, national wages have increased 3% annually. We used this figure as a starting point for our first round of wage projections on both the state and national wage data. For future iterations of this analysis, a more nuanced approach that more accurately fits future wage trends will be used.

The final caveat to the wage data was the presence of gaps in some SOC codes and percentiles at the state level. In order to fill these gaps, we used the following logic:

- 1) Wage statistic used if present.
- 2) If the wage statistic is missing, average the statistic across all WIA regions for the focal year x SOC code combination.
- 3) If the wage statistic is still missing, average the statistic across all SOC codes for the focal WIA x Year x HEGIS x CIP combination.
- 4) If the wage statistic is still missing, average the statistic across all SOC codes and WIA for the focal year x HEGIS x CIP combination.

At the end of the above process, all possible combinations of WIA x SOC x percentiles are populated and allow for a more detailed geographic analysis.

The state level data were provided by the Maryland Office of Workforce Information and Performance within the Maryland Department of Labor, Licensing, and Regulation; which develops, in partnership with the U. S. Bureau of Labor Statistics, the Maryland Occupational Employment Statistics (OES), and the Quarterly Census of Employment and Wages (QCEW). Data are provided as three-year rolling averages, and cover the same occupational classification system (SOC) as does the national OES surveys. For these surveys, some data are likewise not reported if certain criteria are not met, e.g. some categories are aggregated, and some data may not meet publication standards. We procured annualized data converting the period 2014-2016. Again, these gaps serve as an area of potential improvement in data quality. Maryland data are aggregated to the level of Workforce Investment Areas, which comprise county or multi-county areas that are economically similar. The WIAs include

- Anne Arundel Workforce Region
- Baltimore City Workforce Region
- Baltimore County Workforce Region
- Frederick County Workforce Region
- Lower Shore Workforce Region (Somerset, Wicomico, & Worcester counties)
- Mid-Maryland Workforce Region (Carroll and Howard counties)
- Montgomery County Workforce Region
- Prince George's County Workforce Region
- Southern Maryland Workforce Region (Calvert, Charles, & St. Mary's counties)
- Susquehanna Workforce Region (Cecil and Harford counties)
- Upper Shore Workforce Region (Caroline, Dorchester, Kent, Queen Anne's, & Talbot counties)
- Western Maryland Workforce Region (Allegany, Garrett & Washington counties)

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.

References cited

ⁱ University of Maryland, Baltimore; Self-Study Report: A Comprehensive Self-Study With Special Emphasis; <http://www.umaryland.edu/middlestates/2016-self-study/>, retrieved August 1, 2019

ⁱⁱ University of Maryland, Baltimore; FY FY2017-2021 Strategic Plan Progress Report as of June 30, 2018; <https://www.umaryland.edu/media/umb/cpa/annual-reports/20190603-UMB-Strategic-Plan-Update.pdf>, retrieved August 1, 2019

ⁱⁱⁱ Ibid.

^{iv} Baum, S. & Ma, J., 2014, College affordability: What is it and how can we measure it? Lumina Foundation. Retrieved from http://www.luminafoundation.org/files/publications/ideas_summit/College_Affordability-What_Is_It_and_How_Can_We_Measure_It.pdf, retrieved June 1, 2017.

^v Lumina Foundation, 2015. A benchmark for making college affordable: The rule of 10. <http://www.luminafoundation.org/files/resources/affordability-benchmark-1.pdf>, retrieved June 1, 2017

^{vi} Policies and Procedures for External Researcher and Grant Funded Projects, <https://mldscenter.maryland.gov/egov/publications/ExternalResearch/MLDSCPoliciesandProceduresforExternalResearcherandGrantFundedProjects.pdf>, as referenced in the MLDS 2018 Annual Report, https://mldscenter.maryland.gov/egov/publications/CenterReports/AnnualReports/MLDSC_Annual_Reports_2018.pdf, retrieved August 15, 2019.

Contains confidential and proprietary information of HelioCampus. Use of these materials is limited to HelioCampus licensees, and is subject to the terms and conditions of one or more written license agreements between HelioCampus and the licensee in question.